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सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



RRB ALP 2025 CBT 2

Assistant Loco Pilot · CEN 01/2025 · CBT 2 · Part B of every trade · Question Paper

English

All 30 Shifts (Sets) · Official Answer Key

About this Compilation

This booklet contains all **30 shift papers** of the **RRB ALP 2025 CBT 2 Part B (all trades)** examination in **English**, with the correct option marked as per the official answer key.

✓ Correct option (highlighted green)

193 of these 2250 questions are shown in Bengali / Hindi. Our saved English papers do not carry them in English, so the official Bengali / Hindi version of the same question is printed instead and marked with a **BENGALI / HINDI** chip. Nothing here is machine translated.

How to use

- Use the **Index** page to jump directly to any set (clickable).
- Questions appear section by section in the order of the paper, numbered 1 onward.
- Diagram and wide-table questions appear at full width at the end of their section.
- The correct answer is highlighted in green with a tick.

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Part B

75 Questions • Answer Key

Q1 Part B

Which of the following best describes the function of an intermediate switch in a staircase lighting circuit?

- A. Controls two separate lights from one point
- B. Allows light control from three or more locations ✓
- C. Permits light control from only one location
- D. Used only for temporary bell circuits

Q2 Part B

Why are circuit breakers used at both the sending and receiving ends of a transmission line?

- A. To increase the power factor of the line
- B. To balance the electrical load evenly
- C. To measure line current accurately
- D. To isolate faulty sections during emergencies ✓

Q3 Part B

An industrial plant wants to replace its current lighting system to reduce energy costs while maintaining the same light output. Which factor should be prioritized when selecting new lamps for maximum efficiency and cost-effectiveness?

- A. Choosing lamps that produce a cooler color temperature
- B. Selecting lamps with a higher lumens per watt rating ✓
- C. Choosing lamps with the same physical size
- D. Selecting lamps with a longer warm-up time

Q4 Part B

A technician in a workshop misreads the third band of a resistor as Orange instead of its actual color, Yellow. If the first two bands are Red and Violet, what is the calculation error caused by this mistake?

- A. The value is calculated as 2.7 kΩ instead of 27 kΩ
- B. The value is calculated as 270 Ω instead of 2.7 kΩ
- C. The value is calculated as 27 kΩ instead of 270 kΩ ✓
- D. The value is calculated as 270 kΩ instead of 2.7 MΩ

Q5 Part B

During maintenance of a high-voltage AC power substation feeder, which operating sequence ensures safe isolation of load current while using an isolator and a circuit breaker?

- A. Close the earthing switch before opening the energized feeder circuit
- B. Operate the isolator first, followed by opening of the circuit breaker
- C. Operate the isolator and circuit breaker under loaded conditions simultaneously
- D. Open the circuit breaker first, followed by operation of the isolator ✓

Q6 Part B

Which material can undergo large deformation and return to its original shape?

- A. Glass
- B. Rubber ✓
- C. Clay
- D. Chalk

Q7 Part B

A DC generator uses wave winding with 16 coils and 4 poles. What will be the number of parallel paths?

- A. There will be sixteen parallel paths equal to the number of coils.
- B. There will be two parallel paths regardless of coil and pole number. ✓
- C. There will be four parallel paths equal to the number of poles.
- D. The number of parallel paths depends on the number of turns in a coil.

Q8 Part B

When selecting insulated screwdrivers for use in electrical maintenance, which specification should be prioritized to ensure safe operation in high-voltage environments?

- A. The handle length appropriate for accessing electrical equipment safely.
- B. The maximum torque that can be applied without blade deformation.
- C. The tool's rated voltage insulation capacity. ✓
- D. The wear resistance of the screwdriver tip during repeated use.



Q9 Part B

Why is backup power supply important for the continuous functioning of a smart meter during outages?

- A. It provides electricity to the house during outage
- B. It reduces power consumption of appliances
- C. It ensures meter records and transmits data even without main power ✓
- D. It increases meter reading speed

Q10 Part B

Why must an underground cable be protected with bedding, armouring, and serving layers?

- A. To increase the electrical conductivity
- B. To improve the insulation of the cable
- C. To improve the mechanical protection of cable ✓
- D. To reduce the conductor area and thus resistance

Q11 Part B

In the context of DC machines, why is the commutator essential for proper functioning?

- A. It reverses current direction in the coil. ✓
- B. It supplies voltage to the field winding.
- C. It controls the speed of rotation.
- D. It increases field winding strength.

Q12 Part B

Which method evaluates compliance with IEE regulations for earthing systems in a newly installed industrial facility?

- A. Performing visual inspection of all earthing conductors
- B. Conducting an earth loop impedance test and verifying earth electrode resistance ✓
- C. Checking wire color codes and connection labels
- D. Reviewing installation records and certification documents

Q13 Part B

What is the main function of a penstock in hydel power generation?

- A. To store water for later use
- B. To regulate the voltage produced by the generator
- C. To carry water to the turbines through open or closed conduits ✓
- D. To store electrical energy generated by the turbine

Q14 Part B

During charging using the constant potential method, what happens to the charging current as the battery approaches full charge?

- A. The charging current decreases gradually ✓
- B. The charging current increases steadily
- C. The charging current fluctuates randomly
- D. The charging current stays constant

Q15 Part B

In a double layer winding, an AC machine has 54 slots and 6 poles. Find the pole pitch in terms of slots.

- A. 9 slots ✓
- B. 8 slots
- C. 6 slots
- D. 7 slots

Q16 Part B

A silicon crystal is doped with phosphorus impurity. After doping, which of the following statement correctly describes the charge carriers?

- A. Phosphorus contributes one hole per atom to the crystal
- B. Both electrons and holes exist in equal numbers
- C. Electrons are majority carriers and holes are minority carriers ✓
- D. Holes are majority carriers and electrons are minority carriers

Q17 Part B

Which statement best describes the significance of derating factors when calculating current ratings for cables installed in conduits?

- A. Derating factors are used for cable length calculation only
- B. Derating factors increase cable current ratings for safety
- C. Derating factors only depend on cable colour
- D. Derating factors adjust current ratings due to installation conditions ✓



Q18 Part B

Why is preventive maintenance carried out on AC motors in industrial applications?

- A. To reduce bearing wear losses
- B. To change winding polarity
- C. To avoid unexpected motor failure ✓
- D. To reduce initial set up cost

Q19 Part B

Which component is essential for converting electrical energy into heat in an electric iron?

- A. Heating element ✓
- B. Plug
- C. Thermostat
- D. Outer casing

Q20 Part B

What is the name of the side opposite to the 90° angle in a right-angled triangle?

- A. Perpendicular
- B. Hypotenuse ✓
- C. Adjacent side
- D. Base

Q21 Part B

A 6-pole alternator generates 50 Hz frequency. Its rotor speed is:

- A. 1000 RPM ✓
- B. 1500 RPM
- C. 500 RPM
- D. 750 RPM

Q22 Part B

Which type of instrument is NOT used for measuring alternating current in a circuit?

- A. Moving coil instrument ✓
- B. Hot wire instrument
- C. Moving iron instrument
- D. Electrostatic instrument

Q23 Part B

The external characteristic of a DC generator shows relation between _____.

- A. EMF and speed
- B. Terminal voltage and load current ✓
- C. Torque and speed
- D. Flux and current

Q24 Part B

A voltage stabilizer disconnects the output circuit when the input voltage becomes:

- A. Normal only
- B. Slightly fluctuating only
- C. Very low or very high ✓
- D. Exactly equal to rated voltage

Q25 Part B

Why is cutting fluid used during metal drilling operations?

- A. To cool and lubricate the cutting area ✓
- B. To hold the workpiece in position
- C. To sharpen the tip of the drill bit
- D. To provide power to the machine spindle

Q26 Part B

In a DC machine, which quantity is directly proportional to the torque produced for a given armature current?

- A. The frequency
- B. The voltage
- C. The resistance
- D. The magnetic flux ✓

Q27 Part B

Which type of cell can be recharged by sending an electric current in the reverse direction compared to discharge mode?

- A. Secondary cell ✓
- B. Fuel cell
- C. Primary cell
- D. Dry cell



Q28 Part B

Calculate the diversity factor for a distribution network having 3 loads with 350 kW, 100 kW and 250 kW as their maximum demands. The maximum simultaneous demand for the network is recorded as 400 kW.

A. 1.20

B. 1.75 ✓

C. 1.43

D. 1.00

Q29 Part B

Which procedure should be followed to safely resume operations after a power failure in an industrial environment?

A. Wait for a fixed period and resume operations using normal procedures

B. Turn on all machines immediately after power returns

C. Check electrical wiring and restore production after maintenance approval

D. Inspect all machines for safe status before restarting operations ✓

Q30 Part B

What is the function of a single-phase transformer?

A. To store electrical energy

B. To change the output power level

C. To change the level of AC voltage ✓

D. To convert AC into DC

Q31 Part B

In a universal motor, field winding and armature are connected in:

A. Star Arrangement

B. Parallel Arrangement

C. Series Arrangement ✓

D. Delta Arrangement

Q32 Part B

Which of the following is a disadvantage associated with incandescent lamps used in illumination?

A. Cool operation compared to other lamp types

B. High energy consumption compared to other lamp types ✓

C. Long lifespan compared to other lamp types

D. Low replacement frequency compared to other lamp types

Q33 Part B

A technician tests a PN junction diode with an ohmmeter. The meter shows a very low resistance in both the forward and reverse directions. What does this indicate?

A. The diode is open circuited

B. The diode is functioning properly

C. The diode has high forward resistance

D. The diode is short circuited ✓

Q34 Part B

When operating a portable fire extinguisher in an industrial setting, what is the correct sequence of actions to effectively control a small electrical fire?

A. Pull the pin, aim at the base, squeeze the handle, sweep side to side ✓

B. Squeeze the handle, sweep at the top, pull the pin, aim upward

C. Aim at the flames, squeeze the handle, pull the pin, sweep randomly

D. Sweep at the flames, pull the pin, squeeze the handle, aim at the smoke

Q35 Part B

Which term describes the total magnetic field lines passing through a specific cross-sectional area in a magnetic circuit?

A. Magnetic reluctance

B. Magnetic flux ✓

C. Magnetomotive force

D. Magnetic field strength

Q36 Part B

Which practice helps produce a strong soldered joint in electrical wiring?

A. Applying solder directly to a cold joint

B. Moving the joint while the solder cools

C. Using excess solder to cover an unclean surface

D. Heating both the wire and terminal before applying solder ✓



Q37 Part B

When extending the voltage range of a moving coil voltmeter, which component is essential and how should it be connected?

- A. A variable resistor connected across the supply
- B. A high-value resistor connected in series with the meter ✓
- C. A low-value resistor connected in parallel with the meter
- D. A fuse connected in parallel with the meter

Q38 Part B

What is the safety guideline for using a high rate discharge tester on a battery?

- A. It can be used on charged batteries for any amount of time.
- B. It can be used on any battery for any duration.
- C. It should be used only on charged batteries and for less than ten seconds. ✓
- D. It should be used only on discharged batteries for short time.

Q39 Part B

In a detailed engineering drawing of electrical components for a control panel, which symbol would correctly represent a single pole single throw (SPST) switch, considering the need for clarity in circuit tracing?

- A. A push-button contact that automatically returns to its original position after release
- B. A pair of parallel contacts enclosed within a coil-operated switching device
- C. A rectangle with a diagonal line from corner to corner
- D. Two terminal dots connected by a movable contact that can open or close a single circuit path ✓

Q40 Part B

When interpreting an electrical circuit diagram, what does the symbol of a series of alternating long and short parallel lines typically represent?

- A. A lamp
- B. A capacitor
- C. A switch
- D. A battery ✓

Q41 Part B

Which of the following describes the function of an Earth Leakage Circuit Breaker (ELCB) in an electrical earthing system?

- A. It acts as a fuse during overcurrent conditions only.
- B. It monitors the voltage difference between neutral and earth.
- C. It disconnects the circuit when leakage current to earth exceeds a safe limit. ✓
- D. It limits the voltage supplied to electrical equipment.

Q42 Part B

In industrial power and control circuits, what is the function of a Normally Open (NO) push button during normal operating conditions?

- A. To complete the control circuit only during button actuation ✓
- B. To provide automatic overload protection during fault conditions
- C. To interrupt the control circuit only during button actuation
- D. To maintain continuous current flow without operator actuation

Q43 Part B

In a Zener diode voltage regulator circuit, the Zener diode operates in:

- A. Active region
- B. Reverse breakdown region ✓
- C. Forward bias region
- D. Zero bias

Q44 Part B

An electrician has to make a joint in an overhead bare conductor. The joint must not open under conductor tension. Which jointing method is most suitable?

- A. Simple twist joint with insulation tape
- B. Rat-tail joint covered with PVC sleeve
- C. Britannia joint with proper binding and soldering ✓
- D. Soldered lap joint without binding wire



Q45 Part B

A wooden plank 6 m long is cut into equal pieces of length $\frac{3}{4}$ m each. Find the number of complete pieces obtained.

- A. 7
- B. 8
- C. 6
- D. 9

Q46 Part B

A trainee measures the time period of an AC waveform on an oscilloscope as 2 ms. What is the frequency of the waveform?

- A. 500 Hz
- B. 50 Hz
- C. 1000 Hz
- D. 100 Hz

Q47 Part B

If a student is asked to represent a cylindrical object using free hand geometrical drawing, which combination of techniques will yield the most realistic result?

- A. Outline two parallel lines joined by smooth ellipses at both ends
- B. Combine rectangles and triangles for the main body
- C. Use several curved lines in various directions
- D. Draw two circles joined by straight lines for the sides

Q48 Part B

Which theorem is used along with trigonometry for solving right-angled triangle problems?

- A. Bernoulli theorem
- B. Pythagoras theorem
- C. Pascal's theorem
- D. Archimedes principle

Q49 Part B

Which among the following components ensures that the Uninterruptible Power Supply (UPS) can supply power to the equipment when the main supply fails?

- A. Battery
- B. Transformer
- C. Rectifier
- D. Inverter

Q50 Part B

In a three-phase alternator, the armature winding is placed on the:

- A. Stator
- B. Bearing
- C. Rotor
- D. Shaft

Q51 Part B

Which of the following electronic components is classified as a passive component?

- A. Diode
- B. Resistor
- C. Transistor
- D. Op-amp

Q52 Part B

In a distributed stator winding of an AC machine, what is the effect of increasing the number of slots per pole per phase on the generated emf waveform?

- A. emf waveform lags the current by 90 degrees
- B. emf waveform lags the torque
- C. emf magnitude increases
- D. emf waveform quality improves

Q53 Part B

What is the cause of circulating current flow in DC series generators, during parallel operation?

- A. Difference in generated EMF
- B. Difference in resistance
- C. Difference in load type
- D. Difference in speed

Q54 Part B

Which approach is most effective when representing the size of a cylindrical feature in a dimensioned sketch for manufacturing?

- A. Omitting the size and relying on scale measurements
- B. Marking the length without specifying diameter
- C. Indicating only the radius in the sketch
- D. Indicating the diameter with a leader line and symbol



Q55 Part B

A shop has a lighting load of 600W and a power socket load of 800W. If the diversity factor is 1.25, what is the maximum demand?

- A. 1020 W
- B. 1250 W
- C. 1400 W
- D. 1120 W

**Q56 Part B**

Identify which relay type is used to provide backup protection when the primary distance relay fails in a transmission system.

- A. Overcurrent relay
- B. Thermal relay
- C. Impedance relay
- D. Pilot relay

**Q57 Part B**

In a Variable Frequency Drive controlled induction motor, why is it essential to maintain a constant volts-to-hertz (V/Hz) ratio throughout the speed control range?

- A. To reduce supply frequency to zero
- B. To maintain constant magnetic flux
- C. To increase rotor resistance continuously
- D. To improve bearing lubrication condition

**Q58 Part B**

How does the capacitive reactance of a capacitor change if the frequency of the AC supply connected to it is doubled?

- A. It increases to four times its original value
- B. It decreases to half of its original value
- C. It increases to double its original value
- D. It remains completely unchanged

**Q59 Part B**

If an overhead pole is leaning just after installation, what should be checked first?

- A. Type of pole material used
- B. Color of the installed pole
- C. Weather conditions during installation
- D. Stability and compaction of the surrounding soil

**Q60 Part B**

Why is the Buchholz relay regarded as a sensitive protective device in oil-immersed transformers?

- A. It increases transformer efficiency automatically
- B. It responds to small internal faults at an early stage
- C. It controls transformer voltage ratio
- D. It prevents magnetic saturation

**Q61 Part B**

External resistance is connected to the rotor circuit of a 3-Phase slip ring induction motor to:

- A. Stop magnetic rotation
- B. Reduce supply voltage
- C. Increase starting torque
- D. Increase core losses

**Q62 Part B**

Which primary function do cable thimbles used in electrical panel wiring serve during terminal connection?

- A. They provide mechanical mounting support for terminal blocks
- B. They increase the continuous current carrying capability of conductors
- C. They prevent stranded conductor wires from fraying at terminal ends
- D. They regulate the operating voltage level of electrical circuits

**Q63 Part B**

Which characteristic makes the separately excited DC generator different from the self-excited DC generator?

- A. The method of field excitation
- B. The armature winding resistance
- C. The number of poles
- D. The speed of rotation

**Q64 Part B**

Which factors will be affected by changing field excitation of alternators operating in parallel?

- A. Power factor and reactive power output
- B. Rotor speed and generated frequency
- C. Armature resistance and copper losses
- D. Mechanical torque and shaft rotation



Q65 Part B

In an industrial facility, a sudden power failure occurs while critical machinery is operating. Which is the most effective first response to ensure worker safety and minimize equipment damage?

- A. Restart affected machinery quickly once electrical power becomes available
- B. Wait for power restoration and monitor equipment conditions from a distance
- C. Initiate emergency shutdown procedures according to the facility protocol ✓
- D. Evacuate the building immediately, ignoring shutdown protocols

Q66 Part B

What is the purpose of using a Variable Frequency Drive (VFD) in AC motor applications?

- A. Prevent motor overheating at low speeds.
- B. Eliminate harmonic distortion
- C. Provide high starting current
- D. Control AC motor speed ✓

Q67 Part B

To minimize the loading effect, which of the following voltmeters is used to measure the voltage across a resistor in a high-impedance circuit?

- A. A voltmeter with internal resistance equal to the resistor
- B. A voltmeter with very low internal resistance compared to the resistor
- C. A voltmeter with internal resistance slightly lower than the resistor
- D. A voltmeter with internal resistance much higher than the resistor being measured ✓

Q68 Part B

Which component is bypassed when an EV is charged using a supercharger?

- A. On-board rectifier ✓
- B. Alternator
- C. Transformer
- D. Inverter

Q69 Part B

Which condition is necessary for satisfactory load sharing in parallel transformers?

- A. Equal active power rating
- B. Equal tank size only
- C. Equal resistance to Impedance ratio
- D. Equal impedance percentage ✓

Q70 Part B

Which design characteristic in impulse turbines ensures that the pressure remains constant as steam passes over the moving blades?

- A. All expansion occurs in stationary nozzles ✓
- B. Expansion is divided between nozzles and blades
- C. Expansion occurs in moving blades
- D. Variable pressure over moving blades

Q71 Part B

While testing a logic gate IC on a workshop breadboard, a trainee observes that the output becomes HIGH when any input is switched to logic HIGH. Which logic gate is being verified?

- A. NAND gate
- B. AND gate
- C. OR gate ✓
- D. NOT gate

Q72 Part B

A laboratory needs to install a single-phase socket for a 2000 W heater. If the supply voltage is 250 V, which wire size should be chosen if 1.5 sq. mm wire is rated at 10 A and 2.5 sq. mm at 15 A?

- A. 1 sq. mm wire is sufficient for this load
- B. 2.5 sq. mm wire is required for this load
- C. 4 sq. mm wire is required for this load
- D. 1.5 sq. mm wire is sufficient for this load ✓



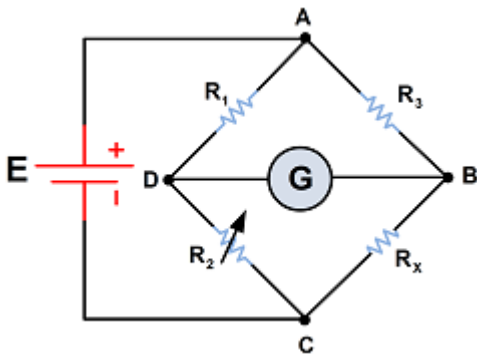
Q73 Part B

Which characteristic distinguishes electrical isolators from circuit breakers in high-voltage switchgear systems?

- A. Isolators lack arc-quenching mechanisms required for on-load current interruption ☒
- B. Isolators are designed to automatically reclose after protective tripping operation
- C. Isolators provide automatic voltage magnitude regulation during operation
- D. Isolators can automatically detect electrical fault currents in the system

Q74 Part B

A standard Wheatstone bridge is set up with $R_1 = 100\ \Omega$, $R_2 = 200\ \Omega$, and $R_3 = 150\ \Omega$. What should R_x be for the bridge to balance?



- A. $150\ \Omega$
- B. $100\ \Omega$
- C. $300\ \Omega$ ☒
- D. $200\ \Omega$

Q75 Part B

A three-phase load is supplied at a line voltage of 415 V and a line current of $\frac{20}{\sqrt{3}}\text{ A}$ at a power factor of 0.9. What is the real power delivered?

- A. 10,390 W
- B. 12,940 W
- C. 8,100 W
- D. 7,470 W ☒



Part B

75 Questions · Answer Key

Q1 Part B

A technician needs to estimate the total current load of a workshop circuit. The circuit has five 1.5 kW machines, each operating at 230 V. What is the approximate total current drawn by the circuit?

- A. 7.5 A
- B. 65.2 A
- C. 32.6 A
- D. 15.2 A



Q2 Part B

A DC shunt generator is running at a constant speed and field excitation. If the load increases causing armature current to rise, what will be the effect on the generated voltage with reason?

- A. The generated voltage remains unchanged due to constant speed.
- B. The generated voltage decreases due to increased armature reaction.
- C. The generated voltage increases due to load demand.
- D. The generated voltage increases due to improved commutation.



Q3 Part B

Which factor affects the level of illumination received on a working surface in an electrical installation?

- A. Quality of the electrical wiring used
- B. Distance between the light source and the surface
- C. Shape of the room where light is installed
- D. Color of the wall paint in the room



Q4 Part B

An alternator has 500 turns per phase and flux per pole of 0.02 Weber at 50 Hz. The generated EMF per phase is:

- A. 2220 V
- B. 1110 V
- C. 4440 V
- D. 3330 V



Q5 Part B

A factory is planning to upgrade its lighting system. The management wants improved energy efficiency, longer service life, and reduced maintenance costs. Based on these needs, which lamp type should they select for optimal overall benefits?

- A. Incandescent lamp
- B. LED lamp
- C. Fluorescent lamp
- D. Halogen lamp



Q6 Part B

A technician is setting up electrical equipment in a workshop with high humidity and metallic flooring. Which earthing practice is critical to ensure both equipment safety and human protection in this scenario?

- A. Connecting all equipment to the neutral wire only
- B. Placing all equipment on wooden platforms
- C. Using only the building's metal structure as earth
- D. Installing a dedicated earth electrode for each major equipment



Q7 Part B

In a workshop, a student observes that metals conduct electricity easily. Which atomic property is responsible for this behavior?

- A. Protons in the nucleus
- B. Free electrons in the outermost shell
- C. Electrons in the innermost shell
- D. Neutrons in the nucleus



Q8 Part B

Which feature is used in energy meters to detect and alert about the unauthorized opening of the meter cover?

- A. Tamper detection switch
- B. Extra fuse
- C. Reinforced lock
- D. Integrated relay



Q9 Part B

Which feature of an ammeter is required to reduce voltage drop across it during measurement of circuit current?

- A. Low resistance coil ✓
- B. High rated current
- C. Large physical size
- D. High resistance coil

Q10 Part B

In an EV charging system, what type of current is supplied to the battery after passing through the rectifier?

- A. High-Frequency Current
- B. Pulsating Current
- C. Alternating Current (AC)
- D. Direct Current (DC) ✓

Q11 Part B

Which terminal of a Silicon Controlled Rectifier (SCR) must receive a positive pulse to switch it from the forward blocking state to conduction when controlling a DC load?

- A. Anode
- B. Base
- C. Gate ✓
- D. Cathode

Q12 Part B

What is a key benefit of implementing BIS standards for industrial occupational health in terms of employee training and hazard awareness?

- A. It increases the number of safety training sessions
- B. It ensures employees receive uniform safety training modules ✓
- C. It reduces equipment maintenance requirements
- D. It assigns training based on employee working hours

Q13 Part B

Which of the following is the application of primary cells?

- A. Large power transformers
- B. Heavy industrial motors
- C. Electronic products ✓
- D. Electric power transmission

Q14 Part B

Which feature makes a dry cell suitable for portable electronic devices?

- A. It requires special mounting brackets
- B. It can operate in any position without leaking electrolyte ✓
- C. It must be kept upright to function
- D. It is less portable than other types

Q15 Part B

Which is the correct sequence of functional blocks in the block diagram of the working of a basic Uninterruptible Power Supply (UPS) system?

- A. Battery, Inverter, Rectifier, Load, AC supply
- B. AC supply, Rectifier, Battery, Inverter, Load ✓
- C. Load, Battery, Inverter, AC supply, Rectifier
- D. Rectifier, Load, Inverter, Battery, AC supply

Q16 Part B

Which method is most effective for identifying chemical hazards in a manufacturing unit during a routine workplace safety inspection?

- A. Monitoring workplace noise levels and PPE compliance
- B. Examining chemical labels and Safety Data Sheets (SDS) ✓
- C. Inspecting machine guards and emergency stops
- D. Reviewing housekeeping practices in the work area

Q17 Part B

An on-delay timer relay is set to 10 seconds. Its normally open (NO) timed contact controls a load. If the timer coil is energized continuously, what will happen?

- A. The normally open contact will close after 10 seconds and energize the load. ✓
- B. The normally open contact will close immediately and energize the load.
- C. The normally open contact will close after 20 seconds and energize the load.
- D. The normally open contact will remain open indefinitely and prevent load energization.



Q18 Part B

Which material is most commonly used for manufacturing DIN rails used in industrial power distribution and control panel assemblies?

- A. Cold-rolled carbon steel with zinc surface plating** ✓
- B. Copper with electrolytic finishing for enclosure mounting systems
- C. Stainless steel with corrosion-resistant treatment for universal applications
- D. Aluminum with anodized coating for standard DIN rail fabrication

Q19 Part B

A transformer has no-load secondary voltage of 220 V and full-load secondary voltage of 200 V. Find the percentage voltage regulation.

- A. 12%
- B. 5%
- C. 10%** ✓
- D. 8%

Q20 Part B

While testing a diode circuit, an ITI trainee connects the positive terminal of a DC power supply to the cathode and the negative terminal to the anode of the diode. Which bias condition is this?

- A. Zero bias
- B. Avalanche bias
- C. Reverse bias** ✓
- D. Forward bias

Q21 Part B

What is meant by an unbalanced load in a three-phase electrical system?

- A. Equal load currents in all three phases
- B. Identical resistive loads in all three phases
- C. Equal phase voltages with identical loads
- D. Unequal load currents in the three phases** ✓

Q22 Part B

How many P-N junctions are present in a standard bipolar junction transistor (BJT)?

- A. Exactly 1 P-N junction
- B. Exactly 4 P-N junctions
- C. Exactly 3 P-N junctions
- D. Exactly 2 P-N junctions** ✓

Q23 Part B

Assuming others parameter remains constant, if the frequency of supply voltage of a transformer increases, the induced EMF will:

- A. Become zero
- B. Increase** ✓
- C. Decrease
- D. Remain unchanged

Q24 Part B

Which of the following must be (mandatorily) displayed at every substation, as per IE rules compliance?

- A. Fire extinguisher location on map
- B. Transformer voltage ratings
- C. Access pass list for staff
- D. Warning sign boards indicating danger** ✓

Q25 Part B

If two distribution feeders have the same maximum demand but different load factors, what does the difference in load factor indicate?

- A. The feeder with the lower load factor has higher maximum demand.
- B. The feeder with higher load factor has shorter periods of peak usage only.
- C. The feeder with higher load factor uses less energy overall.
- D. The feeder with the higher load factor has more consistent use of its maximum capacity.** ✓

Q26 Part B

Which of the following quantities is measured in kilograms?

- A. Mass** ✓
- B. Energy
- C. Pressure
- D. Force

Q27 Part B

Before connecting a three-phase motor, which instrument is used to check the order of the supply phases?

- A. Phase sequence meter** ✓
- B. Three-phase energy meter
- C. AC voltmeter
- D. Three-phase Wattmeter



Q28 Part B

In a tidal power generation system, what is the primary function of sluice gates during energy production?

- A. They prevent sediment from entering the power generation chamber.
- B. They increase the speed of water passing turbines for higher output.
- C. They store generated electricity during low tide for later use.
- D. They are responsible for the flow of water through the barrage. ✓

Q29 Part B

When analyzing an engineering drawing for a lighting circuit, how would you identify the symbol for an incandescent lamp among other common components?

- A. A square with an arrow through it
- B. A rectangle with two lines inside it
- C. A circle with a cross inside it ✓
- D. A triangle with a horizontal line below it

Q30 Part B

In a contactor-based motor control circuit, which component is responsible for interrupting the circuit during excessive current conditions?

- A. Thermal overload relay ✓
- B. Buchholz relay
- C. Rotor resistance unit
- D. Impedance relay

Q31 Part B

In an NPN transistor circuit, the collector current stops increasing even when the base current is increased further. In which region is the transistor operating?

- A. Reverse bias region
- B. Saturation region ✓
- C. Active region
- D. Cut-off region

Q32 Part B

Which of the following statements best describes the relationship between voltage and current in a purely resistive single-phase AC circuit?

- A. Current is in phase with voltage ✓
- B. Current is opposite in phase to voltage
- C. Current leads voltage by 90°
- D. Current lags voltage by 90°

Q33 Part B

Which factor must remain constant to ensure that generated voltage in a DC machine depends only on the speed?

- A. Load current
- B. Number of conductors
- C. Field flux ✓
- D. Armature resistance

Q34 Part B

A large electrical fire breaks out in an industrial workshop where energized machinery is running. As the supervisor, which is the safest and most effective way to extinguish the fire?

- A. Use a foam fire extinguisher directly on the energized equipment
- B. Use a water fire extinguisher to cool the machinery and suppress the flames
- C. Use a CO_2 extinguisher after isolating the electrical power supply ✓
- D. Use a dry powder extinguisher and leave the power supply on

Q35 Part B

Two transformer secondary voltages are 120 V and 80 V. If connected in series aiding, the total voltage is:

- A. 200 V ✓
- B. 40 V
- C. 120 V
- D. 80 V



Q36 Part B

Which formula is used to calculate the perimeter of a rectangle having length l and breadth b ?

- A. $l \times b$
- B. $l + b + h$
- C. πr^2
- D. $2(l + b)$ ✓

Q37 Part B

Which scenario would result in a lower diversity factor in a distribution network?

- A. Some consumers have peak load in the morning, others at night.
- B. Consumers have peak load at different times during the day.
- C. All consumers have peak loads at the same time. ✓
- D. Consumers have random, uncoordinated peak load times.

Q38 Part B

Which parameter of an induction motor remains almost constant from no-load to full-load operation?

- A. Rotor copper loss
- B. Motor operating speed ✓
- C. Starting current value
- D. Stator winding temperature

Q39 Part B

In a three-phase system with RYB phase sequence, phase Y reaches its maximum value:

- A. After phase B reaches its peak value
- B. After phase R reaches its peak value ✓
- C. Before phase R reaches its peak value
- D. Along with phase B peak value

Q40 Part B

What is the primary use of a hand file in metalworking operations?

- A. To cut wooden pieces for fitting work
- B. To smoothen and shape metal surfaces efficiently ✓
- C. To measure angles on sheet metal precisely
- D. To join two metal parts together

Q41 Part B

What is the function of an exciter in a wind power plant?

- A. To provide the necessary excitation to the coil to generate voltage ✓
- B. To convert mechanical energy to electrical energy directly
- C. To measure wind speed for power regulation
- D. To control the speed of the wind turbine rotor

Q42 Part B

What happens to the depletion region of a PN junction diode during forward bias?

- A. It narrows ✓
- B. It becomes open circuit
- C. It widens
- D. It remains unchanged

Q43 Part B

A 20 m workshop circuit carries a 16 A load, and minimizing voltage drop is the top priority. Which copper cable size is the best choice?

- A. 1.0 sq mm copper cable
- B. 4.0 sq mm copper cable ✓
- C. 2.5 sq mm copper cable
- D. 1.5 sq mm copper cable

Q44 Part B

If the mass of a body increases while its volume remains unchanged, what happens to its density?

- A. Becomes zero
- B. Increases ✓
- C. Remains same
- D. Decreases

Q45 Part B

Which statement about voltage in a delta-connected three-phase circuit is correct?

- A. Line voltage is less than phase voltage
- B. Line voltage is zero
- C. Line voltage is double the phase voltage
- D. Line voltage equals phase voltage ✓



Q46 Part B

Which process involves depositing a thin layer of one metal onto the surface of another metal using electrolysis?

- A. Electroplating ✓
- B. Annealing
- C. Tempering
- D. Galvanizing

Q47 Part B

A generating station has a total connected load of 9500 kW. If the demand factor is 0.65, what is the station's maximum demand?

- A. 6175 kW ✓
- B. 14615 kW
- C. 6500 kW
- D. 9500 kW

Q48 Part B

A factory manager is updating the workplace safety procedures and must select an appropriate safety standard to minimize electrical hazards. Which action best demonstrates effective application of the concept of standards in industrial occupational safety and health?

- A. Implementing recognized electrical safety guidelines issued by an accredited organization. ✓
- B. Selecting safety requirements according to commonly followed workplace practices.
- C. Developing separate safety rules independently for each production department.
- D. Relying on individual judgment when addressing electrical safety concerns.

Q49 Part B

What is self-induced electromagnetic force (emf) in an electrical circuit?

- A. An emf induced in the coil due to a battery connected to the coil
- B. An emf induced in the coil by some external circuit voltage
- C. An emf induced in one coil due to the current change of nearby coil
- D. An emf produced in a coil due to rate of change of current flowing through itself ✓

Q50 Part B

A worker completes one job in 5 hours. Estimate the total time required for the same worker to complete 8 similar jobs.

- A. 35 hours
- B. 30 hours
- C. 40 hours ✓
- D. 45 hours

Q51 Part B

In a distributed winding of AC machines, the coils are connected in _____.

- A. Random order only
- B. Dummy slots only
- C. Proper phase sequence ✓
- D. Reverse polarity only

Q52 Part B

If the direction of current in a DC motor armature is reversed while keeping the magnetic field unchanged, what happens to the rotation?

- A. The speed of rotation increases
- B. The direction of rotation remains the same
- C. The motor stops rotating
- D. The direction of rotation reverses ✓

Q53 Part B

In an AC variable frequency drive, the maximum frequency setting determines the:

- A. Maximum braking torque of the drive
- B. Highest attainable running speed of motor ✓
- C. Minimum output frequency supplied to drive
- D. Maximum permissible operating temperature

Q54 Part B

An industrial facility uses a three-phase system and plans to upgrade wiring. According to IE rules, what is the maximum allowable voltage drop from supply point to load?

- A. Voltage drop should not exceed 10 percent of the nominal voltage
- B. Voltage drop should not exceed 5 percent of the nominal voltage ✓
- C. Voltage drop should not exceed 2 percent of the nominal voltage
- D. Voltage drop should not exceed 20 volts from supply point to load



Q55 Part B

Which feature of a smart energy meter enables remote disconnection and reconnection of electrical service without physical site visit?

- A. Wireless communication module
- B. Integrated relay switch ✓
- C. Tamper detection circuit
- D. High speed data transfer

Q56 Part B

According to IEE regulations, what is the purpose of earthing an electrical installation?

- A. To increase the efficiency of the electrical circuit
- B. To ensure safety by preventing electric shocks ✓
- C. To improve voltage regulation in distribution lines
- D. To limit electromagnetic interference in circuits

Q57 Part B

If the load on a DC motor suddenly increases, what initially happens to the back emf?

- A. Back emf reaches its maximum
- B. Back emf decreases temporarily ✓
- C. Back emf remains unchanged
- D. Back emf increases immediately

Q58 Part B

Which characteristic of DC drive systems makes them suitable for elevator and lift control applications?

- A. Less maintenance
- B. Low operational cost
- C. Precise speed control ✓
- D. Light weight construction

Q59 Part B

What causes excessive brush sparking during single-phase AC operation of a universal motor affecting the commutation process?

- A. Mechanical vibration and bearing friction effects only
- B. Low magnetic flux and reduced field strength
- C. Armature reaction and inductive reactance effects ✓
- D. High insulation resistance and winding leakage only

Q60 Part B

In an NPN transistor switch, the load and external wiring are verified as normal. The base drive is present, but the load remains OFF and the collector-emitter voltage V_{CE} remains nearly equal to the supply voltage V_{CC} . What is the most likely transistor fault?

- A. The load has become short-circuited
- B. The transistor is operating in saturation region
- C. The collector-emitter path has failed short-circuit
- D. The collector-emitter path has failed open-circuit ✓

Q61 Part B

When installing a grommet in a sheet metal panel for control wiring, which installation requirement ensures protection of conductor insulation from mechanical abrasion at the panel opening?

- A. The grommet must remain loosely fitted to permit unrestricted movement inside the panel opening
- B. The grommet must be mechanically tightened using threaded fastening tools at the panel opening
- C. The grommet must be adhesively bonded to provide permanent fixation at the panel opening
- D. The grommet must fit snugly to completely cover the sharp metal edges of the panel opening ✓

Q62 Part B

A single insulator string must withstand a phase-to-earth voltage of 220 kV. Each disc insulator is rated for 11 kV. Considering a safety factor of 2, what is the minimum number of discs required?

- A. 30 discs
- B. 25 discs
- C. 20 discs
- D. 40 discs ✓

Q63 Part B

Which type of alternator is best suited for high-speed operation due to its mechanically strong rotor construction?

- A. Split phase alternator
- B. Salient pole alternator
- C. Repulsion type alternator
- D. Cylindrical rotor alternator ✓



Q64 Part B

Which type of switch is used to control a single-phase lighting circuit from only one location in residential electrical wiring systems?

- A. Double Pole Double Throw (DPDT) switch
- B. Single Pole Double Throw (SPDT) switch
- C. Single Pole Single Throw (SPST) switch ✓
- D. Double Pole Single Throw (DPST) switch

Q65 Part B

Which method is used to achieve damping in moving iron instruments?

- A. Spring friction damping is applied to the pointer
- B. Liquid damping is used with an oil-filled chamber
- C. Eddy current damping is achieved with a magnet
- D. Air friction damping is provided using an air chamber ✓

Q66 Part B

The V-curve of a synchronous machine shows the relation between:

- A. Power and efficiency
- B. Speed and torque
- C. Armature current and field current ✓
- D. Voltage and frequency

Q67 Part B

An industrial facility requires a wiring layout to minimize voltage drop over long distances. What should the electrician adjust in the layout?

- A. Select smaller gauge conductors
- B. Increase insulation thickness while keeping the same conductor size
- C. Use thinner conductors with longer cable routes
- D. Increase the conductor size and minimize cable length ✓

Q68 Part B

Which statement illustrates how the torque of a DC machine changes if the armature current is doubled while the flux per pole remains constant?

- A. The torque will become four times the flux.
- B. The torque will double. ✓
- C. The torque will remain unchanged.
- D. The torque will be half times flux.

Q69 Part B

A DIAC used in a triggering circuit starts conducting only after which condition is met?

- A. Supply frequency increases
- B. Forward resistance becomes infinite
- C. Holding current becomes zero
- D. Breakover voltage is reached ✓

Q70 Part B

When constructing a regular hexagon using only a compass and straightedge, which method ensures accurate equal sides and correct angles without measurement errors?

- A. Draw a circle and mark six random points on the circumference, then connect them sequentially in order.
- B. Draw a circle and divide it into six equal parts by estimating angles at the center of the circle.
- C. Draw a circle and connect alternate points without ensuring equal spacing around the circumference.
- D. Draw a circle and step off equal arcs using compass radius around the circumference, then join points in order. ✓

Q71 Part B

A student needs to transfer several equal measurements along a straight line on a drawing. Which method will help maintain consistency and accuracy throughout the process?

- A. Measure each interval with a scale and mark with a pencil
- B. Reset the divider for each interval before marking
- C. Draw multiple lines freehand at estimated equal distances
- D. Set the divider once and step it repeatedly along the line ✓

Q72 Part B

What is the purpose of using earth connection in domestic electrical appliances?

- A. To prevent wire overheating
- B. To improve voltage stability
- C. To provide a safe path for fault current ✓
- D. To increase appliance efficiency



Q73 Part B

An engineer is required to draw a small hole of 15 mm diameter accurately on a machine component drawing. Which instrument would provide the most precise result for this task?

- A. Pivot joint compass
- B. Spring bow compass ✓
- C. Protractor
- D. Set square

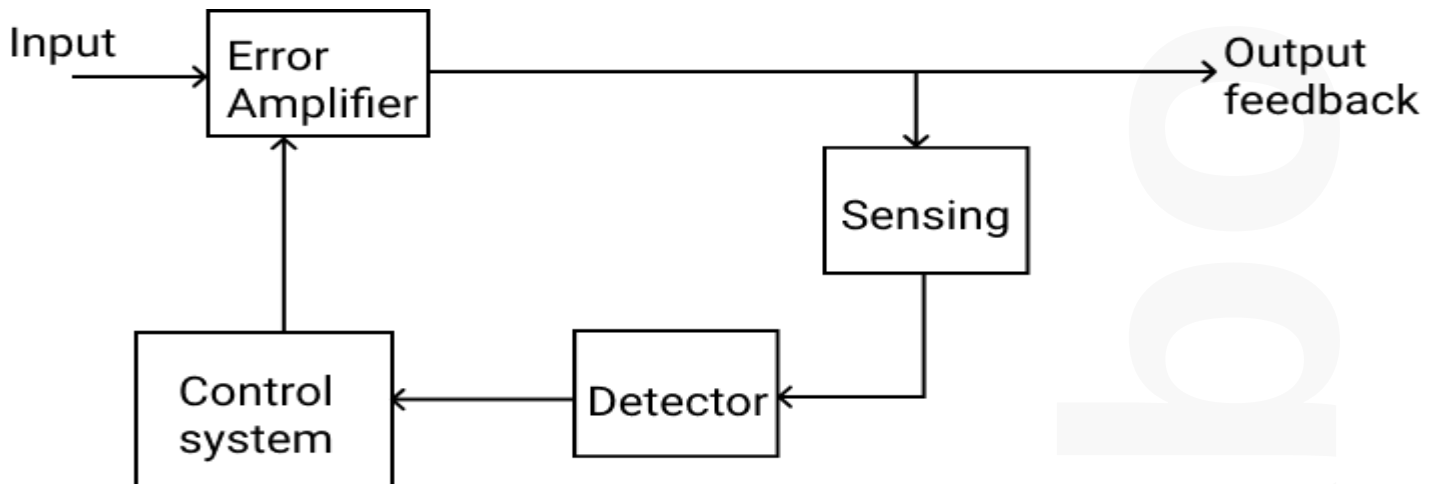
Q74 Part B

How is the efficiency of a DC generator determined?

- A. The total losses in the generator
- B. The ratio of output power to input power ✓
- C. The electrical losses only
- D. The speed of the generator's rotation

Q75 Part B

In the block diagram of a voltage stabilizer, which unit senses voltage variation?



- A. Control circuit unit
- B. Sensing unit ✓
- C. Detector unit
- D. Input unit



Part B

75 Questions · Answer Key

Q1 Part B

What is the primary purpose of carrying out routine maintenance on workshop equipment?

- A. To modify equipment design for new tasks
- B. To replace old machines with new equipment
- C. To increase production speed beyond design limits
- D. To ensure consistent performance and minimize downtime ✓

Q2 Part B

Which of the following is an example of a lever?

- A. A screw holding two boards together
- B. A hydraulic jack used for lifting heavy vehicles
- C. A pulley with a rope
- D. A crowbar used to lift a heavy object ✓

Q3 Part B

In a bolt drawing, which line type is typically used to show the hidden portion of the thread inside a drilled hole?

- A. Solid thick lines for visible outlines
- B. Chain lines indicating center paths
- C. Dashed lines representing hidden details ✓
- D. Wavy lines showing internal details

Q4 Part B

Which advantage of a D.C. welding generator allows control of heat distribution between the electrode and the base metal?

- A. Polarity selection capability ✓
- B. Cooling fan operation
- C. Welding cable insulation
- D. Electrode coating selection

Q5 Part B

While setting up a cross belt drive in a workshop, what practical disadvantage might be observed compared to an open belt drive system?

- A. The cross belt drive experiences increased wear due to belt rubbing and twisting ✓
- B. The cross belt drive requires less frequent maintenance than open belt drive systems
- C. The cross belt drive improves pulley alignment and reduces power loss significantly
- D. The cross belt drive reduces vibration and operates more quietly than open belt drive

Q6 Part B

Which of the following best describes the main function of a solid pulley in power transmission systems?

- A. It increases the force applied to the driven shaft
- B. It transmits rotary motion between shafts using a belt ✓
- C. It is used to connect electrical circuits in machines
- D. It changes the direction of motion in gear systems

Q7 Part B

Which part of a depth gauge rests on the reference surface while taking a measurement?

- A. Lock screw
- B. Base ✓
- C. Spindle
- D. Vernier scale

Q8 Part B

Which property of ceramic tool materials is most beneficial during dry machining operations?

- A. High toughness
- B. High resistance to heat ✓
- C. Low cost
- D. Ease of sharpening



Q9 Part B

Which tool is most suitable for tightening and loosening pipes in pipe fitting work?

- A. Adjustable spanner
- B. Hacksaw
- C. Pipe wrench ✓
- D. Screwdriver

Q10 Part B

An AC welding transformer typically reduces the mains voltage to an open-circuit voltage ranging between:

- A. 120 to 180 volts
- B. 10 to 20 volts
- C. 40 to 100 volts ✓
- D. 200 to 250 volts

Q11 Part B

Which of the following best describes the primary use of a pillar file in fitting work?

- A. Enlarging round holes in metal
- B. Shaping flat surfaces and slots with parallel sides ✓
- C. Removing material from curved surfaces
- D. Sharpening saw blades for cutting

Q12 Part B

What is the main reason for using a shuttle valve instead of a two-way valve in a system with two independent control points for a single actuator?

- A. A shuttle valve enables actuator operation from either control point without signal interference or loss. ✓
- B. A shuttle valve discharges air from both control points when either is activated.
- C. A shuttle valve allows only one control point to function at a time by blocking the other.
- D. A shuttle valve interlocks the signals from two control points to prevent simultaneous operation.

Q13 Part B

Which kind of drill is mainly used to enlarge an existing hole rather than create a new one?

- A. Core drill ✓
- B. Twist drill
- C. Spade drill
- D. Center drill

Q14 Part B

If a pneumatic system must alternate the air supply between two actuators based on manual control, which valve classification best suits this function?

- A. Non-return valve
- B. Flow control valve
- C. Pressure relief valve
- D. Directional control valve ✓

Q15 Part B

While assembling a pneumatic press, which valve type should be chosen to precisely manage the speed of the cylinder during operation?

- A. Pressure reducing valve
- B. Directional control valve
- C. Shuttle valve
- D. Flow control valve ✓

Q16 Part B

An engineer selects an M8 screw for assembling two steel plates. Which value indicates the nominal diameter in the specification $M8 \times 1.25 \times 40$?

- A. 1.25 mm
- B. 40 mm
- C. 8 mm ✓
- D. 16 mm

Q17 Part B

A machine in the workshop suddenly stops working and emits smoke during a critical operation. As the shift supervisor, which immediate action best demonstrates proper emergency management for system failure response?

- A. Shut down the machine immediately and activate emergency ventilation. ✓
- B. Evacuate the work area immediately and leave the smoke unchecked.
- C. Begin repairing the machine immediately to restore normal operation.
- D. Notify the maintenance team immediately and await further assistance.



Q18 Part B

During the overhaul of a workshop drilling machine, what is the most appropriate initial step to ensure safety before any maintenance activity?

- A. Check accuracy of spindle alignment using dial indicator
- B. Lubricate all gears and sliding surfaces thoroughly
- C. Remove dust and debris from the work area
- D. Isolate power supply and secure moving parts ✓

Q19 Part B

A manufacturer needs to choose a metal for producing thin, complex-shaped sheets that must withstand bending and hammering without cracking. Which property should the manufacturer prioritize when selecting the material?

- A. Ductility
- B. Hardness
- C. Brittleness
- D. Malleability ✓

Q20 Part B

Which cutting tool material would lose effectiveness the fastest when used for continuous high-speed machining of steel?

- A. Carbon tool steel ✓
- B. Ceramic tool material
- C. High-speed steel (HSS)
- D. Cast alloy steel

Q21 Part B

Which feature in tolerance diagrams visually indicates transition fit?

- A. Overlapping tolerance zones of hole and shaft relative to zero line ✓
- B. Completely separated tolerance zones of hole and shaft
- C. Hole tolerance zone entirely above shaft tolerance zone
- D. Shaft tolerance zone entirely above hole tolerance zone

Q22 Part B

Ductility of a material refers to the ability of the material to:

- A. Undergo plastic deformation before fracture ✓
- B. Conduct heat efficiently
- C. Resist surface indentation
- D. Return to its original shape after unloading

Q23 Part B

A material that can withstand pressure, bending, and pulling forces without breaking is said to possess:

- A. Hardness
- B. Elasticity
- C. Tenacity ✓
- D. Brittleness

Q24 Part B

In a transition fit sketch, what does the overlapping region of tolerance zones represent?

- A. The maximum possible clearance between hole and shaft
- B. The minimum possible clearance between hole and shaft
- C. The range in which either clearance or interference may occur ✓
- D. The exact basic size of the mating components

Q25 Part B

Which type of bearing material is commonly referred to as Babbitt metal?

- A. Lead-coated steel alloy
- B. Antimony-hardened cast iron
- C. Tin-based white metal ✓
- D. Copper-based bearing alloy

Q26 Part B

During the assembly of a pneumatic circuit for a machine, the FRL unit is mounted upstream of all control valves. What is the purpose of placing the FRL unit at this location in a workshop's air supply line?

- A. To isolate specific actuators from the main line during maintenance operations
- B. To ensure that all downstream components receive cleaned, regulated, and lubricated air ✓
- C. To supply compressed air at a constant temperature to all actuators in the system
- D. To provide lubrication only to the last pneumatic tool in the workshop line



Q27 Part B

How is the grip size of a footprint wrench adjusted to suit different pipe diameters?

- A. By tightening a thumb-screw located on the side of the handle
- B. By replacing the jaw insert with a different standardised size piece
- C. By sliding an adjustable collar along the full length of the strap
- D. By placing the pivot pin into different holes of the solid handle ✓

Q28 Part B

Which aspect must be checked first when interpreting the representation of a countersunk rivet in a workshop assembly drawing?

- A. The type of head illustrated in the sectional view ✓
- B. The method of insertion shown in the drawing
- C. The rivet material specified in the notes
- D. The rivet shank length dimensioned

Q29 Part B

What distinguishes a shell reamer from a solid reamer?

- A. Shell reamer is always adjustable
- B. Shell reamer has spiral flutes only
- C. Shell reamer lacks an integral shank ✓
- D. Shell reamer is used for soft materials only

Q30 Part B

Which feature of a pipe vice improves its ability to hold pipes during threading operations?

- A. Replaceable wooden jaws
- B. Flat smooth jaw plates
- C. Rubber padding
- D. Serrated gripping surfaces ✓

Q31 Part B

Which method is often used to bend a flat bar accurately in a workshop without damaging its surface finish?

- A. Heating the bar and then quenching in water
- B. Clamping in a vice and twisting the bar
- C. Using a bending block and applying uniform pressure ✓
- D. Striking the bar with a hammer repeatedly

Q32 Part B

Aluminium oxide abrasive is produced from:

- A. Zinc ore
- B. Copper ore
- C. Bauxite ore ✓
- D. Iron ore

Q33 Part B

During the installation of a flat belt pulley system, which feature on the pulley face helps maintain the belt in the center during operation?

- A. An entirely rough surface with no shape change
- B. A slightly concave shape across the pulley face
- C. A flat face with no curvature at all
- D. A slightly convex shape across the pulley face ✓

Q34 Part B

When creating an orthographic projection of a rectangular block on a drawing sheet, which reference plane is used to project the top view accurately?

- A. Auxiliary plane is used for projecting the top view
- B. Horizontal plane is used for projecting the top view ✓
- C. Vertical plane is used for projecting the top view
- D. Profile plane is used for projecting the top view

Q35 Part B

In improved white metal bearings, the thin white metal layer is usually supported by:

- A. A cast iron backing
- B. A wooden backing
- C. A steel backing ✓
- D. A brass backing

Q36 Part B

In an electro-pneumatic control system for a workshop machine, which component directly converts electrical energy into linear mechanical motion to operate a pneumatic valve?

- A. The solenoid coil inside the valve assembly ✓
- B. The pressure switch attached to the manifold
- C. The control relay in the circuit panel
- D. The pilot air signal from the compressor



Q37 Part B

Tightening of the cap screw produces:

- A. Rotational motion
- B. Cutting action
- C. Clamping action ✓
- D. Sliding motion

Q38 Part B

Which feature should be included in a free hand sketch of a flat file used in the workshop?

- A. The curved blade should be shown clearly in the sketch
- B. The tapered edge should be shown clearly in the sketch ✓
- C. The round handle should be shown clearly in the sketch
- D. The serrated body should be shown clearly in the sketch

Q39 Part B

In a thrust bearing, the load acts along which direction in relation to the shaft axis?

- A. Perpendicular to the shaft axis
- B. Parallel to the shaft axis ✓
- C. Along a circular path
- D. In a random direction

Q40 Part B

A machine part is manufactured with a surface area of 169 square millimeters. If the unit is changed to square centimeters, what is the square root of the surface area in the new unit?

- A. 1.3 ✓
- B. 169
- C. 0.13
- D. 13

Q41 Part B

A screw thread is specified as M12 × 1.75. What does 'M12' represent in this specification?

- A. Minor diameter of twelve millimeters
- B. Thread angle of twelve degrees
- C. Major diameter of twelve millimeters ✓
- D. Pitch of twelve millimeters

Q42 Part B

Which solder is most suitable for joining electrical wires in a control panel without damaging sensitive electronic components?

- A. Solid wire plumbing solder
- B. Resin core solder ✓
- C. Acid core solder
- D. Silver solder

Q43 Part B

Which statement best explains how elasticity affects the behavior of a metal rod when a force is applied to it?

- A. Elasticity allows the rod to return to its original shape after the force is removed. ✓
- B. Elasticity prevents the rod from deforming under any force.
- C. Elasticity causes permanent deformation in the rod after the force is applied.
- D. Elasticity increases the hardness of the rod when a force is applied.

Q44 Part B

What is the primary purpose of a straight peen hammer in workshop operations?

- A. To measure the thickness of metal components precisely
- B. To hold workpieces firmly during machining operations
- C. To shape metal along a direction parallel to the hammer handle axis ✓
- D. To cut metal sheets into required shapes

Q45 Part B

Which of the following is an example of a personal safety sign commonly used in a workshop environment?

- A. Fire extinguisher location sign
- B. Wear safety goggles symbol ✓
- C. First aid box sign
- D. Emergency exit sign

Q46 Part B

Which main structural component supports the spindle in a pillar-type drilling machine?

- A. Foot pedal
- B. Column ✓
- C. Belt cover
- D. Table



Q47 Part B

A lifting system has equal number of pulleys in upper and lower blocks, with the upper block fixed and the lower block movable. A single rope passes around all the pulleys and a load is attached to the lower block. If the number of pulleys is 4, what will be the velocity ratio (VR)?

- A. 16
- B. 8
- C. 2
- D. 4

**Q48 Part B**

Why is crowning provided on the face of a flat belt pulley in workshop machinery?

- A. It reduces the overall diameter of the pulley
- B. It helps keep the flat belt centered during rotation
- C. It decreases the thickness of the belt used
- D. It significantly increases friction between belt and pulley

**Q49 Part B**

What is the purpose of the threading dial indicator during thread cutting?

- A. To indicate spindle speed during thread cutting
- B. To confirm depth of cut during threading operation
- C. To indicate carriage position relative to leadscrew rotation
- D. To synchronize spindle speed with feed rate during threading

**Q50 Part B**

Which feature most distinguishes a GI pipe from other common types of pipes used in pipe fitting?

- A. It is coated with a layer of zinc to prevent rusting
- B. It is lined with rubber for flexibility
- C. It is made from copper for high conductivity
- D. It is made from plastic and is lightweight

**Q51 Part B**

Which is the primary constructional feature responsible for the greater impact energy of a sledge hammer compared with ordinary hammers?

- A. Greater head mass combined with longer handle producing higher striking momentum
- B. Extended handle leverage increasing swing radius during forceful striking operations
- C. Solid forged head construction improving energy transfer during repeated heavy blows
- D. Balanced head geometry improving directional stability during heavy impact striking

**Q52 Part B**

In a standard hand tap set used for internal threading, how can a plug (bottoming) tap be identified quickly?

- A. By one ring marked on the shank
- B. By two rings marked on the shank
- C. By four rings marked on the shank
- D. By three rings marked on the shank

**Q53 Part B**

Which property is most closely related to fusibility?

- A. Thermal expansion
- B. Electrical resistance
- C. Density
- D. Melting point

**Q54 Part B**

How can the operator minimize the risk of tool collision with clamps during faceplate operations?

- A. By increasing spindle speed
- B. By tightening clamps more firmly
- C. By using longer cutting tools
- D. By planning the tool path before machining



Q55 Part B

In a fabrication unit, noisy operation is observed in a gear train using parallel shaft connections. If the goal is to minimize noise and axial force in future installations, which gear should be recommended?

- A. Spur gear for basic power transmission with higher noise levels
- B. Helical gear for reduced noise but presence of axial force
- C. Herringbone gear for smooth and quiet operation with no axial force ✓
- D. Bevel gear for changing shaft direction in noisy applications

Q56 Part B

Which of the following elements is NOT normally present in high-speed steel?

- A. Vanadium
- B. Tungsten
- C. Nickel ✓
- D. Chromium

Q57 Part B

On which part of the lathe are the chucks and faceplates mounted?

- A. Carriage
- B. Tailstock
- C. Spindle ✓
- D. Bed

Q58 Part B

A steel spring in a machine is compressed when a load is applied. When the load is removed, the spring returns to its original shape and length without any permanent deformation. Which mechanical property of the material is responsible for this behavior?

- A. Hardness
- B. Brittleness
- C. Plasticity
- D. Elasticity ✓

Q59 Part B

Which is the first step in the Five S concept used for workplace organization?

- A. Set in order
- B. Standardize
- C. Shine
- D. Sort ✓

Q60 Part B

What is the main use of a warding file?

- A. Diameter checking
- B. Narrow filing ✓
- C. Surface polishing
- D. Thread cutting

Q61 Part B

Which type of gear has two sets of teeth inclined in opposite directions to form a 'V' shape on the same gear wheel?

- A. A spur gear with straight teeth cut parallel to the center axis.
- B. A bevel gear with conical teeth cut to transmit angular motion.
- C. A herringbone gear with V-shaped teeth formed by opposing angles. ✓
- D. A worm gear with screw-like teeth designed to mesh with a wheel.

Q62 Part B

Which situation requires the use of a castle nut as a locking device on a machine part?

- A. When a split pin is needed to prevent nut loosening ✓
- B. When a spring washer is enough to hold the nut
- C. When the nut is used only for adjustment
- D. When frequent removal of the nut is required

Q63 Part B

Which of the following best describes a common use of a protractor in the ITI Fitter trade?

- A. Marking the center of a hole on a plate
- B. Drawing parallel lines on metal surfaces
- C. Measuring and marking angles on workpieces ✓
- D. Checking the thickness of material



Q64 Part B

In a pneumatic system, why is an air receiver tank placed after the compressor and before the distribution lines?

- A. To filter out dust particles from compressed air
- B. To lubricate pneumatic tools in operation cycles
- C. To reduce energy consumption of air compressor
- D. To store compressed air and maintain pressure stability ✓

Q65 Part B

Which of the following welding methods joins metals by melting the base materials at the joint?

- A. Resistance welding
- B. Fusion welding ✓
- C. Pressure welding
- D. Solid-state welding

Q66 Part B

In comparison with ball bearings of the same size, roller bearings can carry:

- A. Lower radial load
- B. Equal radial load
- C. No radial load
- D. Higher radial load ✓

Q67 Part B

A technician is troubleshooting a circuit that is not working properly. The measured voltage across a resistor is much lower than expected, even though the power supply is functioning and all connections appear intact. Which of the following is the most likely cause?

- A. The resistor is shorted out by a parallel path
- B. The power supply is providing insufficient current to the circuit load
- C. There is a high resistance connection or partial break in wiring path ✓
- D. The resistor value is too small for proper circuit operation conditions

Q68 Part B

Which part of an outside micrometer remains fixed and supports the workpiece during measurement?

- A. Spindle
- B. Ratchet stop
- C. Thimble
- D. Anvil ✓

Q69 Part B

A fitter is tasked with marking accurate parallel lines on a metal plate before cutting. He must select a divider with tips made of a suitable material for this job. Which divider tip material would be most appropriate to use to avoid rapid wear and ensure precise marking on the metal surface?

- A. Brass tips
- B. High carbon steel tips
- C. Hardened steel tips ✓
- D. Aluminum tips

Q70 Part B

Which of the following describes the main function of a double-acting cylinder in pneumatic systems used in workshop equipment?

- A. It uses spring force to return the piston after extension
- B. It only delivers force in one direction with air pressure
- C. It creates a vacuum inside the cylinder for retraction
- D. It provides controlled force in both directions for movement ✓

Q71 Part B

What do you call the sloping surface connecting the crest and root of a thread?

- A. Flank ✓
- B. Major diameter
- C. Crest
- D. Root

Q72 Part B

To check the accuracy of a spirit level, after taking the first reading, the level is rotated by:

- A. 180 degrees end-to-end ✓
- B. 45 degrees slight tilt
- C. 90 degrees sideways turn
- D. Full circular rotation

Q73 Part B

Which combination of root gap and bevel angle is most suitable for preparing a butt joint to ensure proper weld penetration in metal joining?

- A. A root gap of 0.5 mm and a bevel angle of 45 degrees
- B. A root gap of 1 mm and a bevel angle of 30 degrees
- C. A root gap of 3 mm and a bevel angle of 20 degrees
- D. A root gap of 2 mm and a bevel angle of 60 degrees ✓



Q74 Part B

Why are calipers generally used along with a steel rule in workshop measurement?

- A. Because caliper replaces steel rule in machining
- B. Because calipers cannot hold the dimension
- C. Because calipers do not have a graduated scale ☒
- D. Because calipers cannot touch the workpiece directly

Q75 Part B

While assembling two mild steel plates using dowel pins, which method ensures the most accurate alignment without relying on visual inspection?

- A. Using a jig with reference holes for positioning ☒
- B. Holding plates together with spring clamps only
- C. Measuring edge distances with a steel scale
- D. Applying chalk to mark direct contact points



Part B

75 Questions · Answer Key

Q1 Part B

Which component in a pneumatic system stores compressed air before it is distributed to the workshop machines?

- A. An air compressor generates compressed air for distribution
- B. A filter removes moisture and dust from the air
- C. A regulator controls the pressure supplied to equipment
- D. The air receiver tank stores compressed air for later use ✓

Q2 Part B

Vibration during hacksawing can be minimized by:

- A. Increasing cutting speed within recommended limits
- B. Maintaining proper blade tension ✓
- C. Steady strokes and proper grip
- D. Using correct blade pitch (TPI)

Q3 Part B

Cast iron is mainly used in bearings for:

- A. Heavy loads
- B. Light loads ✓
- C. Shock loads
- D. Impact loads

Q4 Part B

In a quick cut die stock, the two die halves are held securely by:

- A. A threaded guide plate ✓
- B. A locking pin and washer
- C. A spring-loaded clamp
- D. A tapered retaining ring

Q5 Part B

A workshop assembly requires joining two metal plates to withstand vibrations without loosening over time. Which mechanical jointing method is most suitable for this requirement?

- A. Using permanent spot welding process
- B. Using solid rivets for fixed assembly
- C. Using standard threaded fasteners only
- D. Using lock nuts and spring washers ✓

Q6 Part B

Which material will deform plastically first when temperature rises during a lathe operation?

- A. High-speed steel (HSS)
- B. Carbon tool steel ✓
- C. Cast alloy steel
- D. Ceramic tool material

Q7 Part B

Which problem is most likely to occur if a lathe tool's cutting angles are not ground properly?

- A. Issues with tool magnetism
- B. Problems with storing the tool
- C. Excessive tool length
- D. Poor surface finish ✓

Q8 Part B

In a cast iron pulley, the rim is connected to the central boss through structural members whose cross-section is generally elliptical. What are these members called?

- A. Arms/Spokes ✓
- B. Keys
- C. Bushes
- D. Flanges



Q9 Part B

In which situation would wrought iron be a better choice than cast iron?

- A. Where vibration damping is a priority
- B. Where ductility and shock resistance are required ✓
- C. Where maximum compressive strength is needed
- D. Where high wear resistance is essential

Q10 Part B

Using anti-stick compounds on gaskets may cause:

- A. Increased strength
- B. Improved sealing
- C. Longer service life
- D. Premature failure ✓

Q11 Part B

What happens when the feed rate is too high during turning?

- A. Surface finish improves significantly
- B. Tool wear decreases completely
- C. Spindle speed reduces automatically
- D. Cutting force and roughness increase ✓

Q12 Part B

What is a butt joint in welding as per BIS SP 46-1988?

- A. A joint where two metal pieces are joined at an edge not in the same plane
- B. A joint where two metal pieces are overlapped and welded
- C. A joint where two metal pieces are placed end to end and welded together ✓
- D. A joint where two metal pieces are placed at right angles and welded

Q13 Part B

The grade of a grinding wheel indicates:

- A. Grain size
- B. Bond strength ✓
- C. Cutting depth
- D. Wheel speed

Q14 Part B

Bolted joints are preferred because they are:

- A. Permanent only
- B. Easy to assemble ✓
- C. Difficult to remove
- D. Heavy in weight

Q15 Part B

During maintenance, an employee notices that a hydraulic press is unable to lift the usual load even though the input force remains the same. Based on Pascal's Law, which scenario could be responsible for this failure?

- A. Increasing the input force beyond the usual value causes lifting failure
- B. Using more hydraulic fluid while keeping pressure the same improves lifting
- C. Replacing the fluid with a heavier type increases lifting capacity
- D. A leak in the hydraulic line reduces pressure transmission to the lifting piston ✓

Q16 Part B

What does the term 'centre of gravity' refer to in workshop calculations and science?

- A. It is the lowest point of the object
- B. It is the point where the mass is maximum
- C. It is the point where the entire weight of an object acts ✓
- D. It is the point where the object is fixed

Q17 Part B

In a workshop, you need to fill a cylindrical tank with a liquid. The tank has a diameter of 1 meter and a height of 2 meters. Which method will give you the most accurate measurement of the tank's volume before filling it?

- A. Calculate using the formula for the volume of a cylinder based on precise measurements ✓
- B. Measure the circumference and assume the tank is a sphere to calculate volume
- C. Use the formula for the volume of a cube with the tank's height as a side
- D. Estimate by visual inspection and compare with other tanks



Q18 Part B

What is the main function of a pipe bending machine in pipe fitting work?

- A. To cut a pipe accurately to the required length
- B. To create threads on the ends of a pipe for connections
- C. To join two pipes together permanently using welding methods
- D. To change the direction of a pipe without cutting it ✓

Q19 Part B

What is the primary advantage of using a hydraulic bending machine for G.I. and M.S. pipes?

- A. It cleans pipe surfaces without using chemical solutions.
- B. It bends pipes without requiring sand filling inside the pipe. ✓
- C. It joins pipes permanently without requiring threaded fittings.
- D. It cuts pipes accurately without producing metal shavings.

Q20 Part B

How does a hole gauge achieve higher accuracy in measurement?

- A. Using fluid-based expansion mechanism
- B. Using magnetic alignment measurement method
- C. Using two-point contact with split ball ends ✓
- D. Using multi-point laser scanning system

Q21 Part B

A heavy-duty belt drive requires reliable torque transmission without relative motion between the pulley and shaft. Which additional element is recommended for a split pulley?

- A. Sunk key ✓
- B. Set screw
- C. Crowning
- D. Bush bearing

Q22 Part B

Which process is essential to ensure moisture is removed from compressed air before it enters pneumatic tools in a workshop environment?

- A. Allowing air to rest in a storage tank for moisture to settle
- B. Passing air through a filter to trap solid contaminants
- C. Using an air dryer to eliminate water vapor from compressed air ✓
- D. Cooling air in a closed chamber to reduce temperature

Q23 Part B

Which change will decrease the electrical resistance of a metal wire in a workshop circuit?

- A. Using a less conductive material for the wire
- B. Lowering the voltage applied to the wire
- C. Increasing the thickness of the wire ✓
- D. Raising the temperature of the wire

Q24 Part B

Due to low thermal conductivity, laminated phenolic bearings require:

- A. Surface hardening
- B. Metal lining
- C. Cooling system ✓
- D. Hard coating

Q25 Part B

In a gear set, which circle is used as the reference to determine the point where two gears effectively make contact and transfer motion?

- A. Addendum circle is the contact reference for motion transfer
- B. Root circle is the contact reference for motion transfer
- C. Dedendum circle is the contact reference for motion transfer
- D. Pitch circle is the contact reference for motion transfer ✓



Q26 Part B

In an assembly process, which sealing method is most appropriate to prevent oil leakage between two precisely machined flanges when disassembly may be required for maintenance?

- A. Using a preformed gasket between the flanges** ✓
- B. Applying a thread sealant to the surfaces
- C. Sealing with adhesive compounds
- D. Filling the joint with welding material

Q27 Part B

What is the standard material used for hacksaw blades in adjustable frames?

- A. High carbon steel** ✓
- B. Tungsten carbide
- C. Mild steel
- D. Alloy tool steel

Q28 Part B

Which item is essential to wear for personal safety in a mechanical workshop?

- A. Safety goggles** ✓
- B. Earplugs
- C. Wrist watch
- D. Regular shoes

Q29 Part B

A drawing shows two steel plates joined with a continuous fillet weld along one edge, and the drawing specifies a welding symbol with the fillet shape filled in and a reference line beneath. Based on this drawing, which interpretation is correct about the weld placement and its representation?

- A. The weld is to be placed on the arrow side with a continuous fillet along the joint** ✓
- B. The weld is to be placed on the other side with an intermittent fillet
- C. The weld should be a groove type applied on both sides of the plates
- D. The weld should be placed on the arrow side but as an intermittent fillet

Q30 Part B

Which arrow head type is not recommended for dimension lines when preparing engineering drawings for fabrication tasks?

- A. Dotted arrow head** ✓
- B. Closed and filled arrow head
- C. Open arrow head
- D. Slashed arrow head

Q31 Part B

In a gang drilling machine, how are the spindles typically arranged?

- A. Vertically stacked above each other
- B. Randomly positioned on the base
- C. In a circular pattern around the table
- D. In a straight line on a common table** ✓

Q32 Part B

If the tolerance zone is completely above the basic size line, how is it indicated as per BIS?

- A. By using only negative deviation values
- B. By using zero deviation values
- C. By combining positive and negative deviations
- D. By using only positive deviation values** ✓

Q33 Part B

Which tool is best suited for shifting heavy machinery during erection by applying leverage, given constraints on space and need for controlled movement?

- A. Crowbar is used to move heavy objects with leverage in restricted areas** ✓
- B. Spanner is used to move heavy objects with leverage in restricted areas
- C. Hammer is used to move heavy objects with leverage in restricted areas
- D. Pipe wrench is used to move heavy objects with leverage in restricted areas

Q34 Part B

A material that fractures with very little or no plastic deformation is said to exhibit:

- A. Toughness
- B. Brittleness** ✓
- C. Ductility
- D. Elasticity



Q35 Part B

In wet lapping, the abrasive compound is mixed with a liquid medium before application. Which substance is specifically mentioned for mixing with the abrasive powder?

- A. Water as cooling medium
- B. Kerosene as liquid medium ✓
- C. Glycerine as bonding medium
- D. Alcohol as cleaning medium

Q36 Part B

Which of the following best describes the method of operating HP (High Pressure) welding equipment in metal joining processes?

- A. The regulator can be ignored during normal operation
- B. Only turning on the gas supply is necessary for operation
- C. The equipment should be operated at maximum pressure for better results
- D. The torch and regulator must be adjusted to control the gas flow accurately ✓

Q37 Part B

Why is the beam of a vernier caliper made long and rigid during construction?

- A. To provide a straight guide for smooth sliding jaw movement
- B. To support long measurement range without bending ✓
- C. To reduce the least count of the instrument
- D. To provide a stable reference surface for accurate measurement

Q38 Part B

Which measurement tool is most appropriate for checking the major diameter of a screw thread?

- A. Feeler gauge
- B. External micrometer ✓
- C. Thread pitch gauge
- D. Depth gauge

Q39 Part B

Which statement best explains the primary use of red lead in marking media for ITI Fitter Trade work?

- A. Red lead is applied to surfaces to make scribed lines more visible during layout work. ✓
- B. Red lead is used for cleaning measuring instruments before use.
- C. Red lead is used for protecting measuring tools from rust during storage.
- D. Red lead is applied as a lubricant for smooth movement of measuring instruments.

Q40 Part B

Which of the following is the most important reason for providing continuous ventilation while working in a confined space?

- A. To reduce noise levels for workers
- B. To prevent the build-up of hazardous gases ✓
- C. To control dust generated during work
- D. To keep the confined space cool

Q41 Part B

Which solder composition is most suitable for joining delicate electronic components requiring a low melting point and reliable electrical connections?

- A. Copper-based solder with 95% copper, 5% tin
- B. Silver solder with 2% silver, 97% tin, 1% copper
- C. Lead solder with 70% lead and 30% tin
- D. Tin-lead solder with 60% tin and 40% lead ✓

Q42 Part B

Which tap in a standard set is best suited for starting a thread in a new hole?

- A. Taper tap ✓
- B. Flat bottomed tap
- C. Thread chaser
- D. Bottoming tap



Q43 Part B

Which of the following is the main reason a pipe cut using a wheel pipe cutter must be deburred or reamed after cutting?

- A. The cutter wheel increases the internal diameter of the pipe after cutting
- B. The cutting process leaves a ridge inside the pipe that may obstruct flow ✓
- C. The pipe cutter produces rough external threads on the pipe surface
- D. The cutter removes excess metal chips inside the pipe during cutting

Q44 Part B

Which factor affects the velocity ratio in a simple gear train during workshop assembly tasks?

- A. The material used for making the gear wheels
- B. The shaft length between the two connected gears
- C. The number of teeth on the driver and driven gears ✓
- D. The module size selected for the gear teeth

Q45 Part B

Which of the following best describes the proper use and maintenance of a chipping hammer during welding operations?

- A. Use the chipping hammer to remove slag after welding and keep the hammer clean to ensure effective slag removal. ✓
- B. Use the chipping hammer to shape the welded joint before welding and occasionally sharpen its pointed tip properly with a flat file.
- C. Use the chipping hammer during welding to cool the joint and wipe its handle carefully with oil after every use.
- D. Use the chipping hammer before welding to clean oil from the surface and safely store it with welding rods.

Q46 Part B

Which application is suited for a 5 by 2 valve in pneumatic systems?

- A. It is suited for pressure release and exhaust control
- B. It is used for double acting cylinder direction control ✓
- C. It is used for single acting cylinder simple movement
- D. It is best for adding lubrication to compressed air

Q47 Part B

Which characteristic best describes a Barrette file used in fitting work?

- A. It has round surfaces with teeth on all sides for enlarging holes
- B. It has square faces with rough teeth for cutting keyways
- C. It has curved edges with double cut teeth for rapid metal removal
- D. It has a flat triangular face with teeth only on the wide surface ✓

Q48 Part B

A machine drawing specifies an M12 screw for assembly. What does 'M12' indicate about the screw?

- A. The major diameter of the screw is 12 mm ✓
- B. The screw head diameter is 12 mm
- C. The pitch length of the screw is 12 mm
- D. The screw length is 12 mm

Q49 Part B

What is the orientation of the peen relative to the handle in a straight peen hammer?

- A. At sixty degrees to the hammer handle
- B. Parallel to the axis of the hammer handle ✓
- C. Perpendicular to the axis of the hammer handle
- D. At forty five degrees to the hammer handle

Q50 Part B

During a welding operation in a workshop, a 10-meter extension cable rated for 5 amperes is used to power a portable grinder that draws 8 amperes. To prevent electrical accidents, which corrective action should be taken before starting work?

- A. Leave the existing extension cable unchanged and work quickly
- B. Use a longer cable rated for 3 amperes to increase distance from the source
- C. Replace the extension cable with one rated for at least 8 amperes ✓
- D. Reduce the grinder running time to minimize overload risk



Q51 Part B

Why does the vernier scale contain slightly different spacing than the main scale?

- A. To allow comparison between main scale and vernier scale divisions
- B. To create a measurable difference between scales ✓
- C. To obtain fractional readings smaller than one main scale division
- D. To help align the vernier zero with the main scale zero

Q52 Part B

Which of the following is a key purpose of implementing preventive maintenance in workshop equipment?

- A. To reduce unexpected breakdowns and improve equipment reliability. ✓
- B. To schedule downtime for the longest possible periods of production.
- C. To focus only on repair activities after equipment failure occurs.
- D. To use maintenance only for minor workshop tools and accessories.

Q53 Part B

A workshop supervisor needs a tool for scribing and layout work in a confined space. Which feature of the Hermaphrodite Caliper makes it different from other calipers?

- A. Both legs are straight and parallel to each other
- B. One leg is straight while the other leg carries a flat measuring edge
- C. One leg ends in a pointed tip while the other has a caliper jaw ✓
- D. Both legs have sharp pointed tips for accurate marking work

Q54 Part B

Which actuator type converts compressed air energy into linear motion for clamping during a machining operation?

- A. Double-acting cylinder actuator is used for tasks requiring motion in both directions
- B. Rotary actuator is used to convert air into rotary motion for cutting
- C. Single-acting cylinder actuator is used to generate linear motion for clamping tasks ✓
- D. Diaphragm actuator is used for precise control in regulating pressure

Q55 Part B

A workshop needs to transfer power across two parallel shafts using an open belt drive. If the center distance between the pulleys is increased while keeping pulley sizes unchanged, what is the most likely result regarding the required belt length?

- A. The required belt length decreases to maintain proper tension
- B. The required belt length increases to maintain proper tension ✓
- C. The required belt length remains unchanged for correct operation
- D. The required belt thickness increases to maintain proper grip

Q56 Part B

How is a small-diameter straight shank drill usually held in the tailstock?

- A. With a dog carrier
- B. With a drill chuck ✓
- C. With a Morse taper
- D. With a sleeve adapter

Q57 Part B

A workshop supervisor needs to mix two types of oils in a ratio so that the resulting mixture maintains the same performance as the original oils used separately. If the first oil costs 60 rupees per liter and the second oil costs 80 rupees per liter, in what ratio should these be mixed to get a mixture worth 70 rupees per liter?

- A. 3:2
- B. 2:1
- C. 1:2
- D. 1:1 ✓

Q58 Part B

Which cutting tool is primarily used to produce a smooth, flat face perpendicular to the workpiece axis?

- A. Turning tool
- B. Boring tool
- C. Facing tool ✓
- D. Knurling tool



Q59 Part B

Which part of the Vernier height gauge is used to mark lines on the workpiece surface?

A. Scriber



B. Clamp screw

C. Fine adjustment screw

D. Vernier scale

Q60 Part B

In a basic hydraulic circuit, what is the function of the reservoir in relation to the other system components?

A. Pressure relief valve is used to control the maximum system pressure

B. Hydraulic filter removes contaminants from the hydraulic fluid during operation

C. Hydraulic pump is used to generate pressure for fluid movement

D. Hydraulic reservoir stores and supplies fluid to the system continuously

**Q61 Part B**

What does 'interchangeability' refer to in mechanical engineering?

A. Ability to change machine dimensions freely

B. Ability to assemble parts in any sequence

C. Ability to use any material for parts

D. Ability to replace parts without modification

**Q62 Part B**

When integrating a solenoid valve into a sequence control circuit for a machining process, what is a potential effect if the return spring inside the valve is damaged or missing?

A. The valve may fail to return to its original position after de-energization



B. The valve cycles faster, improving process speed in the workshop

C. Continuous air supply to the actuator is ensured for all cycles

D. The electrical consumption of the valve decreases significantly

Q63 Part B

When preparing an orthographic projection of a rectangular block resting with its largest face on the horizontal plane, which view will accurately represent the true shape and size of that face?

A. The auxiliary view drawn from an inclined axis

B. The side view drawn at 45 degrees to the projection plane

C. The top view drawn parallel to the horizontal reference line



D. The front view drawn perpendicular to the reference line

Q64 Part B

What determines the final diameter of a hole after reaming?

A. The hardness of the workpiece

B. The size of the reamer used



C. The type of the lubricant applied

D. The rotational speed of the lathe

Q65 Part B

Which property makes tin suitable for coating steel sheets used in food containers?

A. High magnetic permeability

B. High hardness

C. High tensile strength

D. High corrosion resistance

**Q66 Part B**

Which type of bearing is specifically designed to support axial loads in machinery?

A. Roller bearing

B. Thrust bearing



C. Plain bearing

D. Ball bearing



Q67 Part B

During the fabrication of a machine base, an engineering drawing is provided with detailed dimensioning. What is the main purpose of these dimensioned drawings in the workshop setting?

- A. To mark guidelines for the workshop before cutting begins
- B. To indicate the type of material to be used for the part
- C. To provide exact sizes and locations for manufacturing parts accurately ✓
- D. To show the required surface finish for each feature

Q68 Part B

A belt drive operating at a speed of 8 m/s is used to transmit a small amount of power in an agricultural machine. How is this drive classified?

- A. Light drive ✓
- B. Heavy drive
- C. Medium drive
- D. Compound drive

Q69 Part B

Which of the following situations best demonstrates when a needle bearing is preferred over other types of bearings in an industrial setting?

- A. When high-speed axial loads are present and minimal heat generation is needed
- B. When large axial loads and self-alignment are required
- C. When vibration isolation is critical and misalignment may occur
- D. When limited radial space is available and high load capacity is needed ✓

Q70 Part B

Which parameter must be lowered to decrease tool wear while machining a tough alloy material?

- A. Depth of cut
- B. Rake angle
- C. Feed rate
- D. Cutting speed ✓

Q71 Part B

When selecting an electrode for ARC welding mild steel structures exposed to variable weather conditions, which factor is most critical to ensure weld durability and integrity?

- A. Selecting an electrode with high current carrying capacity to increase speed
- B. Picking an electrode with fast deposition rate for quicker completion
- C. Using an electrode with higher tensile strength to match the base metal
- D. Choosing an electrode with low hydrogen content to minimize cracking risk ✓

Q72 Part B

What is the main reason silver is used in high-quality electrical contacts?

- A. Mechanical strength
- B. High thermal conductivity
- C. Superior corrosion resistance
- D. Excellent electrical conductivity ✓

Q73 Part B

Which situation requires the use of a reamer?

- A. When a highly accurate hole diameter is needed ✓
- B. When making holes in wood
- C. When rough shaping a workpiece
- D. When removing large amounts of material quickly

Q74 Part B

Which of the following statements correctly describes the use of Allen keys in fitting accessories?

- A. Allen keys are used to tighten nuts with square holes.
- B. Allen keys are used to turn screws with round heads only.
- C. Allen keys are used for tightening or loosening hex socket screws. ✓
- D. Allen keys are used to adjust screws with slotted heads.

Q75 Part B

Pig iron is produced in a blast furnace using iron ore, coke, and limestone. In this process, coke acts as:

- A. Fuel ✓
- B. Flux
- C. Impurity
- D. Coolant



Part B

75 Questions · Answer Key

Q1 Part B

Which emission standard is currently enforced for diesel vehicles to limit harmful exhaust gases in India?

- A. Bharat Stage III
- B. Bharat Stage VII
- C. Bharat Stage IV
- D. Bharat Stage VI



Q2 Part B

Which sensor helps quiet diesel technology operate effectively?

- A. Engine oil temperature sensor
- B. Fuel filter clog sensor
- C. Crankshaft position sensor
- D. Air intake pressure sensor



Q3 Part B

Which engine part must work closely with the connecting rod to produce rotational movement?

- A. Cylinder head
- B. Fuel injector
- C. Crankshaft
- D. Oil filter



Q4 Part B

In a single overhead camshaft diesel engine, how many camshafts are used for both intake and exhaust valves?

- A. Three
- B. Four
- C. One
- D. Two



Q5 Part B

In which operation would a single-acting cylinder most likely provide the greatest efficiency?

- A. Regulating hydraulic fluid flow
- B. Extending and retracting a tool holder
- C. Ejecting finished components from a machine
- D. Opening and closing a heavy gate



Q6 Part B

A mechanic inspects a diesel engine and finds the oil level indicator shows the oil is just at the 'Low' mark after running the engine for several hours. What is the most appropriate professional action to ensure engine protection?

- A. Add oil until the level reaches the Full mark as indicated
- B. Check the oil again without adding oil to confirm reading
- C. Continue running the engine until next scheduled maintenance
- D. Add oil until the stick is overfilled beyond Full mark



Q7 Part B

In the context of diesel engines, which of the following best describes the primary objective of emission standards?

- A. Increase smoke emission
- B. Reduce pollution levels
- C. Reduce engine power
- D. Increase fuel wastage



Q8 Part B

Where is the timing belt or timing chain generally located in a typical engine layout?

- A. Top section of the engine
- B. Bottom section of the engine
- C. Front section of the engine
- D. Middle section of the engine



Q9 Part B

Which of the following best defines machine efficiency?

- A. Ratio of output to input
- B. Product of input and output
- C. Ratio of input to output
- D. Difference between input and output



Q10 Part B

Which type of valves is most commonly used in diesel engine cylinder heads?

- A. Sleeve valve
- B. Poppet valve ✓
- C. Rotary valve
- D. Needle valve

Q11 Part B

In engineering drawing, what is another name for a pictorial/isometric drawing?

- A. Orthographic drawing
- B. Dimension drawing
- C. Three-dimensional drawing ✓
- D. Sectional drawing

Q12 Part B

During maintenance, a supervisor asks the role of a turbocharger when atmospheric pressure is low. How does it help the engine?

- A. It supplies extra fuel to the engine
- B. It lowers the engine noise produced
- C. It regulates the coolant flow to the engine
- D. It supplies sufficient air to the engine ✓

Q13 Part B

A marine diesel engine is fitted with a coolant system operating under increased pressure. During operation, the engine coolant temperature rises above normal limits. What is the most likely direct consequence regarding the coolant's boiling point due to the increased system pressure?

- A. The coolant will boil at a lower temperature under higher pressure.
- B. The boiling point of the coolant decreases with system pressure.
- C. The boiling point of the coolant remains unchanged at all pressures.
- D. The boiling point of the coolant increases with system pressure. ✓

Q14 Part B

Which practice helps maintain the accuracy of a steel rule during daily use?

- A. Measure hot metal parts
- B. Wash after every use
- C. Avoid dropping on floor ✓
- D. Oil every hour of use

Q15 Part B

Which of the following is a common cause of knocking noise in a diesel engine?

- A. Incorrect fuel injection timing ✓
- B. Excessive engine oil
- C. Worn out piston rings
- D. Loose cylinder head bolts

Q16 Part B

Why is it important for a temperature-resistant thread sealant to resist both thermal cycling and vibration in automotive environments?

- A. To prevent real-world leaks and seal degradation ✓
- B. To withstand continuous high heat without vibration
- C. To ensure rapid curing under cold start conditions
- D. To facilitate easy removal of components after use

Q17 Part B

In a battery, the electrolyte conducts electricity through movement of:

- A. Neutral atoms only
- B. Ions ✓
- C. Free electrons only
- D. Magnetic domains

Q18 Part B

The voltage regulator controls alternator voltage by varying the current flow to the:

- A. Rotor ✓
- B. Battery
- C. Ammeter
- D. Stator



Q19 Part B

Compression ignition engines are known for their ability to operate efficiently at which type of compression ratio?

- A. Medium compression ratio
- B. Low compression ratio
- C. High compression ratio ✓
- D. Variable compression ratio

Q20 Part B

Which factor is most important when selecting the material for main bearings in diesel engines?

- A. Ability to withstand cyclic loads ✓
- B. Good machinability
- C. High thermal conductivity
- D. Low manufacturing cost

Q21 Part B

What is a direct mechanical reason for low power generation in a diesel engine?

- A. Damaged fan belt
- B. Worn piston rings ✓
- C. Faulty alternator
- D. Incorrect coolant level

Q22 Part B

In a gravity feed system, what action causes fuel to start moving from the tank to the engine?

- A. Heating the fuel tank initiates fuel movement
- B. Releasing the fuel cock allows fuel to flow downward ✓
- C. Activating the pump starts the fuel flow upward
- D. Pressurizing the fuel line pushes fuel forward

Q23 Part B

What should be done if a toxic dust container is full in the workshop?

- A. Continue using the same container
- B. Mix dust in the container with general waste
- C. Leave the container open until convenient
- D. Seal and replace the container immediately ✓

Q24 Part B

Which components are connected to each end of the alternator rotor's field winding?

- A. Slip rings ✓
- B. Diodes
- C. Iron poles
- D. Bearings

Q25 Part B

Which part of the Vernier caliper slides along the main scale for measurement?

- A. Lock screw
- B. Depth rod
- C. Vernier scale ✓
- D. Lower jaw

Q26 Part B

A solar cell operates on the principle of the:

- A. Photovoltaic effect ✓
- B. Heating effect
- C. Electrochemical effect
- D. Piezoelectric effect

Q27 Part B

What happens to the armature and rotor in an electromagnetic coupling when the voltage is removed?

- A. Torque remains applied
- B. The armature stays connected
- C. The magnetic force holds them together
- D. The pre stressed spring separates them ✓

Q28 Part B

A customer complains about sluggish acceleration at low speeds in a diesel vehicle with a fixed-geometry turbocharger. How does a variable geometry turbocharger address this issue?

- A. By raising exhaust gas temperature automatically
- B. By altering turbine geometry to create boost at low speed ✓
- C. By increasing fuel supply at low engine speeds
- D. By reducing exhaust manifold pressure at idle



Q29 Part B

Which type of bearings is most commonly used for supporting the crankshaft in a diesel engine?

- A. Ball bearing
- B. Needle bearing
- C. Plain bearing ✓
- D. Roller bearing

Q30 Part B

What property is primarily strengthened in alloy steels through carburizing for piston pins?

- A. Thermal conductivity
- B. Ductility
- C. Corrosion resistance
- D. Surface hardness ✓

Q31 Part B

A diesel engine workshop tests a radiator by measuring the temperature of water entering and exiting the radiator core during a simulated run. What finding would best confirm that the radiator is performing its intended function?

- A. The water entering is significantly hotter than the water exiting ✓
- B. The water temperature changes slightly with no significant difference
- C. The water entering is the same temperature as the water exiting
- D. The water exiting is significantly hotter than the water entering

Q32 Part B

If a vehicle has two axles and each axle supports two wheels, what technical category does it fall under?

- A. It is grouped as a six-wheeler vehicle type
- B. It is classified as a four-wheeler vehicle type ✓
- C. It is known as a three-wheeler vehicle type
- D. It is categorized as a two-wheeler vehicle type

Q33 Part B

In a training scenario, a student is asked about the correct sequence in a forced feed system. Which order best reflects the movement of fuel from the tank to the combustion chamber?

- A. Fuel travels from injectors to water separator, then to tank, finally to combustion chamber
- B. Fuel moves from injection pump to filters, then to tank, finally to injectors
- C. Fuel bypasses filters, moves directly from tank to injectors, then to combustion chamber
- D. Fuel passes from tank to water separator, through filters, to injection pump, then injectors ✓

Q34 Part B

Which of the following has both magnitude and direction, making it a vector quantity?

- A. Time
- B. Distance
- C. Speed
- D. Velocity ✓

Q35 Part B

Which of the following statements correctly matches the units of mass with their respective systems?

- A. F.P.S system uses gram, C.G.S system uses kilogram, M.K.S system uses pound
- B. F.P.S system uses gram, C.G.S system uses pound, M.K.S system uses kilogram
- C. F.P.S system uses pound, C.G.S system uses gram, M.K.S system uses kilogram ✓
- D. F.P.S system uses kilogram, C.G.S system uses pound, M.K.S system uses gram

Q36 Part B

Which type of line is typically used to represent centre lines in engineering drawings?

- A. Continuous thin line
- B. Dashed thin line
- C. Chain thick
- D. Chain thin line ✓



Q37 Part B

In an alternator stator, how are the windings typically connected in lightweight stator units?

- A. Star connected** ✓
- B. Series connected
- C. Delta connected
- D. Parallel connected

Q38 Part B

Which process is initiated when the cooling fan operates as designed in a diesel engine cooling system?

- A. Fuel is circulated faster through the injector pump
- B. Air is drawn through radiator fins, cooling engine coolant** ✓
- C. Air is filtered before entering the combustion chamber
- D. Electric current is increased by the alternator circuit

Q39 Part B

In which application is an external gear pump commonly used in the field of hydraulics?

- A. Compressing fuel in injectors
- B. Supplying oil to hydraulic systems** ✓
- C. Transferring air in pneumatic systems
- D. Lubricating bearings in engines

Q40 Part B

Which combination of materials is commonly used for the construction of a cross-cut chisel's body and edge?

- A. Body of hardened steel, edge of mild steel
- B. Body and edge both brass
- C. Body of mild steel, edge of hardened steel** ✓
- D. Body and edge both mild steel

Q41 Part B

In a transformer, if primary conditions remain constant, increasing the number of turns in the secondary winding causes the secondary voltage to:

- A. Remain unchanged
- B. Decrease
- C. Increase** ✓
- D. Become zero

Q42 Part B

In a parallel connection, all branches connected across the same two nodes have :

- A. Equal power dissipation
- B. Zero resistance
- C. Different currents only
- D. Equal voltage** ✓

Q43 Part B

A diesel mechanic observes that certain engine parts show signs of rust after a long period without maintenance. Which function of lubricating oil is most relevant in preventing this scenario, considering its role in corrosion reduction?

- A. Neutralizing acids produced during combustion
- B. Facilitating heat transfer within engine parts
- C. Reducing mechanical friction among moving parts
- D. Forming a protective barrier over metal surfaces** ✓

Q44 Part B

A diesel engine manufacturer needs to ensure rapid and consistent coolant flow through the engine regardless of its operating temperature. Which cooling system design should be selected to meet this requirement?

- A. Pump circulation system provides rapid and consistent coolant flow** ✓
- B. Thermosyphon system provides rapid and consistent coolant flow
- C. Water cooling system provides rapid and consistent coolant flow
- D. Air cooling system provides rapid and consistent coolant flow

Q45 Part B

A diesel mechanic compares engine types and finds one where each cylinder contains two pistons attached to separate connecting rods. What operational benefit is most associated with this engine type?

- A. Achieving a higher power to weight ratio is most associated with this engine type.** ✓
- B. Improving engine cooling efficiency is most associated with this engine type.
- C. Simplifying engine maintenance tasks is most associated with this engine type.
- D. Reducing overall fuel consumption is most associated with this engine type.



Q46 Part B

Which component is commonly used in evaporative emission control systems to store fuel vapors temporarily?

- A. Radiator expansion tank
- B. Activated charcoal canister ✓
- C. Air filter case housing
- D. Oil separator ball valve

Q47 Part B

A commercial vehicle manufacturer plans to design a new city bus for frequent stop-and-go urban traffic. Which engine layout would most effectively facilitate easy passenger boarding, maximize internal space, and support rear-driven axles for better traction, given the operational requirements?

- A. Selecting a rear longitudinal engine layout for the bus design
- B. Selecting a rear transverse engine layout for the bus design ✓
- C. Selecting a front transverse engine layout for the bus design
- D. Selecting a front longitudinal engine layout for the bus design

Q48 Part B

What is the main function of the adjustment feature on a micrometer?

- A. To lock the spindle for repeated readings
- B. To increase the measurement range
- C. To change the scale type used
- D. To set the zero reading for accuracy ✓

Q49 Part B

Which property makes particulates from diesel engines particularly harmful in urban environments?

- A. Particulates neutralize when exposed to sunlight
- B. Particulates dissolve rapidly in water near cities
- C. Particulates remain suspended in air for long periods ✓
- D. Particulates settle quickly on ground surfaces

Q50 Part B

Which of the following actions is the safest procedure if fuel is accidentally spilled in a workshop environment?

- A. Apply water directly to the spill area so that the fuel is immediately diluted.
- B. Clean the spill using approved absorbents and dispose of it as per guidelines ✓
- C. Ignore the spilled fuel completely and allow yourself to continue working as normal.
- D. Leave the spill completely unattended and deal with it only at the end of the shift.

Q51 Part B

An automotive technician needs to ensure the camshaft is not bent during installation. How can a dial indicator assist in this process?

- A. By measuring the camshaft's straightness as it is rotated and noting any deviation ✓
- B. By measuring the camshaft lobe base circle diameter at a completely fixed position
- C. By ensuring the camshaft journals are properly lubricated prior to the installation
- D. By verifying the camshaft achieves the specified torque value after final tightening

Q52 Part B

Which issue complicates the implementation of quiet diesel engines?

- A. Designing larger injectors
- B. Precise control of injection timing ✓
- C. Using simpler fuel lines
- D. Operating at lower injection pressure

Q53 Part B

Which tool is most appropriate for marking parts before removing them during diesel engine dismantling to ensure correct reassembly?

- A. A metal brush.
- B. A barrette file.
- C. A center punch. ✓
- D. An adjustable wrench.



Q54 Part B

Why are compression ignition engines NOT preferred for high-speed applications?

- A. Produces no torque at high speeds
- B. Smooth operation which decreases speed
- C. Heavier components reduce maximum speed ✓
- D. Requires a complex ignition system

Q55 Part B

An industrial diesel engine fitted with an automatic shutdown system begins to overheat. Which stopping method will the system typically initiate to ensure rapid and safe engine stoppage?

- A. Disconnecting the starter motor circuit fully
- B. Blocking the air intake using a shutoff flap
- C. Engaging the decompression lever automatically
- D. Cutting the fuel supply via solenoid valve action ✓

Q56 Part B

Which statement describes the main function of a die stock in the context of threading tools?

- A. It cleans debris from newly cut threads
- B. It measures the diameter of threads during threading operations
- C. It sharpens the cutting edges of dies
- D. It securely holds the die to cut external threads on rods or pipes ✓

Q57 Part B

If a flat chisel is used instead of a center punch before drilling, what problem might occur?

- A. Drill will make a larger hole
- B. Drill will cut faster
- C. Workpiece will become softer
- D. Drill bit may slip off the spot ✓

Q58 Part B

Excessive oil consumption in a diesel engine, accompanied by thick blue smoke emitting from the exhaust, most likely indicates:

- A. Piston rings worn out ✓
- B. Worn out gudgeon pins
- C. Low coolant level
- D. High oil level in the sump

Q59 Part B

When proper safety procedures are followed, compressed air may be used for many workshop tasks. Which of the following should never be done with compressed air?

- A. Clean machine surfaces
- B. Operate pneumatic tools
- C. Inflate vehicle tyres
- D. Remove dust from clothes ✓

Q60 Part B

If the battery is too weak to operate the starter motor, which starting method can be used in a suitable manual-transmission vehicle?

- A. Starting the vehicle by starter motor.
- B. Starting the vehicle by ignition switch.
- C. Starting the vehicle by push-starting. ✓
- D. Starting the vehicle by remote switch.

Q61 Part B

A technician observes that after a diesel engine runs for several hours, the vehicle's exhaust sound becomes much louder and a strong smell is detected at the tail pipe. What is the most probable function of the muffler being compromised in this situation?

- A. To regulate exhaust back pressure for engine braking
- B. To redirect exhaust gases and control flow only
- C. To convert exhaust gases and neutralize pollutants
- D. To silence exhaust noise and cool gases before exit ✓

Q62 Part B

A key advantage of using a lubricating compound in thread sealing is that it:

- A. Accelerates the curing of sealant used
- B. Acts as a solvent for contaminants present
- C. Improves thread strength significantly
- D. Prevents galling and seizing of threads ✓



Q63 Part B

During a batch production task, the operator must switch quickly between different sizes of workpieces. Which drill vice feature will improve efficiency without compromising holding security?

- A. Fixed jaws with no jaw adjustment capability
- B. Manual unscrewing of vice jaws for each workpiece change
- C. Quick-release mechanism with adjustable jaw inserts ✓
- D. Elastic bands added to standard vice jaws being used

Q64 Part B

In what way does contrast marking contribute to workshop safety?

- A. Raises cutting speed
- B. Minimizes chance of miscuts ✓
- C. Decreases lighting needs
- D. Increases oil spillage

Q65 Part B

When selecting a drill bit for making precise holes in a hard metal workpiece, which feature should be prioritized to ensure accuracy and tool life?

- A. The drill bit must have a decorative coating and short overall length.
- B. The drill bit should be made up of carbon steel and have a flat tip.
- C. The drill bit should have a long flute length and no coating at all.
- D. Drill bits need appropriate point angles and must be HSS or carbide. ✓

Q66 Part B

Which bearing applications in diesel engines make use of bronze materials?

- A. Bushings ✓
- B. Camshaft bearings
- C. Connecting rod bearings
- D. Main bearings

Q67 Part B

In Third Angle Projection, onto which plane is the elevation of an object projected?

- A. Vertical plane ✓
- B. Auxiliary plane
- C. Horizontal plane
- D. Inclined plane

Q68 Part B

Which component works directly with engine valves to manage air and exhaust flow in a diesel engine?

- A. The crankshaft
- B. The camshaft ✓
- C. The fuel injector
- D. The flywheel

Q69 Part B

Which mechanism acts as a lever to open the engine valve when pushed by the push rod in a diesel engine?

- A. Rocker arm mechanism ✓
- B. Tappet mechanism
- C. Camshaft mechanism
- D. Push rod mechanism

Q70 Part B

An engine test reveals that the feed pump supplies inconsistent amounts of fuel to the filters under varying engine speeds. What is the most likely explanation for this behavior, considering the feed pump's design and function?

- A. Air entering the fuel tank causes irregular fuel supply patterns.
- B. The camshaft-driven feed pump varies delivery with engine speed changes. ✓
- C. A clogged fuel filter causes fluctuating pressure in the system.
- D. The injector opening pressure changes with engine temperature.

Q71 Part B

Which component typically initiates the oil splash in a splash lubrication system?

- A. The vibrating crankcase
- B. The intake valve
- C. The rotating crankshaft ✓
- D. The vibrating cylinder head



Q72 Part B

In a real-life scenario, how should a mechanic systematically diagnose and remedy persistent high engine oil pressure involving multiple possible causes?

- A. Adjust fuel mixture, check battery terminals, and clean spark plugs
- B. Replace coolant, inspect radiator, and adjust idle speed
- C. Clean exhaust manifold, replace air filter, and tighten cylinder head bolts
- D. Check oil viscosity, inspect relief valve, clean oil filter, and verify oil pump operation ✓

Q73 Part B

Which electrical component fault can completely interrupt power supply to the ignition and starter circuits, causing engine not starting?

- A. Main fuse blown off ✓
- B. Air lock in fuel system
- C. Defective starting relay
- D. Defective brushes in starter

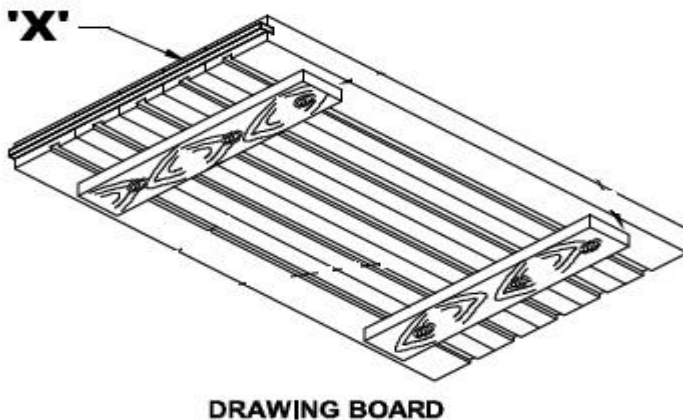
Q74 Part B

What is the main function of a direction control valve in a hydraulic system?

- A. To control the path of fluid flow ✓
- B. To adjust fluid temperature
- C. To regulate system pressure
- D. To filter contaminants from fluid

Q75 Part B

What is the name of the part of the shorter edges of the drawing board shown in the figure that is marked with 'X'?



- A. Drawing pin
- B. Battens
- C. Ebony edge ✓
- D. Wooden Strips



Part B

75 Questions · Answer Key

Q1 Part B

Which repair action is directly associated with restoring smooth current transfer in a damaged commutator in the starter motor?

- A. Tightening
- B. Rewinding
- C. Lubricating
- D. Regrounding ✓

Q2 Part B

When performing external checking of a forged component with outside callipers, which practice ensures reliable results?

- A. Recalibrating the tool after every measurement
- B. Reading values directly from the calliper scale
- C. Zeroing calliper to a known standard before use ✓
- D. Applying excessive force to ensure contact

Q3 Part B

Which combination of components allows a vernier calliper to measure both internal and external dimensions accurately?

- A. Fixed jaw, movable jaw & vernier scale ✓
- B. Locking screw and main scale
- C. Depth measuring blade and main scale
- D. Fixed jaw and locking screw

Q4 Part B

Which feature distinguishes a taper reamer from a straight reamer?

- A. A taper reamer's edges match the required taper ✓
- B. The number of flutes is always greater on taper reamers
- C. The handles are always longer on taper reamers
- D. Taper reamers have serrated teeth for faster cutting

Q5 Part B

A technician must prevent vibration-induced loosening in a bolted assembly on a high-speed machine. Which type of washer is suitable for this situation?

- A. Taper washer
- B. Flat washer
- C. Spring lock washer ✓
- D. Plain washer

Q6 Part B

A diesel mechanic is asked why carburetors are essential for petrol engines but not used in standard diesel engines. Based on the working principle, what is the best explanation?

- A. Carburetors adjust exhaust emissions for diesel engines only
- B. Carburetors create air-fuel mixtures required in petrol engines ✓
- C. Carburetors control engine cooling in both engine types
- D. Carburetors increase fuel atomization in diesel engines

Q7 Part B

Increasing current through a conductor increases the heat produced because heat is proportional to:

- A. Current
- B. Resistance only
- C. Voltage only
- D. Square of current ✓

Q8 Part B

Which factor most influences the completeness of combustion in a diesel engine?

- A. The engine's battery condition
- B. The mixing of air and fuel ✓
- C. The frequency of high voltage
- D. The octane number of fuel



Q9 Part B

Which condition can lead to low engine oil pressure in a diesel engine?

- A. Oil pressure gauge showing excessive pressure
- B. Oil pressure relief valve stuck closed
- C. Insufficient oil level in the sump ✓
- D. Oil of higher-than-recommended viscosity

Q10 Part B

In a hydraulic system, why is a non-return valve used when connecting a pump to a cylinder?

- A. To increase the pressure in the cylinder only
- B. To permit fluid flow in both directions
- C. To ensure one-way fluid flow & no backflow ✓
- D. To reduce leakage between connections

Q11 Part B

When using outside calipers to compare two shafts, what is the best approach?

- A. Estimate by eye after using calipers
- B. Use inside calipers for both shafts
- C. Measure both shafts together at once
- D. Set calipers to one shaft and check the other ✓

Q12 Part B

The extension lines are used together with _____ in engineering drawing dimensioning.

- A. Cutting plane lines
- B. Border lines
- C. Dimension lines ✓
- D. Hidden lines

Q13 Part B

In planning a new industrial site, engineers must select vehicles for internal goods movement. If safety and maneuverability are both priorities, which vehicle classification by wheels is most suitable?

- A. Two-wheel hand trolley
- B. Six-wheel articulated truck
- C. Four-wheel electric cart ✓
- D. Three-wheel scooter with mixed tires

Q14 Part B

How does the flywheel contribute to the operation of other engine accessories?

- A. By regulating valve operation
- B. By filtering fuel
- C. By providing a mounting surface ✓
- D. By cooling lubricant

Q15 Part B

In an industrial engine, the cooling water temperature unexpectedly rises above normal, but oil pressure and oil flow remain consistent. How does this condition affect the oil cooler's ability to regulate engine oil temperature?

- A. The oil cooler cools oil faster due to greater heat exchange rate
- B. The oil cooler becomes less effective, resulting in higher oil temperature ✓
- C. The oil cooler compensates automatically, keeping oil temperature stable
- D. The oil cooler maintains oil temperature by increasing water pressure

Q16 Part B

What is the main purpose of a diesel engine cylinder head?

- A. To seal the combustion chamber ✓
- B. To drive the crankshaft
- C. To lubricate pistons
- D. To supply fuel

Q17 Part B

Which vehicle body classification has a fixed roof, moderate passenger capacity, and a separate luggage compartment, commonly used as a family car?

- A. Sedan ✓
- B. Van
- C. Convertible
- D. Hatchback

Q18 Part B

How does the crankshaft help maintain engine balance during operation?

- A. By reducing exhaust gases
- B. By controlling valve timing
- C. By increasing fuel injection
- D. By using counterweights ✓



Q19 Part B

Which part of the crankshaft connects to the connecting rod in a diesel engine?

- A. Flange
- B. Flywheel
- C. Crankpin ☒
- D. Main journal

Q20 Part B

What is a key diagnostic sign of low oil pressure in a Hydraulic Electronic Unit Injector (HEUI) system?

- A. Engine misfires or rough running ☒
- B. Timing chain rattle noise
- C. High exhaust temperature
- D. Rapid fuel consumption rate

Q21 Part B

When designing an automated cutting machine that requires precise blade positioning from both sides, why is a double-ended cylinder preferred over a single-ended one?

- A. It allows use of different cylinder sizes for each side
- B. It requires more manual adjustment for alignment
- C. It balances force and movement bilaterally for accuracy ☒
- D. It makes synchronization with separate cylinders easier

Q22 Part B

The total surface area of a cylinder is given by _____.

- A. $2\pi r(h + r)$ ☒
- B. $2\pi rh$
- C. $4\pi r^2$
- D. $\pi r^2 h$

Q23 Part B

An engine exhibits erratic idling and excessive smoke after the induction manifold was reinstalled. What should be evaluated first regarding the diesel induction system's function?

- A. Clean the air cleaner to restore unrestricted intake flow
- B. Adjust the timing to optimize combustion efficiency
- C. Inspect the intake valve for proper seating and movement
- D. Check for manifold air leaks affecting air supply consistency ☒

Q24 Part B

In Marine Engines, which sequence best describes the coolant flow in a heat exchange cooling system after leaving the expansion tank?

- A. Direct to engine, then to oil cooler, then to cores
- B. To exhaust manifold, then to oil cooler, then to cores
- C. Around cores, to oil cooler, to engine coolant pump inlet ☒
- D. To keeling coil, then to engine, then to expansion tank

Q25 Part B

While welding, an operator observes sparks flying towards a nearby electrical extension board. What should be done to minimize electrical hazards during this activity?

- A. Place a damp cloth over the electrical extension board
- B. Shield the extension board using a metal cover
- C. Leave the electrical board in its current position
- D. Relocate the extension board outside the hazard zone ☒

Q26 Part B

What is the main function of the evaporative emission control system?

- A. It increases the engine operating temperature
- B. It increases the overall fuel consumption of the vehicle
- C. It prevents fuel vapours entering the atmosphere ☒
- D. It improves the performance and grip of tyres

Q27 Part B

A mechanic turns the ignition key in a vehicle fitted with an electrical fuel pump. What happens to the pump at that moment?

- A. The pump starts after engine warms up fully
- B. The pump starts after fuel pressure drops
- C. The pump starts when the vehicle begins moving
- D. The pump starts operating immediately upon ignition ☒

Q28 Part B

Which part of a Vernier caliper is used to measure the depth of a hole?

- A. The main scale
- B. The locking screw
- C. The depth measuring blade ☒
- D. The fixed jaw



Q29 Part B

Which scenario best demonstrates the correct use of a wire brush in an ITI workshop?

- A. Painting a metal pipe for finishing
- B. Measuring the pipe length accurately
- C. Cutting a metal pipe for measurement tasks
- D. Cleaning a metal pipe before using a scribe ☒

Q30 Part B

In a scenario where flatness and minimal material removal are both critical, which lapping abrasive trait should be prioritized when selecting a compound?

- A. Chemical inertness
- B. Controlled abrasive friability ☒
- C. High initial hardness
- D. High thermal conductivity

Q31 Part B

Which combination of actions helps prevent engine overheating due to coolant flow issues?

- A. Replace exhaust manifold gasket and inspect timing
- B. Flush cooling system and replace thermostat ☒
- C. Change fuel type for better combustion
- D. Adjust injector pressure and clean air intake

Q32 Part B

Which of the following best describes the use of a non-continuous/dashed lines in engineering drawing?

- A. To show dimension and extension lines
- B. To represent visible outlines and edges
- C. To indicate hidden outlines and edges ☒
- D. To indicate cutting planes

Q33 Part B

Which of the following aspects is most important for controlling vehicle emissions in modern diesel vehicles?

- A. Using proper emission control systems reduces harmful exhaust gases ☒
- B. Increasing engine size helps reduce emission levels in diesel vehicles
- C. Using high-content carbon fossil fuels results in lower vehicle emissions
- D. Ignoring engine maintenance and overhauling leads to reduced emissions

Q34 Part B

During routine workshop maintenance, 80 liters of used engine oil are collected. If each disposal drum has a marked capacity of 25 liters and regulations require drums to be filled to only 80 percent for safe transport, how many drums are required?

- A. 4 drums ☒
- B. 6 drums
- C. 3 drums
- D. 5 drums

Q35 Part B

Which type of wire is used for the pull-in winding in a solenoid switch?

- A. Thin Copper wire
- B. Thick Aluminium wire
- C. Thick Copper wire ☒
- D. Silver wire

Q36 Part B

In engineering drawing, what angle do two radii form within a quadrant?

- A. 45°
- B. 180°
- C. 360°
- D. 90° ☒

Q37 Part B

Which maintenance task is critical for a Hydraulic Electronic Unit Injector (HEUI) system reliability?

- A. Regular injector nozzle cleaning
- B. Routine air filter replacement
- C. Regular engine oil changes ☒
- D. Frequent fuel filter cleaning

Q38 Part B

Which engine is generally more compact for the same power output?

- A. External combustion engine
- B. Internal combustion engine ☒
- C. Steam engine
- D. Stirling engine



Q39 Part B

In which situation is a paper gasket used as a sealing element in automotive applications?

- A. Sealing flat, smooth surfaces with low pressure ✓
- B. Sealing high-temperature exhaust manifolds
- C. Sealing uneven, rough surfaces in high vibration areas
- D. Sealing joints exposed to heavy oils and chemicals

Q40 Part B

Which of the following represents the total surface area of a sphere?

- A. $2\pi r^2$
- B. $4\pi r^2$ ✓
- C. πr^2
- D. $3\pi r^2$

Q41 Part B

A mechanic inspects a modern diesel vehicle and notices the seat belt warning light remains active even when the passenger seat is empty. Based on the dashboard instrument design, which action should the mechanic prioritize to ensure system reliability?

- A. Check for blown seat belt indicator bulbs only
- B. Inspect the seat weight sensor wiring for faults ✓
- C. Update the vehicle's onboard software system
- D. Replace the dashboard instrument cluster immediately

Q42 Part B

Which part of the micrometer should be cleaned to remove debris after use?

- A. Ratchet stop
- B. Thimble
- C. Measuring faces ✓
- D. Lock nut

Q43 Part B

Why are fillets provided at the junctions of crank pins and webs?

- A. Decrease exhaust noise
- B. Enhance combustion efficiency
- C. Reduce stress concentration ✓
- D. Improve fuel atomization

Q44 Part B

In an electrical machine, interaction between stator and rotor magnetic fields produces:

- A. Mechanical torque ✓
- B. Thermal insulation
- C. Electrochemical action
- D. Optical energy

Q45 Part B

An engine with a two-part mechanical fuel pump design is experiencing intermittent fuel supply issues. During inspection, the technician finds that all external connections are secure and the mounting bolts are tight. What should the technician examine next to identify the source of the problem?

- A. The technician should check the fuel quality in the tank.
- B. The technician should inspect the pump exterior for leaks.
- C. The technician should inspect the internal rocker cam connection. ✓
- D. The technician should examine electrical connections to the pump.

Q46 Part B

Why does using oil with incorrect viscosity contribute to low engine oil pressure in a diesel engine?

- A. Overfilled oil sump increases oil pressure
- B. Underfilled oil sump increases oil pressure
- C. High viscosity oil restricts oil flow and increases pressure
- D. Low viscosity oil flows too easily and reduces pressure ✓

Q47 Part B

Which environmental problem is most closely linked to increased carbon dioxide emissions?

- A. Thinning of ozone layer in upper sky
- B. Soil erosion in agricultural fields
- C. Rising global temperatures over long periods ✓
- D. Formation of acid rain on buildings



Q48 Part B

In a scenario where multiple remedies are possible, how should a mechanic address persistent engine noise after all standard procedures have failed?

- A. Lubricating piston rings using correct oil
- B. Replacing air filter with high-quality type
- C. Conducting a comprehensive engine teardown and inspection ✓
- D. Adjusting valve clearance to manufacturer recommendations

Q49 Part B

While manufacturing a cutting tool, which mechanical property is most important for the material to resist wear and scratching during operation?

- A. Ductility
- B. Hardness ✓
- C. Elasticity
- D. Toughness

Q50 Part B

What issue can occur in the charging system due to a worn out or sticking brush in the alternator?

- A. No charging condition ✓
- B. Alternator noise
- C. Over charging condition
- D. Low output

Q51 Part B

What type of gears is most commonly used in a ship's reduction gearbox?

- A. Double helical gears ✓
- B. Spur gears
- C. Worm gears
- D. Bevel gears

Q52 Part B

A mechanic observes that the gear shift indicator suggests an upshift during steady driving at moderate speed. Why is following the gear shift indicator's recommendation beneficial in this scenario?

- A. Following the gear shift indicator's recommendation enhances rapid acceleration and shortens journey times.
- B. Following the gear shift indicator's recommendation reduces unnecessary engine load and improves fuel efficiency. ✓
- C. Following the gear shift indicator's recommendation increases transmission temperature and reduces driver comfort.
- D. Following the gear shift indicator's recommendation maintains high engine speed and increases exhaust emissions.

Q53 Part B

Apart from drawing circles, a large compass is also used for:

- A. Measuring temperature
- B. Cutting sheets
- C. Printing drawings
- D. Taking large measurements ✓

Q54 Part B

If a supercharger is driven directly by the engine through gears and shafts, what will happen for engine operation at higher speeds?

- A. It decreases compressed intake-charge delivery.
- B. It stops compressed intake-charge delivery.
- C. It keeps intake-charge delivery unchanged.
- D. It increases compressed intake-charge delivery. ✓

Q55 Part B

Which engine type is more suitable for vehicles requiring frequent speed changes and quick acceleration?

- A. Stirling engine
- B. Steam engine
- C. Internal combustion engine ✓
- D. External combustion engine



Q56 Part B

Which process best describes the use of a cylindrical lap in achieving a high-quality surface finish on hardened steel shafts?

- A. Rubbing the lap manually without compound
- B. Applying compound but not rotating the lap
- C. Using the lap without abrasive compound applied
- D. Rotating the lap with abrasive compound applied evenly ✓

Q57 Part B

Why are Bharat Stage standards updated periodically for diesel engine vehicles in India?

- A. They are updated to reduce pollution and match global emission requirements ✓
- B. They are updated to improve fuel efficiency and decrease maintenance costs
- C. They are updated to increase vehicle sales and purchasing capacity in India
- D. They are updated to maintain older diesel engine designs and keep them functional

Q58 Part B

Which feature makes a scribe suitable for marking on metal surfaces?

- A. Flexible rubber grip
- B. Hard pointed tip ✓
- C. Graduated measuring scale
- D. Wide flat blade

Q59 Part B

Which piston pin locking system is NOT commonly preferred in high-speed engines because of vibration loosening?

- A. Wire lock locking
- B. End pad locking
- C. Circlip locking
- D. Set screw locking ✓

Q60 Part B

A thermocouple generates thermoelectric voltage when its two junctions are at:

- A. Different temperatures ✓
- B. Equal temperatures
- C. Zero pressure
- D. Equal resistance

Q61 Part B

Which of the following is a common application of pneumatic systems in automobiles?

- A. Running the fuel pump in cars
- B. Operating heavy vehicle brakes ✓
- C. Powering headlights in cars
- D. Starting the engine in cars

Q62 Part B

A mechanic observes that the engine temperature indicator on the instrument panel has moved into the red zone during operation. What does this instrument primarily indicate in the context of the cooling system?

- A. It indicates the temperature of water in engine water jackets. ✓
- B. It shows the fuel level in the fuel tank only.
- C. It displays the engine RPM on the instrument panel.
- D. It measures the oil pressure in the engine block.

Q63 Part B

A senior technician explains that the recovery system's design allows expelled coolant to return to the radiator instead of being lost. How does this benefit overall cooling system performance?

- A. It maintains system volume and reduces risk of overheating or air entry ✓
- B. It lowers engine noise and reduces mechanical vibration
- C. It enhances coolant flow rate and improves engine performance
- D. It improves fuel efficiency and reduces exhaust emissions

Q64 Part B

During troubleshooting, a mechanic finds premature bearing wear in a diesel engine with infrequent oil filter changes. What does this suggest about the filter's function?

- A. It is used for reducing operational noise in oil
- B. It is critical for removing abrasive particles from oil ✓
- C. It is important for raising the total oil volume always
- D. It is necessary for changing oil flow direction only



Q65 Part B

What property should a diesel engine bearing material have to withstand high loads?

- ☒ A. High fatigue strength
- ☐ B. Low melting point
- ☐ C. High porosity
- ☐ D. Low thermal conductivity

Q66 Part B

If an engine is operated in a tilted position for extended periods, which lubrication system is most likely to ensure reliable oil supply to all parts?

- ☐ A. Oil mist lubrication system
- ☐ B. Wet sump lubrication system
- ☒ C. Dry sump lubrication system
- ☐ D. Splash lubrication system

Q67 Part B

Which of the following is an important step to ensure personal safety in an auto workshop?

- ☒ A. Wearing protective gloves and goggles
- ☐ B. Working with wet hands near electrical equipments
- ☐ C. Keeping tools scattered on the floor of the workshop
- ☐ D. Ignoring warning signs in the workshop

Q68 Part B

Valve seat inserts are commonly made from which type of material?

- ☒ A. High-strength alloy steel
- ☐ B. Aluminum alloy base
- ☐ C. Lead-tin alloy
- ☐ D. Copper and tin mixture

Q69 Part B

In a series circuit, all components are connected in:

- ☐ A. Separate branches
- ☐ B. Parallel paths only
- ☐ C. Independent voltage loops
- ☒ D. A single current path

Q70 Part B

If the oil return passages are blocked and the piston rings are worn, what is the likely outcome in a diesel engine?

- ☐ A. Reduced fuel pressure
- ☐ B. Overheated starter motor
- ☐ C. Poor battery charging
- ☒ D. Excessive oil consumption

Q71 Part B

Which part interacts directly with the camshaft lobe to open an engine valve?

- ☐ A. The crankshaft main journal
- ☒ B. The valve lifter or follower
- ☐ C. The piston ring assembly
- ☐ D. The flywheel ring gear

Q72 Part B

While servicing a diesel engine, a technician notes that the extractor manifold helps maintain a specific gas velocity. What design feature of the extractor primarily supports this function?

- ☐ A. Modifying the timing of ignition sparks
- ☐ B. Adjusting the size of engine pistons used
- ☐ C. Changing the type of fuel supplied to engine
- ☒ D. Choosing the correct tube diameter for flow

Q73 Part B

A maintenance supervisor is designing a test to evaluate the effect of radiator cap pressure on engine cooling systems. He uses three identical engines but fits each with radiator caps rated at 0.7 bar, 1.0 bar, and 1.3 bar, respectively. Which system will allow the coolant to reach the highest temperature before boiling?

- ☒ A. System with the 1.3 bar radiator cap installed
- ☐ B. System with the 0.7 bar radiator cap installed
- ☐ C. System with the 1.0 bar radiator cap installed
- ☐ D. All systems will boil at the same temperature

Q74 Part B

What is the main advantage of using superchargers in marine engines?

- ☐ A. Reduces air compression
- ☐ B. Increases engine size
- ☐ C. Decreases engine efficiency
- ☒ D. Increases thermal efficiency



Q75 Part B

What would happen if the intake valve in a diesel engine is too small?

A. Less air would enter the cylinder



B. The engine would cool faster

C. More fuel would flow into the engine

D. Exhaust gases would increase

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Part B

75 Questions • Answer Key

Q1 Part B

Which trigonometric ratio represents the opposite side divided by the hypotenuse in a right triangle?

- A. Sine ✓
- B. Cotangent
- C. Cosine
- D. Tangent

Q2 Part B

Which operational amplifier configuration is commonly used in zero crossing detectors?

- A. Inverting amplifier with negative feedback is used.
- B. Comparator configuration without feedback is used. ✓
- C. Integrator circuit with resistive feedback is used.
- D. Non-inverting amplifier with positive feedback is used.

Q3 Part B

What is the first safety step before dismantling a desktop computer?

- A. Remove RAM from all RAM slots
- B. Open the cabinet
- C. Switch off and unplug the power supply ✓
- D. Disconnect data cables

Q4 Part B

Which of the following is a primary criterion when choosing a sensor for monitoring temperature in a manufacturing process?

- A. Accuracy of the sensor readings ✓
- B. Color of the sensor housing
- C. Overall cost of the sensor
- D. Physical size of the sensor

Q5 Part B

Which component is used to set biasing in a transistor amplifier but, if omitted, leads to unstable operation?

- A. Inductor
- B. Diode
- C. Resistor network ✓
- D. Transformer

Q6 Part B

In an 8051 microcontroller, during a debugging session, several PUSH instructions are executed, and the stack pointer reaches address 31H. Which memory area is now being used for stack storage?

- A. Bit-addressable RAM area
- B. General-purpose RAM area ✓
- C. Register bank area
- D. Program memory area

Q7 Part B

A draftsman needs to construct a precise 75° angle without using a protractor. Which combination of instruments should be used?

- A. Use two 45° set-squares together against a T-square
- B. Use a mini-drafter aligned with a T-square edge
- C. Use a 45° set-square with a 30°–60° set-square against a T-square ✓
- D. Use a divider to bisect a 120° angle accurately

Q8 Part B

A semiconductor sample shows conduction mainly due to holes, while electrons exist only in small numbers due to thermal generation. Identify the semiconductor type.

- A. Intrinsic semiconductor at 0 K
- B. N-type semiconductor at room temperature
- C. P-type semiconductor at room temperature ✓
- D. Intrinsic semiconductor at room temperature



Q9 Part B

An n-type semiconductor is formed by doping with:

- A. Trivalent impurities
- B. Pentavalent impurities** ✓
- C. Divalent impurities
- D. Monovalent impurities

Q10 Part B

Which factor determines the selection of a soldering iron tip for a solder joint?

- A. The color of the soldering iron handle
- B. The size and type of the solder joint** ✓
- C. The storage condition of the soldering iron
- D. The frequency of tip cleaning

Q11 Part B

A technician connects a load to the output of a half-wave rectifier without using a filter. What is the nature of the voltage across the load?

- A. Alternating voltage
- B. Pulsating DC voltage** ✓
- C. Pure DC voltage
- D. Pulsating AC voltage

Q12 Part B

A technician connecting a desktop PC to a network switch in a modern office environment should use a _____ cable terminated with _____ connectors to establish a stable local connection.

- A. coaxial; BNC
- B. twisted pair; RJ45** ✓
- C. USB; Type A
- D. fiber optic; SC

Q13 Part B

What is the function of an HDMI port when connecting an external source device to an LED or LCD TV?

- A. To step down the main AC power voltage to safely operate the internal TV logic boards
- B. To convert incoming analog video signals into digital formats inside the TV panel
- C. To automatically increase the native optical refresh rate of the liquid crystal display pixels
- D. To transmit uncompressed digital video and multi-channel audio simultaneously through a single cable** ✓

Q14 Part B

Three identical 12 V batteries are connected in parallel to supply a load current of 18 A. Assuming equal sharing, how much current is supplied by each battery?

- A. 9 A
- B. 18 A
- C. 6 A** ✓
- D. 4 A

Q15 Part B

Which connection interface should be used to link a high-definition (HD) digital set-top box to a modern LED or LCD TV to transmit both uncompressed digital video and multi-channel audio through a single cable while supporting Consumer Electronics Control (CEC) to operate both devices with a single remote?

- A. Component Video (YPbPr)
- B. Composite Video (RCA)
- C. S-Video
- D. HDMI** ✓

Q16 Part B

When a zero crossing detector is used to measure the frequency of a periodic AC signal, what quantity must be counted?

- A. The number of output transitions per unit time** ✓
- B. The phase difference between input and output signals
- C. The average voltage level of the output signal
- D. The number of input voltage peaks per cycle

Q17 Part B

If the input resistor of an inverting amplifier using OP-AMP is doubled and the feedback resistor remains the same, what happens to the magnitude of voltage gain?

- A. Becomes one fourth
- B. It is halved** ✓
- C. Stays the same
- D. It doubles



Q18 Part B

An industrial engineer wants to optimize a photoelectric switch system for detecting various packages on a conveyor belt, where the packages differ in shape, color, and surface reflectivity. Which of the following changes would most improve the switch's detection reliability for all package types?

- A. Increasing supply voltage to the sensor within rated limits
- B. Adjusting the sensor's sensitivity and alignment to account for target surface characteristics ✓
- C. Changing wire insulation material for better signal integrity
- D. Using a heavier sensor for mounting stability

Q19 Part B

During circuit testing across a PN junction diode, a technician finds that holes are responsible for electrical conduction in a semiconductor. Which region of a PN junction diode does this indicate?

- A. Intrinsic region
- B. P-type region ✓
- C. Depletion region
- D. N-type region

Q20 Part B

What is the phase shift required in RC phase shift oscillator from the entire feedback RC network to produce oscillations?

- A. 90 degrees
- B. 360 degrees
- C. 180 degrees ✓
- D. 270 degrees

Q21 Part B

What is the resistance value of a surface-mount resistor marked '472' according to SMD resistor code conventions?

- A. 470 ohms
- B. 47000 ohms
- C. 4700 ohms ✓
- D. 4.7 ohms

Q22 Part B

Which phase relationship exists between input and output signals in a Common Emitter amplifier?

- A. Output is in phase with input
- B. Output lags input by 90°
- C. Output leads input by 90°
- D. 180° phase shift ✓

Q23 Part B

While diagnosing an NPN BJT in a SOT-23 package, your multimeter positive probe (+) is locked on the Base (Pin 1). Measuring to Pin 3 reads 0.6 V, while measuring to Pin 2 reads 0.68 V. Which pin is the Emitter?

- A. Pin 2 is the Emitter, because it has the higher voltage drop. ✓
- B. Pin 3 is the Emitter, because it has the lower voltage drop.
- C. Neither pin; the transistor is broken because the readings don't match.
- D. Both pins are identical and can be used interchangeably.

Q24 Part B

How many pins are present on a standard PATA ribbon cable header for desktop hard drives?

- A. 50 pins
- B. 68 pins
- C. 34 pins
- D. 40 pins ✓

Q25 Part B

Which safety action shall be completed first before replacing a blown fuse in an electrical circuit?

- A. Replace the fuse with a copper wire
- B. Touch the fuse terminals to confirm the fault
- C. Replace the fuse with a higher current rating
- D. Switch OFF the circuit supply ✓

Q26 Part B

How does a voltage cut-off system contribute to the reliability of a power inverter in industrial use?

- A. It increases the battery life in all circumstances.
- B. It ensures the inverter operates only within safe voltage parameters. ✓
- C. It directly lowers electromagnetic interference.
- D. It maintains efficiency regardless of input voltage.



Q27 Part B

During the operation of a two-phase stepper motor, one of its phase windings becomes disconnected. What is the most likely effect on the performance of the motor?

- A. The motor will rotate at twice its rated speed.
- B. The motor efficiency will improve due to reduced power consumption.
- C. The motor will continue to operate normally with full torque.
- D. The motor will experience a significant reduction in torque and may fail to step accurately. ✓

Q28 Part B

During a lab experiment, the current through a magnetizing coil is increased, while the magnetic path length remains unchanged. What will happen to the magnetic field strength?

- A. It remains constant
- B. It becomes zero
- C. It decreases
- D. It increases ✓

Q29 Part B

A 1 kHz square wave signal is applied to the input A of a NOT gate. What will be observed at the output of the NOT gate?

- A. A constant LOW (0) signal
- B. A 1 kHz square wave signal identical to the input
- C. A constant HIGH (1) signal
- D. A 1 kHz square wave signal inverted (complemented) with respect to the input ✓

Q30 Part B

What is the main function of the sensors in an IoT system?

- A. To process collected data
- B. To store large amounts of information
- C. To collect data from the environment ✓
- D. To perform an action that changes the environment

Q31 Part B

Which of the following is a type of RC Oscillator?

- A. Colpitts Oscillator
- B. Phase Shift Oscillator ✓
- C. Crystal Oscillator
- D. Hartley Oscillator

Q32 Part B

In engineering drawing practice, which lettering convention is preferred for marking part numbers to maintain clarity, readability, and uniformity?

- A. Use lowercase letters for small-sized part numbers to save space
- B. Use lowercase letters for part numbers to reduce writing effort
- C. Use uppercase letters for all part numbers to maintain standardization ✓
- D. Use a mixture of uppercase and lowercase letters for all part numbers

Q33 Part B

In a Pulse Width Modulation (PWM) signal, the duty cycle is defined as:

- A. Variation in the amplitude of the pulses
- B. Ratio of the pulse ON-time (width) to the total time period of the signal ✓
- C. Phase difference between input and output signals
- D. Variation in the frequency of the pulses

Q34 Part B

Which electrical quantity is defined as the potential difference between two points in an electrical circuit?

- A. Current
- B. Resistance
- C. Power
- D. Voltage ✓

Q35 Part B

When following the proper procedure to read voltage using a PMMC Voltmeter, which type of voltage can be measured accurately?

- A. Alternating current (AC) voltage only
- B. Both AC and DC voltage accurately
- C. Direct current (DC) voltage only ✓
- D. High-frequency AC voltage only



Q36 Part B

In a three-phase, four-wire electrical distribution system, the fourth pole of a four-pole Miniature Circuit Breaker (MCB) is generally used for switching and protecting which conductor?

- A. Pilot wire
- B. Neutral conductor ✓
- C. Control circuit conductor
- D. Earth conductor

Q37 Part B

In a single-phase fan or motor circuit used in workshop practice, why is a capacitor connected in series with the auxiliary winding?

- A. To produce phase difference for better starting torque ✓
- B. To increase conductor resistance permanently
- C. To reduce the supply frequency
- D. To act as a fuse during overload

Q38 Part B

Which feature best distinguishes a stud extractor from an open-end spanner in its intended application?

- A. A stud extractor grips and removes a stud, while an open-end spanner fits the flats of a bolt. ✓
- B. A stud extractor is used only for tightening, while an open-end spanner is used only for loosening.
- C. A stud extractor requires external heating before use, while an open-end spanner does not.
- D. A stud extractor is longer than an open-end spanner, providing greater torque.

Q39 Part B

A work area contains flammable chemicals and moving machinery. Which combination of safety signs is most appropriate for these hazards?

- A. Danger signs for chemicals and warning signs for machinery ✓
- B. Caution signs for chemicals and warning signs for exits
- C. Warning signs for chemicals and caution signs for machinery
- D. Danger signs for machinery and caution signs for chemicals

Q40 Part B

To connect a local computer to a network switch, a technician must crimp an 8-pin _____ connector onto the Ethernet cable and plug it directly into the switch's matching _____.

- A. USB; console interface
- B. RJ45; LAN port ✓
- C. RJ11; telephone jack
- D. BNC; coaxial socket

Q41 Part B

Which set of terminals is commonly used to connect a Field Effect Transistor in a circuit?

- A. Gate, Drain, Source ✓
- B. Positive, Negative, Neutral
- C. Emitter, Collector, Base
- D. Anode, Cathode, Grid

Q42 Part B

The working principle of a crystal oscillator is based on:

- A. Hall effect
- B. Thermionic emission
- C. Photoelectric effect
- D. Piezoelectric effect ✓

Q43 Part B

In a JK flip flop, the J input mainly performs which function when $K = 0$ and the clock is active?

- A. The Set input ✓
- B. The Toggle input
- C. The Reset input
- D. The Clock input

Q44 Part B

A technician notices the relay in a stabilizer frequently clicks on and off rapidly when connected to an SMPS. What is the most probable issue?

- A. The SMPS is overloaded
- B. The input voltage is fluctuating rapidly ✓
- C. The relay is stuck in one position
- D. The stabilizer has a blown fuse



Q45 Part B

Why are optical fibers less susceptible to electromagnetic interference compared to copper wires?

A. They use light instead of electrical signals ✓

B. They are covered with metal

C. They have higher resistance

D. They are thicker than copper wires

Q46 Part B

What happens if an amplifier is not properly biased?

A. It increases output power

B. It always turns off the amplifier

C. It may cause distortion ✓

D. It improves efficiency

Q47 Part B

A telecommunications company observes call drops at the borders of adjacent cell sites. Which cell site configuration adjustment would minimize this issue?

A. Introducing overlapping coverage areas with handover protocols ✓

B. Decreasing the height of all cell site antennas

C. Reducing the transmission power of each cell site

D. Assigning the same frequency to neighboring cell sites

Q48 Part B

In the two-wattmeter method used for measuring power in a balanced three-phase load, both wattmeters show equal readings. Based on this observation, what is the power factor of the load?

A. 0

B. 1.0 ✓

C. 0.866

D. 0.5

Q49 Part B

How should screws be tightened when mounting a Hard Disk Drive (HDD) in a desktop computer?

A. Tighten as much as possible with full force

B. Tighten screws evenly and firmly without over-tightening ✓

C. Leave screws slightly loose for HDD to move freely

D. Tighten only one side

Q50 Part B

While free-hand sketching a circular pipe from a very steep viewing angle, the circular end appears as a narrow ellipse. Which statement is correct?

A. The minor axis equals the true diameter, while the major axis becomes very small

B. The major axis becomes twice the true diameter, while the minor axis remains unchanged

C. Both axes reduce equally, forming a smaller circle

D. The major axis equals the true diameter, while the minor axis becomes very small ✓

Q51 Part B

In an n-channel enhancement mode MOSFET, what must be applied to the gate terminal relative to the source to turn the device on?

A. A positive voltage ✓

B. A negative voltage

C. A gate current

D. A zero voltage

Q52 Part B

Which statement correctly distinguishes a primary battery from a secondary battery?

A. A primary battery always has higher voltage than a secondary battery

B. A primary battery is used only in automobiles, while a secondary battery is used only in torches

C. A primary battery can be recharged many times, while a secondary battery cannot be recharged

D. A primary battery is generally non-rechargeable, while a secondary battery can be recharged and reused ✓

Q53 Part B

Which internal hardware component of an LCD TV is responsible for regulating, filtering, and distributing the appropriate low-voltage direct current (DC) operational power rails required by the main logic board and the panel timing controller?

A. Switch-Mode Power Supply (SMPS) board ✓

B. T-CON microprocessing chip

C. Low-Voltage Differential Signaling (LVDS) interface

D. Liquid Crystal Display (LCD) shutter matrix



Q54 Part B

A Pulse Amplitude Modulation signal can be recovered at the receiver end using a/an _____.

- A. Low-pass filter** ✓
- B. Inverter
- C. High-pass filter
- D. Attenuator

Q55 Part B

Which antenna is best suited for directional communication over long distances?

- A. Dipole antenna
- B. Isotropic antenna
- C. Parabolic antenna** ✓
- D. Monopole antenna

Q56 Part B

Which of the following statements about HDDs is correct in computer hardware technology?

- A. HDDs use flash memory to store data
- B. HDDs are used for temporary storage only
- C. HDDs store data on spinning magnetic disks** ✓
- D. HDDs use optical discs for storage

Q57 Part B

A standard multiplexed 6 by 4 LED matrix contains a total of _____ independent light-emitting nodes, which can be fully operated using a minimum of _____ microcontroller control pins.

- A. 10; 24
- B. 48; 48
- C. 24; 10** ✓
- D. 24; 24

Q58 Part B

While designing a system using an 8051 microcontroller, the lower address byte and data are multiplexed on the same lines. Which hardware component is required to hold the lower address byte temporarily for correct memory access?

- A. Multiplexer
- B. Encoder
- C. Latch** ✓
- D. Subtractor

Q59 Part B

Which component provides power to the motherboard and other devices?

- A. RAM
- B. HDD
- C. Heat Sink
- D. SMPS** ✓

Q60 Part B

In a Common-Base (CB) transistor amplifier, the phase difference between the input voltage (emitter-base) and the output voltage (collector-base) is:

- A. 0°** ✓
- B. 45°
- C. 180°
- D. 90°

Q61 Part B

How does Hard Disk store data in a desktop computer?

- A. Paper tape
- B. Flash chips only
- C. Optical discs
- D. Magnetic platters** ✓

Q62 Part B

What problem can occur with a Digital Storage Oscilloscope (DSO) if its sampling rate is too low for a high-frequency signal, compared to an analog CRO?

- A. The analog input probe tips will melt due to excessive heat generation.
- B. Aliasing error, where the displayed waveform appears as an incorrect low-frequency signal shape.** ✓
- C. The input signal will automatically switch to a direct current measurement mode.
- D. The entire display screen will permanently turn off due to over-sampling.

Q63 Part B

What is the configuration called when the emitter terminal of a transistor is common to both input and output circuits?

- A. Emitter follower
- B. Common emitter** ✓
- C. Common base
- D. Common collector



Q64 Part B

In an operational amplifier integrator circuit, which component acts as feedback between the output and the input?

A. Capacitor



B. Inductor

C. Transistor

D. Resistor

Q65 Part B

During a laboratory test, a trainee builds an RS flip-flop using NOR gates (active-HIGH inputs). Initially, the output $Q = 0$. The trainee applies $S = 1$ (Set input) and $R = 0$ (Reset input). After this, both inputs are returned to $S = 0$ and $R = 0$. What will happen to the output Q ?

A. Q will return to 0 after inputs become 0.

B. Q will continuously toggle between 0 and 1.

C. Q will remain at 1 after inputs become 0, holding the last state.



D. Q will become invalid when inputs return to 0.

Q66 Part B

What does 'hand off' mean in the context of cell phones?

A. Handover a call from one cell to another



B. Make a new phone call

C. Turn off the cell phone

D. Charge the phone battery

Q67 Part B

You measure an intact SMD diode in the high-frequency switching stage of an LED driver. The multimeter forward voltage drop reads 0.240 V. What specific type of diode does this low voltage threshold identify?

A. Standard Silicon Rectifier Diode

B. Schottky Diode



C. Zener Diode

D. Light Emitting Diode (LED)

Q68 Part B

Which of the following components are used to determine the frequency of oscillation in a Colpitts oscillator?

A. Diodes and resistors

B. Inductor and resistors

C. Capacitors and inductor



D. Resistors and capacitors

Q69 Part B

A wire of some material has resistance 10 ohm at a certain length. To make its resistance 5 ohm using the same material and same cross-sectional area, what should be the new length?

A. Half of the original length



B. Double the original length

C. One fourth of the original length

D. Same as the original length

Q70 Part B

Which motherboard component is used to connect storage devices like HDD or SSD in desktop computer system?

A. USB port

B. PCIe slot

C. RAM slot

D. SATA port

**Q71 Part B**

How does the construction of a MOSFET help to achieve high input impedance?

A. The device has a thick substrate for support

B. The gate uses a resistive layer to limit current

C. The gate is insulated from the channel by a thin oxide layer



D. The gate is connected directly to the channel

Q72 Part B

Which of the following is **NOT** a sensor performance characteristic?

A. Sensitivity

B. Cost



C. Linearity

D. Range



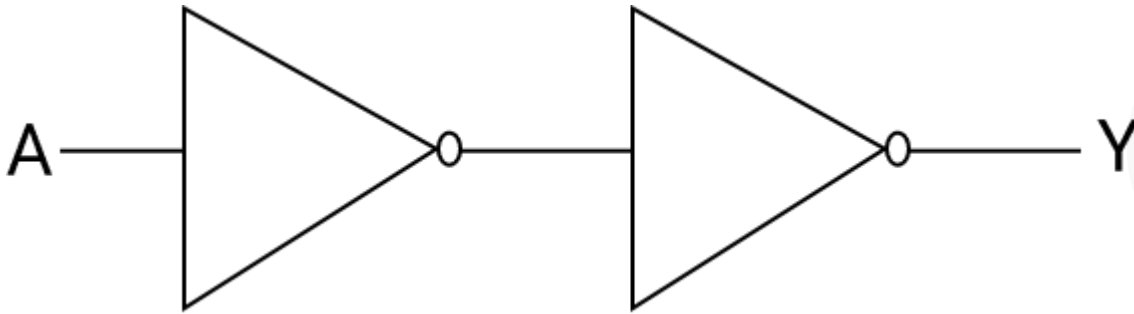
Q73 Part B

If the equivalent inductance in a Hartley oscillator is doubled, the frequency is:

- A. Reduced by $\sqrt{2}$ ✓
- B. Doubled
- C. Halved
- D. Increased by $\sqrt{2}$

Q74 Part B

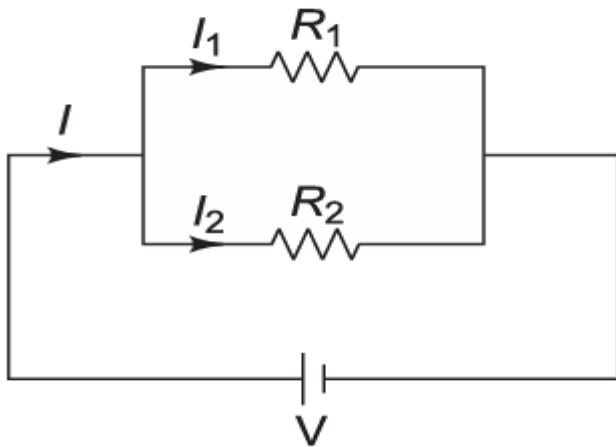
What is the output Y of the following digital circuit if the input A = 1?
(Note: Both the logic gates shown in the diagram are NOT gates.)



- A. 1 ✓
- B. High Impedance State
- C. 0
- D. Undefined

Q75 Part B

Two resistors of $8\ \Omega$ and $24\ \Omega$ are connected in parallel across a 12 V supply, as shown in the following figure. What is the total current drawn from the source?



- A. 4 A
- B. 2 A ✓
- C. 1 A
- D. 0.5 A



Part B

75 Questions • Answer Key

Q1 Part B

Why is an online UPS preferred for critical computer equipment over other types of UPS?

- A. It is less expensive than all other UPS types
- B. It is physically smaller than offline UPS systems
- C. It eliminates transfer time, preventing even brief power interruptions ✓
- D. It uses fewer electronic components

Q2 Part B

During the troubleshooting workflow of an LED TV that has a No Video, But Has Audio fault condition, which of the following diagnostic steps should a technician perform immediately after confirming the power supply voltages are normal?

- A. Replace the primary microprocessing main board assembly.
- B. Replace the liquid crystal display panel assembly immediately.
- C. Perform a flashlight test on the screen to check for a faint image. ✓
- D. Increase the main AC input voltage using a variable autotransformer.

Q3 Part B

A technician opens a computer cabinet and notices a round coin-shaped battery on the motherboard. What is its purpose?

- A. Power the monitor
- B. Control USB ports
- C. Store BIOS/CMOS settings ✓
- D. Increase RAM speed

Q4 Part B

An ITI workshop implements 5S but notices recurring safety hazards because tools are often left in different locations and workers cannot find them quickly. Which 5S step should be strengthened most effectively?

- A. Shine
- B. Set in Order ✓
- C. Sort
- D. Sustain

Q5 Part B

What is the function of a half wave rectifier?

- A. It stores electrical energy
- B. It converts DC to AC
- C. It converts AC to DC ✓
- D. It amplifies signals

Q6 Part B

What does the term booting mean in a computer system?

- A. Starting a computer and loading the operating system ✓
- B. Scanning for virus and deleting the infected files
- C. Defragmenting a hard disk to fix bad sectors
- D. Installing open source software tools

Q7 Part B

Which of the following inputs is applied to a base terminal in a transistor amplifier during lab testing?

- A. Zero signal input
- B. Random noise signal
- C. High DC voltage input
- D. Small AC signal input ✓

Q8 Part B

What is the primary purpose of using the Pulse Amplitude Modulation (PAM) technique in communication systems?

- A. To represent analog information by varying the amplitude of high frequency discrete pulses ✓
- B. To reduce the bandwidth requirements of signals
- C. To increase the frequency of pulses for transmission
- D. To encode information using phase shifts in pulses

Q9 Part B

What is the main purpose of a limiter circuit in a Frequency Modulation receiver?

- A. To change the carrier frequency
- B. To demodulate the signal
- C. To filter out all noise components
- D. To remove amplitude variations ✓



Q10 Part B

The common-emitter (CE) configuration of a transistor is most widely used as a/an:

- A. Passive Filter
- B. Voltage Amplifier ✓
- C. Impedance matcher
- D. Rectifier

Q11 Part B

In the procedure of measuring resistance with a shunt type ohmmeter, what will the pointer indicate if the test terminals remain open during testing?

- A. Negative reading
- B. Infinite resistance ✓
- C. Zero resistance
- D. Mid-scale reading

Q12 Part B

Which sequence best ensures both picture quality and device safety while setting up a new LED or LCD TV with a set-top box?

- A. Connect the set-top box to the TV with HDMI after turning on the TV first, then the set-top box.
- B. Connect the set-top box to the TV with AV cables, plug in while both devices are switched on.
- C. Connect the set-top box to the TV with AV cables, power on both devices, then switch inputs.
- D. Connect the set-top box to the TV with HDMI, power off both devices before plugging, then switch on after connections are secure. ✓

Q13 Part B

Two oscillators use the same inductor (L) and the same capacitor (C) values. One is Colpitts with $C_1 = C_2$ and the other is Hartley with $L_1 = L_2$ with negligible mutual inductance (M). Which of the following is true about their resonant frequencies?

- A. Hartley frequency is higher
- B. Frequency depends on transistor beta
- C. Both have the same frequency
- D. Colpitts frequency is higher ✓

Q14 Part B

When selecting a sensor for an industrial application that requires detecting very small temperature changes, which sensor characteristic should be prioritized to ensure the sensor can detect the smallest variation in temperature?

- A. Range
- B. Resolution ✓
- C. Accuracy
- D. Sensitivity

Q15 Part B

In an N-type semiconductor, what is the role of donor atoms?

- A. They absorb thermal energy
- B. They create holes for conduction
- C. They provide extra electrons for conduction ✓
- D. They increase the energy gap

Q16 Part B

As per BIS SP 46:2003 engineering drawing conventions, which arrowhead type is used for dimension lines?

- A. Closed filled arrowhead ✓
- B. Slashed arrowhead
- C. Dot arrowhead
- D. Open arrowhead

Q17 Part B

What is the function of RAM in a desktop computer?

- A. Permanent storage of files and folders
- B. Temporary data storage for running applications ✓
- C. Processing data and performing calculations
- D. Storing system backup

Q18 Part B

An apprentice needs to make a rectangular opening in a metal plate with accurate edges and sharp corners. Which combination of fitting tools is most suitable?

- A. Round file and center punch for corner shaping work
- B. Surface plate and scriber for cutting and finishing edges
- C. Try square and flat file for layout and edge shaping
- D. Hacksaw and flat file for cutting and edge finishing ✓



Q19 Part B

In quantization process for a Pulse code modulation system, a sampled version of a continuous analog signal are mapped to what type of values?

A. A finite set of discrete Binary levels



B. Random values

C. An infinite set of discrete Binary levels

D. Analog values only

Q20 Part B

Which type of charge carriers mainly control current in a Field Effect Transistor (FET)?

A. Electrons and holes together

B. Minority carriers only

C. Both minority and majority carriers

D. Majority carriers only

**Q21 Part B**

A magnetic path carries a flux density of 0.8 Tesla (T) through an area of 15 cm^2 . What is the magnetic flux (in weber)?

A. 1.2 Wb

B. 0.0012 Wb



C. 0.012 Wb

D. 0.12 Wb

Q22 Part B

For a circuit to function as an oscillator and produce sustained sinusoidal output, the feedback applied must be:

A. Zero feedback to avoid distortion

B. Random feedback depending on input signal

C. Positive feedback with proper phase



D. Negative feedback to stabilize gain

Q23 Part B

Which single logic gate can be used to implement the Boolean equation $Y = A + B$ in a digital circuit?

A. NAND gate

B. AND gate

C. NOT gate

D. OR gate

**Q24 Part B**

A resistor is marked with the bands Yellow, Violet, Orange, and Silver. Which statement is correct regarding the resistance value of the resistor?

A. Its value is 470 k Ω with $\pm 20\%$ tolerance

B. Its value is 47 k Ω with $\pm 10\%$ tolerance



C. Its value is 47 Ω with $\pm 10\%$ tolerance

D. Its value is 4.7 k Ω with $\pm 5\%$ tolerance

Q25 Part B

Two wires are made of the same material and have the same length. Wire A has a cross-sectional area of 2 mm^2 , and Wire B has a cross-sectional area of 5 mm^2 . Which wire has the greater resistance?

A. Resistance cannot be compared without knowing voltage

B. Both have equal resistance because length is the same

C. Wire A, because smaller area gives higher resistance



D. Wire B, because larger area gives higher resistance

Q26 Part B

In a moderately doped p-type semiconductor at $T = 300 \text{ K}$, where is the Fermi level E_F located relative to the intrinsic Fermi level E_i ?

A. At the center of band gap

B. Outside band gap

C. Near valence band and below the intrinsic Fermi level



D. Near conduction band and above the intrinsic Fermi Level

Q27 Part B

On which principle does a Resistance Temperature Detector (RTD) work?

A. Voltage decreases with increase in temperature

B. Resistance remains constant with temperature

C. Resistance decreases with increase in temperature

D. Resistance increases with increase in temperature



Q28 Part B

Which scenario best demonstrates the use of IGBT in a real-world application?

- A. Protecting a circuit from voltage surges
- B. Providing voltage regulation in a small device
- C. Controlling the speed of an industrial motor ✓
- D. Amplifying small signals in a radio circuit

Q29 Part B

Which illustrates the application of a voltage amplifier?

- A. Enhancing the voltage of a sensor output before sending it to a microcontroller ✓
- B. Converting digital signals into analog
- C. Filtering unwanted frequencies
- D. Measuring resistance directly

Q30 Part B

While servicing an inverter-based stabilizer, you notice the relay contacts are heavily pitted. What is the best preventive measure when replacing the relay?

- A. Select a relay with lower coil resistance
- B. Use a relay with smaller contacts
- C. Lower the relay switching voltage
- D. Choose a relay rated for higher contact current ✓

Q31 Part B

The SI unit of magnetic flux density is:

- A. Ampere-turn
- B. Henry
- C. Weber
- D. Tesla ✓

Q32 Part B

Which type of resistance is best measured using a Series type Ohm meter?

- A. Capacitance value of a circuit
- B. Low resistance in less than 1 Ohm range
- C. Very high resistance Greater than 100 Mega-ohm range
- D. Medium resistance ranging from few ohms to kilo-ohms ✓

Q33 Part B

During lab practice, if you connect the input of a NOT gate to a logic low (0), what practical output should you observe?

- A. Undefined
- B. Logic high (1) ✓
- C. Logic low (0)
- D. No change

Q34 Part B

Which of the following best describes the Internet of Things?

- A. A single device connected to the internet
- B. Only computers communicating online
- C. A type of programming language
- D. A network of connected devices sharing data ✓

Q35 Part B

Which of the following materials has the lowest electrical conductivity and should be avoided for connecting sensitive measurement instruments?

- A. Iron ✓
- B. Silver
- C. Aluminum
- D. Copper

Q36 Part B

What is the purpose of the base region in an NPN transistor?

- A. To dissipate heat
- B. To control the number of electrons passing from emitter to collector ✓
- C. To act as the main current path
- D. To generate electrons for the collector

Q37 Part B

According to engineering drawing, how is a plane surface defined?

- A. A surface formed by rotating a straight line about a fixed axis
- B. A surface having the shortest path between any two points
- C. A surface in which the line joining any two points lies entirely within it ✓
- D. A surface kept parallel to one principal reference plane



Q38 Part B

In premium solid-state architectures requiring high color rendering indices, what unique structural method is used to construct a standard commercial white LED light bulb?

- A. Wiring three separate red, green, and blue monochromatic diodes in an absolute series loop fed by an unrectified AC power supply
- B. Forcing a direct current stream backward through an ultra-thin tungsten filament mounted between a pair of direct bandgap substrates
- C. Packing an isolated high-pressure low-temperature mercury vapor gas cell directly inside a silicon diode block
- D. Depositing a yellow cerium-doped yttrium aluminum garnet phosphor coating directly over a blue indium gallium nitride semiconductor die ✓

Q39 Part B

In a Pulse Position Modulation (PPM) signal, which of the following pulse parameters remain constant?

- A. Pulse amplitude only
- B. Pulse width and amplitude both ✓
- C. Pulse position
- D. Pulse width only

Q40 Part B

What happens to the gain of a non-inverting amplifier using OP-AMP if the feedback resistor value is increased by 5 % while keeping the input resistor constant? (Assuming the OP-AMP remains in linear range for operation.)

- A. The gain remains constant
- B. The gain decreases
- C. The gain changes unpredictably
- D. The gain increases ✓

Q41 Part B

Which port is typically used to connect a monitor to the motherboard in computer system?

- A. SATA port
- B. PATA port
- C. VGA port ✓
- D. Ethernet port

Q42 Part B

A silicon sample is doped with boron in a lab. Identify the semiconductor type.

- A. Intrinsic semiconductor
- B. N-type semiconductor
- C. Insulator
- D. P-type semiconductor ✓

Q43 Part B

While fixing a circuit board, which method is best for removing a surface-mount component without ripping or damaging the metal copper tracks?

- A. Applying force with a heated tweezer to pull off the component
- B. Applying high heat quickly with a basic soldering iron and prying tool
- C. Using chemical solvent to dissolve solder and remove the component
- D. Using a temperature-controlled soldering station with proper desoldering tools ✓

Q44 Part B

The surface-mount soldering defect where unequal surface tension causes a chip component to lift vertically off one pad is known as _____, which can be mitigated during manual rework by using _____.

- A. bridging; an unfluxed copper braid
- B. cold joint; a lower melting-point solder paste
- C. de-wetting; a higher-wattage chisel tip
- D. tombstoning; split-tip soldering iron ✓

Q45 Part B

When using a PMMC multimeter to measure current, how should the instrument be connected in the circuit?

- A. In parallel with the load
- B. Across the voltage source
- C. Across the resistor only
- D. In series with the circuit ✓

Q46 Part B

A lamp circuit carries a charge of 24 coulombs in 8 seconds. What is the current in the circuit?

- A. 1/3 A
- B. 3 A ✓
- C. 8 A
- D. 2 A



Q47 Part B

In the output characteristics of a common-emitter configuration, a family of curves is obtained by varying V_{CE} while keeping which quantity fixed? (Symbols have their usual meaning.)

- A. I_C
- B. V_{CE}
- C. I_B ✓
- D. V_{CC}

Q48 Part B

An industrial environment with significant power line interference is causing issues in analog communication. Why would phase modulation be selected over amplitude modulation for the analog signaling in such an environment?

- A. Phase modulation guarantees maximum error in noisy environments
- B. Phase modulation uses less power than amplitude modulation in all cases
- C. Phase modulation requires less complex receivers than amplitude modulation
- D. Phase modulation is less affected by amplitude variations caused by noise ✓

Q49 Part B

During an 8051 microcontroller experiment, switches are connected to Port 1. Before reading the switch status, the program writes logic '1' to the port pins. What is the purpose of this operation?

- A. To configure the port pins as output
- B. To configure the port pins as input ✓
- C. To clear the data stored in the port register
- D. To enable serial communication

Q50 Part B

In a full adder circuit, under which input condition will the sum output be LOW (0)?

- A. When only one input is HIGH
- B. When all inputs are HIGH
- C. When an odd number of inputs is HIGH
- D. When an even number of inputs is HIGH ✓

Q51 Part B

A black rectangular SMD component near an LED driver circuit's input has a white stripe on one edge, and the board is marked with a D. What is this component and its polarity?

- A. Capacitor; stripe is ground
- B. Inductor; stripe is positive input
- C. Diode; stripe is the Anode (+)
- D. Diode; stripe is the Cathode (-) ✓

Q52 Part B

Why is a Double-Pole (DP) Miniature Circuit Breaker (MCB) generally preferred over a Single-Pole (SP) MCB in a single-phase distribution system?

- A. It increases the fault current carrying capacity of the circuit.
- B. It simultaneously disconnects both the phase and neutral conductors during switching or fault conditions. ✓
- C. It reduces the power consumption of the connected load.
- D. It eliminates the requirement for earthing in the installation.

Q53 Part B

What is the working principle of an LVDT?

- A. It works by changing resistance with position
- B. It uses the piezoelectric effect for measurement
- C. It operates on the principle of mutual induction ✓
- D. It relies on the Hall effect for sensing

Q54 Part B

Which type of amplifier is used at the final stage to drive a loudspeaker?

- A. Buffer amplifier
- B. Pre-amplifier
- C. Power amplifier ✓
- D. Voltage amplifier



Q55 Part B

In a lab test, three resistors of $2\ \Omega$, $3\ \Omega$, and $6\ \Omega$ are connected in series across a 22V DC source. What is the current through the $3\ \Omega$ resistor in the circuit?

- A. 11 A
- B. 1 A
- C. 3 A
- D. 2 A

**Q56 Part B**

When analyzing a closed-loop circuit containing an **ideal operational amplifier**, what assumption must be applied regarding the currents entering the inverting and non-inverting input pins?

- A. No current flows into either input terminal
- B. A small bias current flows into each terminal
- C. Current flows only into the non-inverting terminal
- D. Equal and opposite currents flow into both terminals

**Q57 Part B**

A machinist is required to mark the axis of a drilled hole on an engineering drawing. Which line type according to BIS SP 46-2003 should be used for the axis?

- A. Chain thin line
- B. Dashed thin line
- C. Continuous thick line
- D. Thick zig-zag line

**Q58 Part B**

When building a basic 6 by 4 LED matrix display, what is the total number of individual LEDs required to complete the grid?

- A. 24 LEDs
- B. 2 LEDs
- C. 64 LEDs
- D. 10 LEDs

**Q59 Part B**

What is the purpose of the I/O shield supplied with a motherboard?

- A. Maintain the cooling of the cabinet
- B. Improve processor speed
- C. Cover and protect unused RAM slots
- D. Align and protect rear motherboard ports

**Q60 Part B**

To convert an op-amp integrator into a practical integrator (avoiding low-frequency saturation), which component is typically added in parallel with the feedback capacitor?

- A. A second capacitor
- B. A resistor
- C. A diode
- D. An inductor

**Q61 Part B**

Which terminal is unique to an IGBT but not found in a BJT?

- A. Base
- B. Emitter
- C. Gate
- D. Collector

**Q62 Part B**

An electrician is required to test a live electrical panel. Which PPE should be worn to protect the hands from electrical hazards?

- A. Safety helmet
- B. Insulated gloves
- C. Safety goggles
- D. Ear plugs

**Q63 Part B**

Which pin on the IC-555 Timer is used to discharge the timing capacitor when it is operated as an astable multivibrator?

- A. Pin 2
- B. Pin 6
- C. Pin 4
- D. Pin 7

**Q64 Part B**

If an intrinsic semiconductor has equal electrons and holes, and 20 electrons are added, what is the majority carrier?

- A. None present
- B. Electrons only
- C. Holes only
- D. Both electrons and holes are majority carriers



Q65 Part B

Which memory technology is used in USB pen drives?

A. Flash Memory



B. DRAM

C. Cache Memory

D. SRAM

Q66 Part B

During hardware interfacing using the 8051 microcontroller, why are I/O ports essential?

A. To increase the clock frequency of the microcontroller

B. To perform calculations

C. To interface with external devices



D. To store information for processing

Q67 Part B

Why are transistors preferred over mechanical switches for rapid switching operations?

A. Transistors require manual operation

B. Transistors are larger in size

C. Transistors consume more power

D. Transistors switch faster and have long life span

**Q68 Part B**

Which technology is used by a CD-ROM drive to read data in computer systems?

A. Laser technology



B. Magnetic head

C. Ultraviolet light technology

D. Electrical contacts

Q69 Part B

What is the function of the heat sink on the motherboard in a computer system?

A. Absorb heat from the processor



B. Store BIOS settings in ROM

C. Run the BIOS during booting process

D. Provide power to RAM

Q70 Part B

Why is rubber suitable for making seals and gaskets?

A. It readily absorbs water

B. It easily conducts electricity

C. It can form tight, flexible closures



D. It reacts with most chemicals

Q71 Part B

An Earth Leakage Circuit Breaker (ELCB) is designed to disconnect the electrical supply under which of the following conditions?

A. When the earth leakage current exceeds the preset sensitivity (trip) value



B. When the supply frequency deviates from its rated value

C. When the earth leakage current falls below the rated value

D. When the load current exceeds the rated current of the circuit

Q72 Part B

In an FM system, if the modulating signal frequency is doubled and the peak frequency deviation is kept constant, the modulation index will:

A. Double

B. Remain the same

C. Halve



D. Become zero

Q73 Part B

What could happen if the desoldering pump is not used promptly after the solder melts during switch removal from a PCB?

A. The desoldering pump may overheat

B. The switch will detach automatically

C. The solder may solidify before being removed



D. The PCB will break instantly

Q74 Part B

What is the main benefit of increasing (extending) RAM in a desktop computer?

A. Higher disk permanent storage

B. Improved multitasking performance



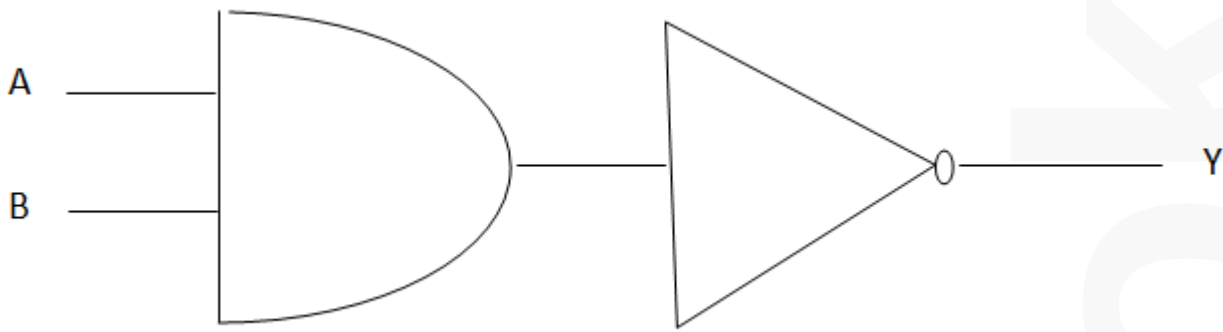
C. Better display resolution

D. Faster processor speed



Q75 Part B

Consider the logic circuit shown in the given diagram. Which pair of the inputs A and B will produce output $Y = 0$?



A. $A=0, B=0$

B. $A=1, B=1$



C. $A=1, B=0$

D. $A=0, B=1$



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Part B

75 Questions · Answer Key

Q1 Part B

In a vernier caliper, 50 vernier scale divisions coincide with 49 main scale divisions. If one main scale division is 1 mm, what is the least count?

- A. 0.04 mm
- B. 0.02 mm ✓
- C. 0.01 mm
- D. 0.05 mm

Q2 Part B

A magnetic core carries a magnetic flux of 0.02 Wb. If the cross-sectional area of the core is kept the same, which action will most directly increase the magnetic flux?

- A. Using a material with higher resistance
- B. Increasing the air gap in the magnetic path
- C. Decreasing the magnetizing current
- D. Increasing the number of turns or current producing the magnetomotive force ✓

Q3 Part B

Which functional characteristic of soft hammers makes them most suitable for use during marking and assembly operations involving finished or precision surfaces?

- A. Ability to deform upon impact thereby preventing surface damage to marked or assembled components ✓
- B. Hardened striking surface enabling accurate indentation during marking with centre punches
- C. High rigidity of hammer face ensuring maximum force transmission during heavy forging operations
- D. Elevated mass concentration providing deeper penetration effect during high-energy striking tasks

Q4 Part B

Which part of a taper shank drill ensures accurate alignment in the machine spindle?

- A. Flute
- B. Point angle
- C. Body length
- D. Tapered end ✓

Q5 Part B

When evaluating surface plate construction for use in a humid environment, which factor is most important to consider?

- A. Material should resist corrosion and moisture effects ✓
- B. Visible surface markings ensure accuracy in humidity
- C. Color of the plate prevents moisture absorption
- D. Surface plate weight determines performance in humidity

Q6 Part B

How does a Continuously Variable Transmission (CVT) system achieve reverse operation compared to forward?

- A. It changes the input pulley diameter to its minimum
- B. It reverses the direction of the output pulley rotation ✓
- C. It increases engine speed to maximum
- D. It keeps the metal belt stationary during reversing

Q7 Part B

If a file is too short for a given job, what is the most likely result during use?

- A. Greater filing efficiency and faster completion
- B. Improves accuracy and provides better control
- C. Uneven surface finish and excess wear on the file ✓
- D. Prevents bending and ensures file durability

Q8 Part B

Which process involves joining two metals by melting them at the joint?

- A. Soldering
- B. Brazing
- C. Welding ✓
- D. Riveting



Q9 Part B

In a vernier caliper, the small scale that slides along the main scale is called:

- A. Limit gauge scale
- B. Pitch scale
- C. Vernier scale ✓
- D. Angular scale

Q10 Part B

What impact does lock-up clutch engagement have on fuel consumption?

- A. Reduces fuel economy by increasing losses
- B. Increases slippage and fuel consumption
- C. Improves fuel economy by reducing slippage ✓
- D. No effect on fuel economy

Q11 Part B

The fuel injector in a direct-injection diesel engine is generally positioned near the centre of the cylinder head primarily to:

- A. Increase valve opening duration by providing symmetrical valve train geometry
- B. Ensure uniform fuel distribution throughout the combustion chamber for efficient combustion ✓
- C. Improve coolant circulation around the combustion chamber while minimizing thermal stresses
- D. Reduce cylinder head deformation by balancing combustion pressure on the casting

Q12 Part B

What is the primary function of the flute in a drill?

- A. To add decorative features in drill
- B. To reduce the weight of drill
- C. To hold the drill in place
- D. To provide path for chip removal ✓

Q13 Part B

Which characteristic should an ideal diesel combustion chamber have?

- A. Reduces intake air pressure drastically
- B. Increases cooling losses significantly
- C. Delays ignition timing with voltage
- D. Promotes complete combustion process ✓

Q14 Part B

What does the magnetic permeability of a material represent?

- A. The ability of a material to store energy in an electric field
- B. The ability of a material to allow magnetic flux to pass through it ✓
- C. The ability of a material to resist the flow of electric current
- D. The ability of a material to oppose the flow of magnetic flux

Q15 Part B

Which problems may arise in engine performance due to excessive piston ring clearance?

- A. Loss of compression and reduced engine efficiency ✓
- B. Completely prevents oil consumption in the engine
- C. Increases the strength of the piston assembly
- D. Improves combustion pressure and fuel economy

Q16 Part B

What is the main purpose of an extension line in engineering drawing?

- A. To show hidden features in a component
- B. To specify the required surface finish
- C. To mark the boundary of a drawing sheet
- D. To indicate the limits of a feature being dimensioned ✓

Q17 Part B

Which of the following materials is commonly used for making cylinder head gaskets in petrol engines?

- A. Cast iron
- B. Asbestos-based composite ✓
- C. Paper reinforced with resin
- D. Copper and zinc alloy

Q18 Part B

What is the purpose of the Electronic Control Unit (ECU) using signals from the transmission fluid temperature sensor?

- A. To dim dashboard lights at night
- B. To cool the high-voltage battery
- C. To prevent shifting when fluid is too cold ✓
- D. To adjust tire pressure automatically



Q19 Part B

How does the base of a micrometer depth gauge differ from that of a standard micrometer?

- A. It is circular to fit different holes
- B. It is C-shaped for hand grip
- C. It is flat and wide for stability on surfaces ✓
- D. It is tapered for narrow slots

Q20 Part B

A technician is selecting a cylinder material for a petrol engine. Which property is most important for ensuring long service life?

- A. High thermal conductivity and wear resistance ✓
- B. High specific heat and low cost
- C. Low density and high electrical conductivity
- D. Moderate strength and easy machinability

Q21 Part B

What distinguishes a wet sleeve from a dry sleeve in a diesel engine?

- A. Wet sleeve is made of plastic, dry sleeve is metal
- B. Wet sleeve is smaller than dry sleeve
- C. Wet sleeve is fixed permanently, dry sleeve is removable
- D. Wet sleeve is surrounded by coolant, dry sleeve is not ✓

Q22 Part B

What value of inductor should be connected in parallel with a series combination of 4 H and 2 H so that the effective inductance of the circuit is 3 H?

- A. 2 H
- B. 9 H
- C. 3 H
- D. 6 H ✓

Q23 Part B

A technician needs to improve the efficiency of combustion in a petrol engine. Which adjustment related to the spark plug could help achieve this goal?

- A. Increasing the amount of engine current
- B. Ensuring correct spark plug gap for proper ignition ✓
- C. Adjusting the exhaust valve opening duration
- D. Modifying the spark plug's diameter

Q24 Part B

Which operation cannot be performed efficiently with a half round file?

- A. Sharpening a saw blade ✓
- B. Finishing a flat edge
- C. Smoothing an inside curve
- D. Filing a rounded groove

Q25 Part B

In which scenario would plastic gears be more appropriate than metal gears in a machine?

- A. Plastic gears are necessary in vehicle transmissions for improved durability.
- B. Plastic gears are preferred in high-temperature machines for better performance.
- C. Plastic gears are used in low-load devices where quiet operation is important. ✓
- D. Plastic gears are ideal for high-load machinery due to their strength.

Q26 Part B

What is the primary reason for ensuring the tap is aligned correctly with the hole when tapping?

- A. To reduce the tapping speed significantly
- B. To allow the use of improperly sharpened tap
- C. To increase the amount of cutting fluid used
- D. To produce accurate and straight threads ✓

Q27 Part B

A technician needs to inspect the internal diameter of a cylinder bore with high accuracy. Which combination of components in a dial bore gauge ensures accurate measurement and effective alignment inside the bore?

- A. A dial indicator, interchangeable anvils, and a spring-loaded plunger. ✓
- B. Includes the micrometer head, steel rule, and rubber grip to hold.
- C. Mentions a digital display, measuring tape, and stationary handle.
- D. Features a fixed anvil, locking screw, and a sliding vernier scale



Q28 Part B

A 2 kW electric heater operates for 45 minutes on its rated supply. How much electrical energy does it consume?

- A. 90 kWh
- B. 0.75 kWh
- C. 1.5 kWh
- D. 5.4 kWh

**Q29 Part B**

What is the primary function of a check valve during the pressure stroke?

- A. To generate electrical signals
- B. To increase line temperature
- C. To block fluid from entering the lines
- D. To allow fluid to enter the lines

**Q30 Part B**

Where are leaf springs most commonly used in vehicle suspension systems?

- A. They are commonly used in the steering mechanism of all kinds of vehicles
- B. They are commonly used in the rear suspension of trucks and commercial vehicles
- C. They are commonly used in the front suspension of motorcycles and bicycles
- D. They are commonly used in the front suspension of small and medium vehicles like cars

**Q31 Part B**

Which situation on the road clearly demonstrates the usefulness of the lock-up feature?

- A. Accelerating hard from a standstill
- B. Reversing into a parking space
- C. Driving on a highway at constant speed
- D. Frequent stop-and-go city driving

**Q32 Part B**

Which statement best explains why both inlet and exhaust valves remain closed during the power stroke of a diesel engine?

- A. To allow maximum heat transfer from the cylinder head to the piston crown
- B. To improve lubrication of the valve guides by reducing exhaust gas temperature
- C. To increase the duration of fuel injection before the piston reaches Bottom Dead Centre
- D. To confine high-pressure combustion gases and convert their energy into useful work

**Q33 Part B**

Which dimensioning method is used when the accumulation of tolerances has no effect on the function of the component?

- A. Parallel dimensioning
- B. Reference dimensioning
- C. Baseline dimensioning
- D. Chain dimensioning

**Q34 Part B**

Why is it important to maintain a slightly convex hammer face rather than a perfectly flat one?

- A. It increases the hardness of the hammer
- B. It reduces tool weight and helps maintain the posture
- C. It improves heat resistance
- D. It reduces glancing blows and improves accuracy

**Q35 Part B**

Ferrous metals generally contain major amounts of:

- A. Iron
- B. Zinc
- C. Aluminium
- D. Copper

**Q36 Part B**

A copper wire has a resistance of $3\ \Omega$ and carries a current of 4 A. What is the power loss in the wire due to heating?

- A. 36 W
- B. 12 W
- C. 48 W
- D. 7 W



Q37 Part B

What is a possible outcome if ATF is not cooled properly during operation over time?

- A. Internal parts are cleaned by hot fluid
- B. A complete rebuild of the transmission may be needed ✓
- C. The transmission will self-adjust to conditions
- D. The ATF will last longer than expected

Q38 Part B

What is the role of the locking mechanism on a micrometer depth gauge?

- A. To secure the measuring rod ✓
- B. To display the measurement
- C. To rotate the thimble
- D. To control the base position

Q39 Part B

Which method joins metals primarily by applying mechanical force at elevated temperature without filler material?

- A. Pressure welding ✓
- B. Fusion welding
- C. Brazing
- D. Soldering

Q40 Part B

Which type of current changes both magnitude and direction at definite intervals?

- A. Alternating current ✓
- B. Static current
- C. Leakage current
- D. Direct current

Q41 Part B

Which process commonly uses the oxy acetylene system in metalworking applications?

- A. Annealing glass rods in laboratory settings
- B. Arc welding stainless steel in electrical industries
- C. Soldering thin wires in electronics manufacturing
- D. Cutting thick metal sheets in fabrication workshops ✓

Q42 Part B

Which tap type should NOT be used to initiate a new thread in a hole?

- A. Intermediate tap
- B. Plug tap
- C. Bottoming tap ✓
- D. Taper tap

Q43 Part B

In a workshop, a mechanic needs to determine the length of the diagonal support for a rectangular metal plate with sides of 9 cm and 12 cm. Which value represents the correct length of the diagonal support needed?

- A. 15 cm ✓
- B. 16 cm
- C. 14 cm
- D. 13.5 cm

Q44 Part B

If air enters the hydraulic brake lines, what is the most likely effect on brake performance?

- A. The brakes generate less heat and cool faster
- B. The brakes become less effective due to compressibility of air ✓
- C. The brakes work more effectively with air in the lines
- D. The brakes do not require brake fluid when air is present

Q45 Part B

What would most likely happen if the carburettor-type air cleaner is clogged with dirt?

- A. Improved combustion efficiency due to higher pressure
- B. It will lead to rich fuel mixture ✓
- C. Stable engine operation with no effect
- D. It will lead to increased exhaust back-pressure

Q46 Part B

Which material offers an optimal combination of toughness and ease of machining for the big end bearings of a diesel engine?

- A. Copper-lead alloy ✓
- B. Bronze
- C. Aluminium alloy
- D. Cast iron



Q47 Part B

Which mallet feature is important for its use in sheet metal work?

A. A head made of wood or rubber ✓

B. A built-in measuring scale

C. A heated striking face

D. A sharp steel cutting edge

Q48 Part B

Which of the following components is primarily responsible for supporting the weight of the vehicle chassis in a suspension system?

A. Shock absorber

B. Suspension control arm

C. Leaf spring assembly ✓

D. Stabilizer (anti-roll) bar

Q49 Part B

Two magnetic paths are made of the same material and have the same cross-sectional area. Path X has length 0.1 m, and Path Y has length 0.3 m. Which statement is correct about their reluctances?

A. Path Y has three times the reluctance of Path X ✓

B. Both paths have the same reluctance because they are made of the same material

C. Path X has greater reluctance because shorter length increases reluctance

D. Path Y has one-third the reluctance of Path X

Q50 Part B

How does wear on turbine blades affect the performance of a fluid coupling?

A. Reduces heat dissipation capability

B. Causes loss of hydraulic fluid from the coupling

C. Decreases power transmission efficiency ✓

D. Decreases engine temperature permanently

Q51 Part B

What is the primary importance of frequent inspection of the vibration damper for proper engine functioning?

A. To maintain correct piston clearance

B. To ensure effective vibration absorption ✓

C. To verify exhaust emission levels

D. To check proper fuel delivery

Q52 Part B

Why is it important to avoid overheating non-ferrous metals during soldering?

A. It increases solder wettability

B. It can cause warping or oxidation ✓

C. It improves electrical conductivity

D. It strengthens the joint

Q53 Part B

How does piston movement during the intake stroke affect the cylinder pressure?

A. Cylinder pressure increases as piston moves down

B. Cylinder pressure increases as piston moves up

C. Cylinder pressure decreases as piston moves down ✓

D. Cylinder pressure stays constant as piston moves up

Q54 Part B

A resistor has a voltage drop of 18 V and carries a current of 3 A. What is its resistance?

A. 54 Ω

B. 15 Ω

C. 1/6 Ω

D. 6 Ω ✓

Q55 Part B

After setting a sine bar with slip gauges and placing the workpiece, which operation is performed to verify correct angle setting?

A. Measure angle using standard protractor scale

B. Rotate sine bar to different position again

C. Mark surface using scribe for checking

D. Sweep surface with dial test indicator tool ✓

Q56 Part B

What is the main purpose of the Ackerman angle in a steering system?

A. To increase the turning radius of the vehicle

B. To change the caster angle of the front wheels

C. To ensure correct turning of wheels during a turn ✓

D. To reduce the steering ratio for quick response



Q57 Part B

Which type of seal is most commonly used to prevent oil leakage in a gearbox where the rotating shaft passes through the housing?

A. Mechanical face seal.

B. Radial lip seal. ✓

C. O-ring seal.

D. Gland packing.

Q58 Part B

What is the main goal of safety legislation in a workshop?

A. To reduce equipment quality in the workshop

B. To increase production speed in the workshop

C. To promote hazardous tasks in the workshop

D. To protect workers from accidents and injuries ✓

Q59 Part B

In a conventional petrol engine assembly, which of the following locking devices is used to secure the connecting rod fasteners against loosening?

A. Plain washers fitted beneath the connecting rod bolt heads

B. Tab washers or lock plates fitted with connecting rod nuts ✓

C. Spring washers used as the only locking arrangement

D. Circlips installed in the connecting rod bearing housing

Q60 Part B

Which of the following is NOT a correct use of a chain line in engineering drawings?

A. To indicate a surface to be machined

B. To show the outer boundary of an object ✓

C. To represent a part for heat treatment

D. To mark the path of a section

Q61 Part B

Why is an ammeter always connected in series with the load while measuring current in a circuit?

A. Because it increases the supply voltage across the load

B. Because it must carry same current as load for correct measurement ✓

C. Because it stores charge before displaying the reading

D. Because it has very high resistance and blocks excess current

Q62 Part B

A V-type petrol engine is characterized by which of the following features?

A. Cylinders are grouped around a central crankshaft

B. Cylinders are arranged in two banks at an angle ✓

C. All cylinders are in a single straight row

D. Cylinders are positioned opposite each other

Q63 Part B

What is the primary purpose of using a neutral flame in gas welding?

A. To increase the carbon content of the welded metal.

B. To cause the surface hardening through carburization.

C. To avoid oxidation and carburization of welded metal. ✓

D. To promote oxidation and strengthen the weld joint.

Q64 Part B

Which engine component is most directly affected by improper piston-to-cylinder clearance?

A. Fuel injector surface

B. Camshaft surface

C. Crankshaft bearing surface

D. Cylinder wall surface ✓

Q65 Part B

In the master cylinder, which port gets sealed when the brake pedal is applied?

A. bypass port ✓

B. outlet valve

C. intake port

D. relief port

Q66 Part B

For ISO metric threads, the depth of thread (theoretical) is approximately:

A. $0.960 \times \text{pitch value of the thread system}$

B. $0.500 \times \text{pitch value of the thread system}$

C. $1.273 \times \text{pitch value of the thread system}$

D. $0.613 \times \text{pitch value of the thread system}$ ✓



Q67 Part B

Which welding technique is best suited for precise and clean joining of thin sheet metal panels in automobile body fabrication?

- A. Friction welding
- B. Submerged arc welding
- C. Resistance spot welding ✓
- D. Forge welding

Q68 Part B

Which part does the cylinder sleeve protect from direct contact with combustion gases?

- A. Engine block ✓
- B. Crankshaft
- C. Connecting rod
- D. Piston

Q69 Part B

Where should an ammeter be connected in a circuit to measure current accurately?

- A. In parallel with the load
- B. In series with the load ✓
- C. With a resistor in parallel
- D. Across the supply terminals

Q70 Part B

What is the SI unit of magnetic flux?

- A. Weber ✓
- B. Tesla
- C. Joule
- D. Henry

Q71 Part B

Which metal is a primary component of most soft solders used in electrical work?

- A. Nickel
- B. Copper
- C. Tin ✓
- D. Aluminum

Q72 Part B

Which of the following materials is welded using an oxy-acetylene oxidizing flame to minimize zinc vaporization?

- A. Aluminum
- B. Brass ✓
- C. Cast iron
- D. Stainless steel

Q73 Part B

Which combination of components are essential for both the cooling and lubrication of a petrol engine?

- A. Distributor and fuel pump
- B. Air cleaner and ignition coil
- C. Carburetor and alternator
- D. Radiator and oil pump ✓

Q74 Part B

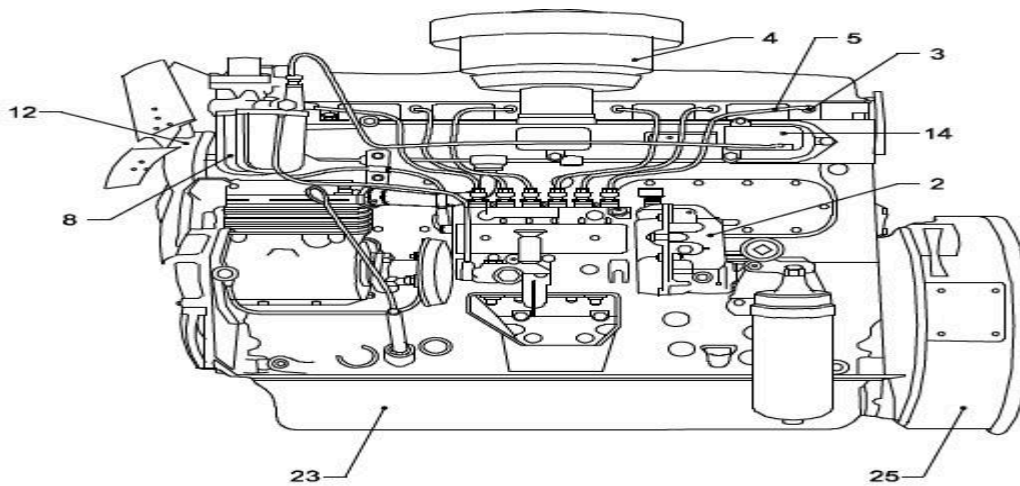
What is a primary challenge associated with increasing the compression ratio in internal combustion engines?

- A. Reduced fuel injection pressure
- B. Increased engine lubrication
- C. Higher risk of engine knocking ✓
- D. Lower engine temperature



Q75 Part B

What is the name of the part marked as No. 2 in the engine diagram?



A. Cylinder block

B. Fuel injector

C. F.I. Pump



D. Air cleaner



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Part B

75 Questions • Answer Key

Q1 Part B

Which part of a ball peen hammer head is located between the striking face and the peen?

- A. Eye hole connecting hammer head to handle
- B. Cheek portion forming the main body of hammer head ✓
- C. Wedge inserted to secure handle tightly
- D. Grip section provided at the handle end

Q2 Part B

A magnetic path has a reluctance of 5000 ampere-turns per weber. If the coil produces a magnetomotive force of 250 ampere-turns, what is the magnetic flux in the core?

- A. 0.05 Wb ✓
- B. 0.005 Wb
- C. 1250000 Wb
- D. 20 Wb

Q3 Part B

Which component shares a similar operational principle with the wheel cylinder but operates in reverse?

- A. Master cylinder ✓
- B. Brake drum
- C. Proportioning valve
- D. Brake booster

Q4 Part B

The geometrical figure of a triangle can be constructed using:

- A. One angle only
- B. One side and one angle only
- C. Four sides
- D. Two angles and one side ✓

Q5 Part B

Which of the following is a direct result of poor cylinder head design in diesel engines?

- A. Frequent cylinder head gasket failures and leaks ✓
- B. Lower emissions and improved environment
- C. Difficulties in gear shifting and transmission operation
- D. Increased vibration due higher unbalance force

Q6 Part B

Which material is commonly used for manufacturing gears in automotive transmission systems due to its strength and durability?

- A. Cast iron
- B. Plastic
- C. Alloy steel ✓
- D. Brass

Q7 Part B

During a real-life pipeline repair, what sequence ensures both safety and weld integrity?

- A. Cleaning joint, aligning, tack welding, final welding, isolating pipeline
- B. Final welding, aligning, cleaning joint, isolating pipeline, tack welding
- C. Tack welding, cleaning joint, aligning, isolating pipeline, final welding
- D. Isolating pipeline, cleaning joint, aligning, tack welding, final welding ✓

Q8 Part B

What does reluctance represent in a magnetic circuit?

- A. The opposition offered to the establishment of magnetic flux ✓
- B. The power loss in the magnetic core
- C. The rate of change of magnetic field with time
- D. The ability of a material to store magnetic flux

Q9 Part B

A truck manufacturer must choose an engine suitable for heavy-duty transport applications. Based on a comparative study, which engine type is generally preferred?

- A. Four-stroke compression-ignition engine ✓
- B. Wankel rotary engine
- C. Two-stroke spark-ignition engine
- D. Four-stroke spark-ignition engine



Q10 Part B

Which characteristic of the crankshaft material plays a vital role in its performance?

A. High fatigue strength ✓

B. High thermal expansion

C. High electrical conductivity

D. High optical clarity

Q11 Part B

How do the compression ratios of conventional petrol engines generally compare with diesel engines?

A. Conventional petrol engines have the same compression ratios as diesel engines.

B. Conventional petrol engines have lower compression ratios than diesel engines. ✓

C. Conventional petrol engines have higher compression ratios at idling speeds only.

D. Conventional petrol engines have higher compression ratios than diesel engines.

Q12 Part B

A diesel engine provides excellent fuel economy and high thermal efficiency, but combustion noise is relatively high. Which combustion chamber design is most likely used?

A. Pre-combustion chamber with initial combustion outside the cylinder

B. Swirl chamber with tangential air entry into an auxiliary chamber

C. Air cell chamber with compressed air stored in a separate chamber

D. Direct injection chamber with fuel injected into the main chamber ✓

Q13 Part B

Which sheet is most commonly used for roofing because it is both lightweight and corrosion-resistant?

A. Copper sheet

B. Tinplate

C. Stainless steel sheet

D. Aluminum sheet ✓

Q14 Part B

What is the typical maximum temperature of an oxy-acetylene flame in gas welding?

A. 2900 degree Celsius

B. 2000 degree Celsius

C. 3100 degree Celsius ✓

D. 2400 degree Celsius

Q15 Part B

Which tool is commonly used to check the backlash between old gears during inspection?

A. Hammer

B. Torque wrench

C. File

D. Feeler gauge ✓

Q16 Part B

Which of the following best describes the main purpose of occupational health in a workshop?

A. To increase production output efficiently

B. To monitor workers' attendance records

C. To reduce the cost of machinery maintenance

D. To protect workers from health hazards at the workplace ✓

Q17 Part B

Which condition leads to disengagement of the overrunning clutch connection in an automatic transmission?

A. Outer ring rotates in a clockwise direction

B. Vehicle comes to a complete stop

C. Outer ring rotates in an anticlockwise direction ✓

D. Brakes are applied forcefully

Q18 Part B

If chips are building up and not breaking during tapping, what should be done?

A. Increase the tapping speed

B. Back off the tap to break and clear chips ✓

C. Reduce the amount of cutting fluid

D. Apply more torque to the tap



Q19 Part B

During lab practice, why does increasing the number of turns on a coil generally increase the magnetic field strength for the same current and magnetic path length?

- A. Because more turns reduce the supply voltage to zero
- B. Because the iron core changes into an insulator
- C. Because magnetomotive force increases as the product of turns and current ✓
- D. Because increasing turns always removes magnetic flux from the core

Q20 Part B

Which of the following auxiliary systems maintains engine temperature by circulating coolant and dissipating excess heat through the radiator?

- A. Lubrication system
- B. Cooling system ✓
- C. Exhaust system
- D. Fuel supply system

Q21 Part B

A vehicle shows irregular engine output at the wheels despite a healthy combustion process. Which component's malfunction in the power transfer chain is most likely responsible?

- A. Flywheel ✓
- B. Spark plug
- C. Exhaust valve
- D. Radiator

Q22 Part B

Which of the following can cause a gear to slip during operation in a manual transmission system?

- A. Tight selector rod
- B. Excessive end float of gear ✓
- C. Proper gear lever adjustment
- D. New locking pin

Q23 Part B

Why does the electrical conductivity of an intrinsic (pure) semiconductor increase with an increase in temperature?

- A. Because higher temperature reduces the atomic size of the crystal
- B. Because higher temperature creates more free charge carriers by breaking some covalent bonds ✓
- C. Because higher temperature converts the semiconductor directly into a superconductor
- D. Because higher temperature permanently increases the number of valence electrons in each atom

Q24 Part B

How often should the die be backed off during external thread cutting?

- A. Periodically during cutting to break chips, depending on material conditions ✓
- B. After forming each complete thread along the workpiece to break chips
- C. Only once at the beginning of the threading operation before cutting starts
- D. Only at the end of the threading pass after reaching the required length

Q25 Part B

In an underground cable, why is a metallic sheath provided over the insulation?

- A. To protect the cable from moisture and damaging liquids in the soil ✓
- B. To increase the electrical conductivity of the phase conductor
- C. To reduce the initial cost of the underground cable system
- D. To provide mechanical protection against heavy soil pressure

Q26 Part B

Magnetic permeability is a measure of a material's ability to _____.

- A. produce heat.
- B. conduct electric current.
- C. carry magnetic flux. ✓
- D. store electric charge.



Q27 Part B

Which of the following best describes the working principle of a 2-stroke diesel engine?

- A. Air and fuel are mixed in the carburetor before entering the cylinder for combustion process
- B. The engine completes one power cycle in two strokes with one crankshaft revolution ☒
- C. The engine completes one power cycle in four strokes with two crankshaft revolutions
- D. Exhaust gases are expelled only during a separate exhaust stroke in the cycle

Q28 Part B

Which combination of parts is directly involved in the conversion of reciprocating motion to rotary motion in a diesel engine?

- A. Piston, connecting rod, crankshaft ☒
- B. Fuel injector, camshaft, flywheel
- C. Valve, cylinder head, camshaft
- D. Cylinder liner, rocker arm, injector

Q29 Part B

What kind of movement does the dial indicator detect in a dial bore gauge?

- A. Thermal expansion
- B. Linear movement ☒
- C. Thermal contraction
- D. Rotational movement

Q30 Part B

Which projection method is recommended by BIS (Bureau of Indian Standards) in India?

- A. Oblique projection
- B. First angle projection ☒
- C. Perspective projection
- D. Third angle projection

Q31 Part B

For which application is a 32 Teeth Per Inch hacksaw blade ideal?

- A. Thick steel bars
- B. Thin sheets ☒
- C. Thin plastics bar
- D. Thick plastics bar

Q32 Part B

A silicon diode in a circuit has a forward voltage drop of 0.7 V. It is connected in series with a 1 ohm resistor to a 5 V supply. What is the current flowing through the resistor when the diode is forward biased?

- A. 3.5 A
- B. 5.7 A
- C. 4.3 A ☒
- D. 0.7 A

Q33 Part B

Which type of material is commonly used for a drive plate to withstand engine torque?

- A. Lightweight plastic
- B. Aluminum alloy
- C. High-strength steel ☒
- D. Copper alloy

Q34 Part B

Which of these is NOT a purpose of the drive plate in an automatic transmission system?

- A. Transmitting torque to the transmission
- B. Handling flexing during rotation
- C. Connecting torque converter to crankshaft
- D. Storing rotational energy ☒

Q35 Part B

Which component interacts directly with the 2-3 shift valve to enable a gear change from second to third gear?

- A. Catalytic converter
- B. Governor valve ☒
- C. Torque converter
- D. Clutch pedal

Q36 Part B

Which pair of metals exhibits the highest electrical and thermal conductivities for engineering applications?

- A. Lead and bronze
- B. Mild steel and stainless steel
- C. Copper and aluminium ☒
- D. Cast iron and wrought iron



Q37 Part B

Why is the piston head designed with a slightly concave or domed shape in petrol engines?

- A. To strengthen the crankshaft and connecting rod
- B. To improve combustion and reduce knocking ✓
- C. To cool the cylinder walls and spark plug
- D. To increase the overall piston weight

Q38 Part B

A sine bar with a 200 mm center distance is used with a 50 mm slip gauge height. Which principle is used to determine the angle?

- A. It is based on the ratio of slip gauge height to the center distance of sine bar. ✓
- B. It is based on the sum of slip gauge height and sine bar length.
- C. It is based on the product of slip gauge height and sine bar length.
- D. It is based on the ratio of center distance of sine bar to slip gauge height.

Q39 Part B

What is a key difference between 2-stroke and 4-stroke diesel engines?

- A. Different fuels are used in 2-stroke and 4-stroke engines
- B. Higher-viscosity lubrication is required in a 4-stroke engine
- C. Power stroke occurs in every revolution of a 2-stroke engine ✓
- D. A cooling system is absent in a 2-stroke engine

Q40 Part B

A worker is required to weld steel frames for 7 hours a day. Which PPE combination ensures both respiratory and visual safety during this task?

- A. Respirator and apron
- B. Welding helmet and respirator ✓
- C. Welding helmet and safety shoes
- D. Apron and dust mask

Q41 Part B

Which material is most commonly used to manufacture a solid frame hacksaw?

- A. Aluminum
- B. High carbon steel ✓
- C. Brass
- D. Stainless steel

Q42 Part B

What is the main purpose of valve seats in a diesel engine?

- A. To guide the movement of the rocker arm
- B. To provide a sealing surface for the valves ✓
- C. To hold the piston rings securely in place
- D. To support the camshaft in its position

Q43 Part B

A technician sets a digital multimeter to the 10 A current range and inserts the red probe into the 10 A terminal. He then accidentally connects the probes directly across a 24 V battery. What is the best evaluation of this action?

- A. It produces a stable reading without affecting the circuit
- B. It correctly measures the current drawn by the battery
- C. It increases the measured voltage due to range selection
- D. It creates a short circuit and may damage the multimeter ✓

Q44 Part B

A technician is designing a safety checklist for petrol engine shutdown. Which combination of tasks ensures optimal safety and engine protection?

- A. Open radiator cap immediately, disconnect battery, check tyre pressure, adjust seat
- B. Clean air filter, check seat belt, polish dashboard, refill coolant
- C. Increase engine speed, turn off ignition, wash engine, inspect seat covers
- D. Idle engine before shutdown, turn off ignition, inspect for leaks, secure battery terminals ✓



Q45 Part B

Air entering the hydraulic brake system makes the brake pedal spongy because air is compressible and prevents proper transmission of force to the brakes. The corrective maintenance action is:

A. System bleeding



B. Pad replacement

C. Cable tightening

D. Fluid topping

Q46 Part B

When evaluating timing synchronization, which symptom most directly suggests cam-crank misalignment in a diesel engine?

A. Low coolant level and high engine temperature

B. Poor battery charge and slow cranking

C. Slipping fan belt and reduced alternator output

D. Difficulty in starting and abnormal engine noise

**Q47 Part B**

Which statement correctly defines the temperature of a body?

A. Amount of heat in a body

B. Ability to conduct heat

C. Degree of hotness or coldness of a body



D. Quantity of temperature in a body

Q48 Part B

When adjusting the brake valve spindle in the released position of the brake pedal, what is the correct procedure according to maintenance guidelines?

A. Adjust the spindle until the pedal is flush with the floor and apply thread sealant

B. Shorten the spindle by half its length and replace the gasket

C. Extend the spindle until it contacts the pedal stop and loosen the jam nut

D. Set the spindle length so the valve is fully pressed and secure the lock nut

**Q49 Part B**

Which scenario best demonstrates the benefit of electronic fuel injection in real-world driving conditions?

A. Frequent engine stalling in city traffic

B. Manual adjustment of fuel jets on highways

C. Delayed ignition timing during acceleration

D. Consistent engine performance at varying altitudes

**Q50 Part B**

Which pair of components is directly connected in a parallelogram steering linkage system?

A. Tie rod and center (relay) link



B. Steering column and center link

C. Pitman arm and idler arm

D. Steering knuckle and pitman arm

Q51 Part B

How does the vertical down welding position influence weld speed and penetration compared to vertical up welding?

A. Increases speed but reduces penetration



B. Increases penetration but reduces speed

C. Reduces speed but increases penetration

D. Gives the same speed and penetration

Q52 Part B

Which liner material is commonly used in petrol engines because of its good wear resistance and heat dissipation properties?

A. Brass

B. Copper

C. Cast iron



D. Pure aluminum

Q53 Part B

Which use of calipers involves transferring a dimension from a workpiece to a scale?

A. Indirect measurement transfer



B. Setting out parallel lines

C. Direct measurement reading

D. Comparing internal and external sizes



Q54 Part B

How does a single cut file differ from a double cut file?

- A. Single cut files have no teeth while double cut do
- B. Single cut files are always round while double cut are always flat
- C. Single cut has one set of parallel teeth while double cut has two ☒
- D. Single cut is used only for wood while double cut is used for metals

Q55 Part B

What is the least count of a standard metric micrometer depth gauge?

- A. 0.1 mm
- B. 0.01 mm ☒
- C. 1 mm
- D. 0.001 mm

Q56 Part B

Which situation in engineering drawing typically requires the use of a dashed line?

- A. To indicate hidden edges that are not directly visible ☒
- B. To indicate center lines for symmetry
- C. To indicate dimension lines for measurements
- D. To indicate visible outlines of an object

Q57 Part B

What is the main function of belt and chain tensioners in a diesel engine timing system?

- A. To maintain proper tension in the drive ☒
- B. To eliminate the need for timing components completely
- C. To increase engine compression ratio by providing high tension
- D. To keep the timing belt or chain rotating

Q58 Part B

A brake pedal that sinks too low or travels excessively before applying the brakes often indicates that the gap between brake lining and brake drum is _____.

- A. too small
- B. properly adjusted
- C. zero
- D. excessive ☒

Q59 Part B

While inspecting a finished part for flatness, which property of the surface plate makes it suitable for this task?

- A. Its light color for visibility
- B. Its weight compared to the workpiece
- C. Its high degree of flatness and stability ☒
- D. Its polished and shiny surface

Q60 Part B

Which sensor provides input to the Automated Manual Transmission (AMT) electronic control unit for deciding gear shifts?

- A. Vehicle speed sensor ☒
- B. Oxygen sensor
- C. Fuel injector
- D. Clutch position sensor

Q61 Part B

If a file's length is measured from tip to heel, what does this exclude?

- A. The width
- B. The teeth
- C. The tang ☒
- D. The Edge

Q62 Part B

If a welded joint lacks sufficient strength and fails under design load, which process requirement was most likely overlooked?

- A. Correct edge preparation before welding ☒
- B. Using the maximum available nozzle size
- C. Marking the weld center line with a scribe
- D. Post-weld grinding for smooth surface finish

Q63 Part B

Which component is directly responsible for opening and closing the engine valves?

- A. Connecting rod
- B. Crankshaft
- C. Camshaft ☒
- D. Piston



Q64 Part B

Which practice is essential for producing accurate external threads using a die?

- A. Applying uneven pressure while rotating the die during cutting
- B. Skipping lubrication during the external threading operation
- C. Tilting the die slightly away from the workpiece axis
- D. Ensuring the die is aligned squarely with the workpiece axis ✓

Q65 Part B

What component is responsible for pressurizing the brake fluid when the brake pedal is applied?

- A. Brake drum
- B. Wheel cylinder
- C. Master cylinder ✓
- D. Pedal return spring

Q66 Part B

Why is Polyvinyl Chloride (PVC) commonly used as a covering material on household electrical wires?

- A. Because it increases the current in the wire
- B. Because it acts as insulator to protect from electric shock ✓
- C. Because it reduces the supply voltage to a safe value
- D. Because it is a good conductor of electricity

Q67 Part B

The distance of the effort from the fulcrum is called the _____.

- A. Effort arm ✓
- B. Load arm
- C. Lever length
- D. Mechanical arm

Q68 Part B

Which feature of a depth gauge allows it to measure from a reference surface?

- A. Handle grip
- B. Flat base ✓
- C. Circular dial
- D. Sharp cutting edge

Q69 Part B

When soldering ferrous metals, which factor can cause a weak joint if not controlled?

- A. Low flux boiling point
- B. High melting solder
- C. Excessive solder application
- D. Insufficient surface preparation ✓

Q70 Part B

A mechanic observes poor wetting of solder on a cleaned iron component. Which corrective action is most effective?

- A. Increase the soldering iron wattage
- B. Cool the iron component before soldering
- C. Apply an appropriate flux before soldering ✓
- D. Reduce the thickness of the solder

Q71 Part B

Which part of a vernier bevel protractor is used as the reference surface while measuring an angle?

- A. Stock ✓
- B. Vernier scale
- C. Dial
- D. Blade

Q72 Part B

Which part of a gas regulator directly responds to changes in outlet pressure?

- A. The regulator body
- B. The pressure gauge attached to the regulator
- C. The diaphragm inside the regulator ✓
- D. The inlet connection of the regulator

Q73 Part B

Which combination of factors makes edge joints less suitable for high-load applications?

- A. High ductility and flexibility in the joint
- B. Wide accessibility and significant reinforcement
- C. Limited weld area and reduced joint strength ✓
- D. Large weld area and high overall strength



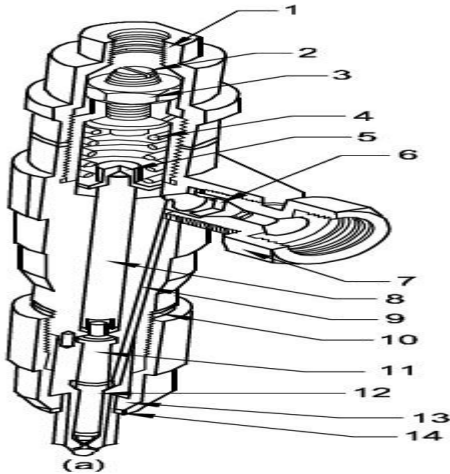
Q74 Part B

Which statement correctly expresses Ohm's law for an electrical conductor under constant physical conditions?

- A. Current is equal to power divided by voltage
- B. Resistance is equal to voltage multiplied by current
- C. Power is directly proportional to resistance
- D. Voltage is equal to current multiplied by resistance ✓

Q75 Part B

In the given fuel injector figure of a three-wheeled diesel engine, what is the name of the part marked as number 8?



- A. Needle valve
- B. Spindle ✓
- C. Nozzle body
- D. Fuel passage



Part B

75 Questions • Answer Key

Q1 Part B

Earthing provides a low-resistance path for:

- A. Load current during normal operation
- B. Fault current under abnormal conditions ✓
- C. Voltage regulation current
- D. Magnetic field circulation

Q2 Part B

If an object is placed in the third quadrant, what is the relative position of the horizontal plane (HP) and the vertical plane (VP) with respect to the object?

- A. Object is below HP and behind VP ✓
- B. Object is below HP and in front of VP
- C. Object is above HP and behind VP
- D. Object is above HP and in front of VP

Q3 Part B

In a soldering operation, which of the following is the base metal?

- A. Two copper wires being connected together ✓
- B. The flux used to remove surface oxides
- C. The solder material applied between wires
- D. The layer of insulation on the wires

Q4 Part B

If the number of turns in an inductor coil is doubled while keeping the core material, length, and cross-sectional area the same, what happens to its self-inductance?

- A. It remains unchanged
- B. It becomes twice the original value
- C. It becomes half of the original value
- D. It becomes four times the original value ✓

Q5 Part B

What is the primary function of an electronic hygrometer in air-conditioning systems?

- A. To measure the refrigerant temperature
- B. To measure the air velocity in ducts
- C. To measure the relative humidity of air ✓
- D. To measure the atmospheric pressure

Q6 Part B

Which component senses the temperature to operate a thermostatic expansion valve?

- A. Solenoid coil
- B. Pressure switch
- C. Evaporator fan
- D. Sensing bulb ✓

Q7 Part B

Which feature of an insulation tester allows it to evaluate the quality of insulation in electrical wiring?

- A. It measures frequency of alternating current supply in the insulation circuit
- B. It applies a high direct current voltage across insulation to measure resistance ✓
- C. It measures insulation thickness by direct contact for checking proper insulation
- D. It provides continuity checks for all insulations across conductors

Q8 Part B

If a circular sheet has a radius of 14 cm, what is the area of a sector with a central angle of 90 degrees?

- A. 77 square centimeters
- B. 154 square centimeters ✓
- C. 66 square centimeters
- D. 308 square centimeters



Q9 Part B

A service vehicle travels 40 meters north, then 30 meters south in 14 seconds. What is the average velocity of the vehicle?

- A. 10 meters per second south
- B. 2.86 meters per second south
- C. 5 meters per second north
- D. 0.71 meters per second north

**Q10 Part B**

Which material should be used when separating a person from a live electric source during first aid?

- A. Bare hands are safe to touch and remove the person from source
- B. A dry wooden stick is safe to push the person away from the source
- C. A metal rod is safe to move the person away from the source
- D. A wet cloth is safe to pull the person from the source

**Q11 Part B**

What is the purpose of the expansion device in the refrigeration cycle?

- A. It removes unwanted gases and oils from the refrigerant circuit
- B. It increases the pressure of refrigerant before it enters the condenser
- C. It lowers the pressure of the liquid refrigerant before it enters the evaporator
- D. It increases the temperature of the refrigerant before the evaporator

**Q12 Part B**

In a domestic refrigerator, which drier construction is most suitable for preventing capillary tube blockage caused by moisture contamination?

- A. Bare coil drier
- B. Open shell drier
- C. Solid core drier
- D. Air vent drier

**Q13 Part B**

If excessive flux residue remains after a soldering operation, which consequence is most likely to impact the reliability of an electrical connection over time?

- A. Thermal failure of the joint with slightly altered joint appearance
- B. Increased risk of corrosion and potential electrical failure at the joint
- C. Noticeably higher melting point of the joint in subsequent heating
- D. Reduced electrical resistance of the soldered connection over time

**Q14 Part B**

In a series circuit, which electrical quantity remains the same through all components?

- A. Current
- B. Power
- C. Resistance
- D. Voltage

**Q15 Part B**

Which setting on the cabin thermostat would most likely result in maximum compressor cycling and frequent temperature fluctuations?

- A. A wide temperature differential setting
- B. Maximum cooling setpoint selected
- C. Minimum cooling setpoint selected
- D. A very narrow temperature differential setting

**Q16 Part B**

A mechanic working in a confined space with suspected ammonia leakage must choose appropriate respiratory protection. Which of the following actions would be most effective in ensuring safety under these conditions?

- A. Select a full-face supplied-air respirator and check for proper fit before entry
- B. Use a half-face respirator with particulate filter and work with a partner
- C. Wear a basic dust mask and ventilate the space with a fan
- D. Choose a filter respirator and perform a short exposure test



Q17 Part B

While analyzing a block diagram of a cold storage refrigeration system, you notice the compressor block is positioned after the condenser. What does this indicate about the system sequence?

- A. It represents a dual circuit system
- B. It indicates a parallel flow system
- C. The sequence is incorrect and may disrupt refrigerant flow ✓
- D. The arrangement improves system efficiency

Q18 Part B

When evaluating materials for a spring in a workshop machine, which factor is most critical for ensuring the spring regains its original shape after repeated use?

- A. High thermal conductivity
- B. High density to increase structural weight
- C. High elasticity to withstand repeated stress ✓
- D. High ductility to allow permanent bending

Q19 Part B

Which method is most effective for reducing heat load in a commercial building?

- A. Adding more interior partitions
- B. Increasing window area
- C. Using darker paint on walls
- D. Increasing roof insulation thickness ✓

Q20 Part B

Porcelain is widely used in overhead line insulators because it has high:

- A. Thermal conductivity
- B. Electrical conductivity
- C. Current carrying capacity
- D. Dielectric strength ✓

Q21 Part B

What is the main effect of bending on the grain structure of sheet metal?

- A. The grain structure stretches in the middle surface and compresses on the outer surface of bend.
- B. The grain structure stretches on the inner surface of bend and compresses on the outer surface.
- C. The grain structure stretches on the outer surface of bend and compresses on the inner surface. ✓
- D. The grain structure remains unchanged and uniform throughout the sheet after bending operation.

Q22 Part B

A combination plier is being used by a mechanic to hold a copper tube firmly while cutting a copper wire. Which construction feature of the combination plier makes it different from a standard long nose plier for this task?

- A. Serrated jaws with side-cutting blade ✓
- B. Cushioned non-slip grip handles
- C. Return spring for automatic opening
- D. Pivot joint with adjustable tension

Q23 Part B

Which of the following units is NOT a part of the SI system?

- A. Inch ✓
- B. Newton
- C. Pascal
- D. Kilogram

Q24 Part B

If a compressor is found to be running but not developing pressure, which of the following is a likely cause?

- A. Blocked condenser fins reducing airflow
- B. Worn or damaged piston rings ✓
- C. Faulty thermostat in cooling circuit
- D. Dirty evaporator coil restricting circulation

Q25 Part B

How does a pressure switch usually respond when the system pressure rises above its preset limit in an air-conditioning system?

- A. It increases fan speed
- B. It closes the electrical circuit
- C. It reduces system voltage
- D. It opens the electrical circuit ✓



Q26 Part B

What is the main function of the evaporator in a commercial air-conditioning system?

- A. It circulates air within the conditioned space
- B. It compresses the refrigerant vapor to high pressure
- C. It cools the condenser coils by transferring heat
- D. It absorbs heat from the air passing over its surface ✓

Q27 Part B

A technician needs to show the right side view of an object using third angle projection. Where should this view be located on the drawing sheet relative to the front view?

- A. Below the front view
- B. Above the front view
- C. To the right of the front view ✓
- D. To the left of the front view

Q28 Part B

What is the main moving part in a centrifugal compressor called?

- A. Valve
- B. Impeller ✓
- C. Piston
- D. Rotor

Q29 Part B

A process that follows a horizontal path to the right on the psychrometric chart corresponds to what change in air properties?

- A. Increase in dry bulb temperature at constant humidity ratio ✓
- B. Decrease in humidity ratio at constant temperature
- C. Decrease in dry bulb temperature at constant enthalpy
- D. Increase in humidity ratio at constant temperature

Q30 Part B

A technician replaces a faulty relay in a refrigerator. Which safety step must be performed before this task?

- A. Clean the condenser coils thoroughly
- B. Wear rubber gloves for handling tools
- C. Label each wire connected to the compressor
- D. Disconnect the refrigerator from the power supply ✓

Q31 Part B

Which form of energy is transferred between objects due to a temperature difference?

- A. Heat ✓
- B. Pressure
- C. Force
- D. Work

Q32 Part B

Which statement accurately describes the temperature range typically used for brazing compared to soldering?

- A. Brazing is always done at the melting point of the base metal
- B. Soldering uses a higher temperature range than brazing
- C. Brazing and soldering use the same temperature range
- D. Brazing uses a higher temperature range than soldering ✓

Q33 Part B

A clamp meter with a maximum range of 400 amperes is required to measure current on a circuit expected to draw 500 amperes. What is the most suitable solution to obtain an accurate reading with this meter?

- A. Add insulation to the conductor before using the clamp meter
- B. Set the clamp meter to the highest available range and measure directly
- C. Use a current transformer to step down the current before measurement ✓
- D. Clamp the meter around two conductors to reduce the current displayed

Q34 Part B

Which part is essential for changing a motor connection from star to delta in a Star Delta Starter used in refrigeration systems?

- A. Current transformer
- B. Pressure switch
- C. Thermal overload relay
- D. Changeover contactor ✓



Q35 Part B

What is the main function of a deep freezer in commercial refrigeration systems?

A. To store products at temperatures below freezing point ✓

B. To reduce humidity in storage chambers

C. To increase room temperature in storage areas

D. To heat food items for serving

Q36 Part B

Which of the following is the function of a package chiller in commercial air conditioning systems?

A. To circulate refrigerant through air ducts

B. To directly produce hot water for sanitary use

C. To provide chilled water for cooling air in buildings ✓

D. To generate fresh ventilation air for rooms

Q37 Part B

How would increasing the number of occupants in a conference hall affect its sensible heat load?

A. It decreases if the hall is well insulated

B. It remains unchanged if the hall size is constant

C. It increases due to additional body heat released ✓

D. It decreases due to improved air circulation

Q38 Part B

A machine shop calculates the cost of a component as follows: Material cost is 500, labour cost is 400, and overhead is 100. If a 20% profit margin is added to the total cost, what is the selling price?

A. 1,300

B. 1,100

C. 1,000

D. 1,200 ✓

Q39 Part B

Which is the primary consequence of undersizing an air duct in a central air-conditioning system?

A. Higher cooling capacity achieved

B. Decreased noise in the duct system

C. Excessive pressure loss and poor airflow ✓

D. Improved energy efficiency

Q40 Part B

If two refrigeration systems have the same cooling effect, but one has higher work input due to increased friction losses, what happens to their coefficient of performance?

A. The system with higher friction losses will have lower coefficient of performance than other system

B. Both systems have the same coefficient of performance because cooling effects are identical

C. The system with higher friction losses will have higher coefficient of performance than other system ✓

D. The system with higher work input always has a coefficient of performance equal to zero

Q41 Part B

What is a common reason for a cold storage room not cooling properly?

A. Excessive insulation thickness

B. Low voltage supply

C. High outside humidity

D. Insufficient refrigerant in the system ✓

Q42 Part B

Which factor should be considered first when selecting an expansion valve for a commercial refrigeration system?

A. Type of compressor oil

B. Shape of evaporator

C. Color of the valve

D. Required refrigerant flow rate ✓

Q43 Part B

If the refrigerator timer fails and remains stuck in the defrost mode, what is the most likely result?

A. Excessive frost formation inside freezer

B. Continuous light inside refrigerator

C. Water leakage inside refrigerator

D. Refrigerator stops cooling properly ✓



Q44 Part B

A customer reports ice formation near the expansion valve and poor cooling performance. After confirming that the valve is partially blocked, what is the best corrective action to restore proper system operation?

- A. Lower the thermostat setting to reduce ice formation
- B. Add more refrigerant to compensate for reduced cooling
- C. Service the expansion valve and recharge the system ✓
- D. Increase the compressor speed to maintain cooling performance

Q45 Part B

What does the current gain parameter (β) of a transistor represent?

- A. Ratio of output power to input power in rectifier circuits.
- B. Ratio of emitter voltage to collector voltage during amplification.
- C. Ratio of base resistance to emitter resistance in biasing circuit.
- D. Ratio of collector current to base current in transistor operation. ✓

Q46 Part B

A customer reports frequent water leaks around their water dispenser with a water-cooled condenser. After confirming all connections are tight, what is the next best action to diagnose the issue?

- A. Increase the water flow rate to the condenser
- B. Inspect the condenser for corrosion or pinhole leaks ✓
- C. Clean the dispenser's outer body thoroughly
- D. Replace the dispenser's water filter element

Q47 Part B

Which type of information does a yellow safety sign provide in a workshop?

- A. It provides information about the location of first aid kits
- B. It provides information about a safe exit route
- C. It gives a warning to be cautious of possible hazards ✓
- D. It provides a command to wear a safety gear helmet

Q48 Part B

When selecting a tool for removing scale from a water cooler evaporator, which tool-and-method combination ensures effective cleaning without damaging the coil fins?

- A. Use a steel scraper with abrasive powder applied vigorously
- B. Use a metal file with detergent solution applied vertically
- C. Use a soft nylon fin brush with a low-pressure cleaning method ✓
- D. Use a wire brush with strong acid applied in a circular motion

Q49 Part B

How would increasing the carbon content in a mild steel sheet affect its properties relevant to sheet metal fabrication?

- A. It would increase corrosion resistance and improve weldability
- B. It would reduce ductility and make the sheet less suitable for forming ✓
- C. It would make the sheet softer and more malleable for forming
- D. It would lower the melting point and increase thermal expansion

Q50 Part B

Which method is used in an indirect air-conditioning system to transfer the cooling effect to air?

- A. Direct spray of refrigerant into air
- B. Direct expansion coils exposed to air
- C. Refrigerant gas blowers in ducts
- D. Chilled water circulated through coils ✓

Q51 Part B

Which property of hydrocarbon (HC) refrigerants makes it necessary to ensure good ventilation during retrofitting work?

- A. Corrosiveness of HC refrigerants
- B. High pressure of HC refrigerants
- C. Flammability of HC refrigerants ✓
- D. Toxicity of HC refrigerants



Q52 Part B

In an air conditioning electronic control board, what is the application of a Zener diode compared to a standard rectifier diode?

- A. It increases the frequency of the incoming control signal to the compressor relay.
- B. It acts as a heavy-duty thermal fuse to cut off power during system overloads.
- C. It is used exclusively to convert high-voltage AC mains into high-voltage DC.
- D. It is used to maintain a constant DC voltage across a load despite variations in input voltage. ✓

Q53 Part B

Which symbol in engineering drawings is used to represent a manually operated valve in a piping diagram?

- A. Two short parallel lines with a gap
- B. A line with a hollow circle and no bar
- C. A line with a filled circle and a short perpendicular bar ✓
- D. A single solid line

Q54 Part B

During maintenance, oil samples from an ice candy plant reveal significant moisture contamination. What should be the technician's next action to prevent equipment failure after retrofitting?

- A. Increase the amount of refrigerant in the system
- B. Add more lubricating oil to dilute moisture
- C. Replace the filter drier and vacuum the system thoroughly ✓
- D. Switch off the system and leave it to dry naturally

Q55 Part B

Which component in a Variable Refrigerant Flow system is primarily responsible for controlling the flow of refrigerant to multiple indoor units?

- A. Solenoid valve
- B. Electronic expansion valve ✓
- C. Mechanical expansion valve
- D. Thermostatic expansion valve

Q56 Part B

How does the wet-bulb temperature change when water evaporates faster from the wet cloth of a psychrometer?

- A. It increases above dry bulb temperature
- B. It decreases compared to dry bulb temperature ✓
- C. It remains equal to dry bulb temperature
- D. It exceeds dry bulb temperature

Q57 Part B

Which step should a technician take first when troubleshooting uneven cooling in a frost-free refrigerator with a 3-door air duct circuit?

- A. Reduce the freezer temperature setting
- B. Replace the temperature sensor immediately
- C. Add refrigerant to the system
- D. Check for obstructions in the air duct passages ✓

Q58 Part B

Which of the following defines the purpose of using lockout/tagout (LOTO) procedures during maintenance work?

- A. To ensure that the maintenance work is completed faster by allowing workers to bypass safety interlocks temporarily
- B. To replace the need for personal protective equipment (PPE) during maintenance activities
- C. To isolate hazardous energy sources and prevent accidental machine start-up, thereby protecting workers from injury ✓
- D. To make report and document equipment downtime for production planning and supervisor approval

Q59 Part B

In the ice candy plant process, what is the primary purpose of the brine solution?

- A. To transfer cold temperature to the ice candy moulds ✓
- B. To clean the ice candy moulds
- C. To generate electricity for the plant
- D. To flavor the ice candies



Q60 Part B

When comparing advanced frost free refrigerator models, which specification most enhances the reliability of long-term automatic defrost cycles under varying voltage conditions?

- A. Use of analog thermostats for temperature sensing
- B. Enhanced door gaskets for improved insulation
- C. Larger defrost water tray for ice melt collection
- D. Incorporation of voltage stabilizer with microcontroller control ✓

Q61 Part B

Which part of a centrifugal fan directs the airflow outwards after it leaves the impeller?

- A. Volute casing ✓
- B. Shaft
- C. Diffuser
- D. Inlet

Q62 Part B

What is the main function of the bimetal strip in a refrigerator?

- A. It increases the compressor speed for faster cooling
- B. It produces cooling inside the freezer compartment
- C. It prevents the refrigerator door from closing tightly
- D. It helps to control the defrost cycle by sensing temperature changes ✓

Q63 Part B

When installing an auto transformer starter for a refrigeration compressor, which action best ensures both electrical safety and system performance?

- A. Testing the control circuit with a live supply before checking wiring with a multimeter
- B. Switching on the main supply before tightening the control wiring to save time
- C. Verifying all connections are tight and properly insulated before supply is switched on ✓
- D. Using an oversized transformer to handle future load increases without rechecking wiring

Q64 Part B

Which part of a bottle cooler evaporator is most responsible for removing heat from the bottles quickly?

- A. The insulation around the cabinet
- B. The finned surface of the evaporator coils ✓
- C. The temperature control knob
- D. The compressor filter drier

Q65 Part B

How does a pneumatic control system differ from an electronic control system in air-conditioning applications?

- A. Pneumatic systems only perform on-off control actions.
- B. Pneumatic systems use compressed air for control signals. ✓
- C. Pneumatic systems use liquid refrigerant for control signals.
- D. Pneumatic systems rely on refrigerant flow.

Q66 Part B

A refrigerant riser piping layout in orthographic projection shows a straight line from the compressor base upward. What does this line indicate about the pipe's orientation?

- A. The pipe is perpendicular to the compressor mounting plane ✓
- B. The pipe is at the centre of the equipment layout
- C. The pipe is slanting relative to the mounting plane
- D. The pipe is parallel to the base datum reference

Q67 Part B

A technician finds that the dry bulb temperature inside a workspace is higher than the outdoor dry bulb temperature. What could be a valid explanation for this observation under normal operating conditions?

- A. Reduced airflow in the ventilation system
- B. Windows are kept open for air circulation
- C. Heat-producing equipment is operating inside ✓
- D. High humidity is present indoors



Q68 Part B

Which sequence accurately describes the flow of refrigerant through the main components in a vapor compression cycle, starting from the evaporator?

- A. Evaporator, expansion valve, condenser, compressor
- B. Evaporator, condenser, compressor, expansion valve
- C. Evaporator, compressor, condenser, expansion valve ✓
- D. Evaporator, condenser, expansion valve, compressor

Q69 Part B

Which property is most important for a material used as thermal insulation in a refrigerator wall?

- A. High density
- B. High thermal conductivity
- C. High electrical conductivity
- D. Low thermal conductivity ✓

Q70 Part B

What is the main effect of adding moisture to the air in a conditioned room?

- A. The density of air decreases
- B. The temperature of the air decreases
- C. The air becomes free of contaminants
- D. The relative humidity of the air increases ✓

Q71 Part B

Which type of screwdriver is most suitable for a slotted screw head in electrical panels?

- A. Torx head screwdriver
- B. Phillips head screwdriver
- C. Pozidriv head screwdriver
- D. Flat head screwdriver ✓

Q72 Part B

An amplifier stage in an electronic control PCB shows phase reversal between input and output signals. Which amplifier configuration is most likely used?

- A. Common emitter configuration producing 180-degree phase reversal. ✓
- B. Darlington pair configuration used only for impedance matching purpose.
- C. Common collector configuration with unity current gain operation.
- D. Common base configuration with zero voltage gain characteristics.

Q73 Part B

What can happen if the temperature control knob in a frost free freezer is set to the coldest setting for a long period?

- A. Compressor will stop running
- B. Ice will form only on the door
- C. Gasket will become loose quickly
- D. Food items may develop freezer burn ✓

Q74 Part B

A factory manager needs a cooling tower design that minimizes water loss and is suitable for an area with limited water supply. Which type of cooling tower construction should be selected for optimal performance in these conditions?

- A. Closed circuit cooling tower ✓
- B. Crossflow cooling tower
- C. Open circuit cooling tower
- D. Counterflow cooling tower

Q75 Part B

Why is a high-capacity blower used in bus air-conditioning systems?

- A. To lubricate moving parts in the compressor
- B. To cool the refrigerant before expansion
- C. To heat the air before it enters the cabin
- D. To circulate air effectively within the bus ✓



Part B

75 Questions • Answer Key

Q1 Part B

While troubleshooting a split air-conditioner, a technician sees a symbol with two parallel lines, one straight and one curved, in the circuit diagram. What is the function of this component?

- A. Stores electrical energy for phase shifting ✓
- B. Switches the circuit on or off automatically
- C. Senses temperature for compressor control
- D. Limits current flow in the circuit

Q2 Part B

In the projection of a circular duct at an inclined angle on an engineering drawing, what is the apparent shape of the duct's cross-section in the projection view?

- A. Parabola
- B. Ellipse ✓
- C. Circle
- D. Rectangle

Q3 Part B

Which sensor is typically used in an electronic hygrometer for measuring relative humidity in air-conditioning systems?

- A. Thermocouple sensor
- B. Capacitive sensor ✓
- C. Optical sensor
- D. Bimetallic sensor

Q4 Part B

A central air-conditioning system in a commercial building is experiencing poor air distribution at the farthest outlets. Which axial fan modification is most likely to improve the situation without altering the ductwork?

- A. Increasing fan diameter while maintaining speed ✓
- B. Adding duct insulation near the outlets
- C. Changing rectangular duct to circular shape
- D. Reducing fan motor voltage

Q5 Part B

What is the most likely effect on the compressor when a refrigerator condenser becomes choked?

- A. Compressor uses less power and cycles off quickly
- B. Compressor runs longer and overheats ✓
- C. Compressor operates silently and cools faster
- D. Compressor stops working completely

Q6 Part B

Which scenario would most significantly increase the latent heat load in a large industrial warehouse?

- A. Using LED lights for reduced heat
- B. Positioning heat-producing equipment far from air intakes
- C. Installing additional insulation panels
- D. Frequent opening of exterior doors during humid weather ✓

Q7 Part B

Which of the following best describes a walk-in cooler?

- A. A heating chamber for baking
- B. A ventilation duct system
- C. A small portable freezer unit
- D. A large refrigerated room for food storage ✓

Q8 Part B

Two wires made of the same material and having the same cross-sectional area are used in a control circuit. Wire A is 2 meters long, while Wire B is 4 meters long. Which wire will have greater resistance?

- A. Wire B has more resistance than Wire A ✓
- B. Resistance does not depend on length
- C. Both have equal resistance
- D. Wire A has more resistance than Wire B



Q9 Part B

When evaluating the reliability of a continuity tester in assessing complex electronic assemblies, which factor most significantly affects the accuracy of its results?

- A. Physical condition and cleanliness of the probes used for testing
- B. Presence of parallel paths that may provide alternative current routes ✓
- C. Ambient temperature of the electronic workshop environment
- D. Battery charge level of the continuity tester during use that may affect voltage

Q10 Part B

In a circuit with constant voltage, an increase in current causes electrical power to:

- A. Increase ✓
- B. Decrease
- C. Remain unchanged
- D. Become zero

Q11 Part B

What happens in an air-conditioning system when the room temperature falls below the thermostat set temperature?

- A. The system switches to heating mode
- B. The compressor runs continuously
- C. The compressor is switched off ✓
- D. The compressor is switched on

Q12 Part B

What is the nature of resulting flame when using excess acetylene in the gas welding process?

- A. Oxidizing flame
- B. Neutral flame
- C. Carburizing flame ✓
- D. Diffusion flame

Q13 Part B

Which defrosting method in a domestic refrigerator uses a built-in timer to control the operation of the heating element?

- A. Hot gas defrosting method
- B. Air circulation method
- C. Manual defrosting method
- D. Electric defrosting method ✓

Q14 Part B

A food processing company requires a cold storage plant that can hold 200 metric tons of produce at -18 degrees Celsius. What specification should be prioritized to ensure consistent temperature throughout the entire storage period?

- A. Higher ceiling heights for better air circulation
- B. Smaller door dimensions for reduced air exchange
- C. Adequate evaporator surface area for uniform cooling ✓
- D. Increased lighting intensity inside the storage room

Q15 Part B

What is the main function of the evaporator in a refrigerator system?

- A. It condenses refrigerant to release heat
- B. It compresses refrigerant to increase pressure
- C. It absorbs heat from the compartment to cool it ✓
- D. It removes moisture from the refrigerant flow

Q16 Part B

Which material would be most suitable for making a light but strong machine part, based on density values?

- A. Copper
- B. Lead
- C. Aluminum alloy ✓
- D. Cast iron

Q17 Part B

Which of the following is the purpose of using flux during soldering?

- A. To increase the melting point of solder
- B. To change the size of the metal joint
- C. To prevent oxidation from metal surfaces ✓
- D. To add strength to the joint

Q18 Part B

What is the main advantage of using a slip ring induction motor in refrigeration compressors?

- A. High starting torque ✓
- B. Reduced noise level
- C. Smaller physical size
- D. Less maintenance required



Q19 Part B

In a central air-conditioning system, which method is most effective for balancing air delivery to different zones within a building?

- A. Adding multiple thermostats
- B. Increasing compressor speed
- C. Using variable air volume boxes ✓
- D. Installing larger ductwork

Q20 Part B

In a mobile AC system, a technician observes poor cooling performance along with high suction pressure. Which expansion valve fault best explains this condition?

- A. Valve stuck closed blocking refrigerant entry
- B. Valve stuck open allowing excess refrigerant flow ✓
- C. Sensing bulb not properly attached
- D. Clogged valve restricting refrigerant passage

Q21 Part B

Which design modification would most improve the performance of a shell-and-tube condenser in a large commercial air conditioning plant?

- A. Using thinner refrigerant piping for increased flow
- B. Reducing the diameter of refrigerant tubes
- C. Raising water velocity through the tubes only
- D. Increasing the surface area of heat exchange tubes ✓

Q22 Part B

What is the main advantage of using a variable speed compressor in commercial refrigeration compared to a fixed speed compressor?

- A. It eliminates need for regular maintenance checks
- B. It adapts capacity to load, improving energy efficiency ✓
- C. It always maintains constant pressure regardless of demand
- D. It operates silently under all load conditions

Q23 Part B

Why is the evaporator coil typically placed inside the storage compartment of a deep freezer?

- A. To keep the compressor cool
- B. To absorb heat from stored items efficiently ✓
- C. To provide structural support to the cabinet
- D. To reduce electrical consumption

Q24 Part B

If the temperature is 0 degrees Celsius, what is the equivalent temperature on the Kelvin scale?

- A. 273 Kelvin ✓
- B. 0 Kelvin
- C. 100 Kelvin
- D. 298 Kelvin

Q25 Part B

Which component does the automatic expansion valve directly control by its operation?

- A. The oil level in the compressor
- B. The temperature of the condenser fan
- C. The speed of the compressor motor
- D. The flow of refrigerant into the evaporator ✓

Q26 Part B

Which of the following best describes the placement of dimension figures and lines in the unidirectional system when dimensioning a complex RAC component drawing?

- A. Dimension figures are always placed horizontally above the dimension line ✓
- B. Dimension figures are positioned along the arrowhead at the end of the dimension line
- C. Dimension figures are placed inside the extension lines wherever possible
- D. Dimension figures are placed in line with the feature being dimensioned

Q27 Part B

Which component in a screw compressor is directly responsible for the compression of the refrigerant?

- A. The intermeshing male and female rotors ✓
- B. The centrifugal impeller
- C. The reciprocating piston assembly
- D. The stationary vanes



Q28 Part B

A cold storage plant is designed for deep freezing food products. The manager notices that the freezing rate is slower than expected and suspects inadequate evaporator performance. Which action is most likely to resolve this issue?

- A. Reducing the airflow across the evaporator coil
- B. Cleaning the evaporator surfaces to improve heat transfer ✓
- C. Raising the room temperature by a few degrees
- D. Increasing the refrigerant charge in the system

Q29 Part B

Which main goal is achieved by the Montreal Protocol related to refrigerants in India?

- A. Increasing the use of traditional refrigerants in old systems
- B. Raising the energy consumption for industrial refrigeration
- C. Encouraging use of natural gases in all household equipment
- D. Protecting the ozone layer by reducing harmful refrigerants ✓

Q30 Part B

What is the main function of the adjusting screw on a compass in engineering drawing?

- A. To mark the circle boundary
- B. To locate the centre point
- C. To set and maintain the radius distance ✓
- D. To draw the arc neatly

Q31 Part B

Which material is commonly used for making disposable air filters in air-conditioning systems?

- A. Steel wire mesh
- B. Activated carbon
- C. Aluminum mesh
- D. Fiberglass mesh ✓

Q32 Part B

Which method is NOT suitable for artificial humidification in standard air-conditioning practice?

- A. Using a spray type humidifier
- B. Using open container of water in corner ✓
- C. Using a wetted pack humidifier
- D. Injecting steam into the airflow

Q33 Part B

A shaft requires a tough core with a hard surface. Which heat treatment process should be applied?

- A. Annealing
- B. Case hardening ✓
- C. Normalizing
- D. Nitriding

Q34 Part B

Which of the following is a key difference between a Variable Refrigerant Volume system and a traditional split AC system?

- A. VRV systems require one outdoor unit per indoor unit
- B. VRV systems use water piping instead of refrigerant piping
- C. A VRV system connects multiple indoor units to one outdoor unit ✓
- D. VRV systems circulate chilled water through AHUs instead of refrigerant piping

Q35 Part B

Which part of a file fits into the handle to secure the file?

- A. Blade
- B. Tip
- C. Heel
- D. Tang ✓

Q36 Part B

Which safety symbol would indicate a risk of high voltage in an industrial workshop?

- A. A gear inside a square
- B. A flame inside a circle
- C. A lightning bolt inside a triangle ✓
- D. A skull and crossbones symbol



Q37 Part B

Which of the following factors results in welding distortion in a gas-welded thin metal sheet?

- A. Moderate heat and continuous filler addition
- B. Uniform heat input and steady hand movement
- C. Low heat input and frequent tack welding
- D. High heat input and lack of proper tack welding ✓

Q38 Part B

How does providing first aid contribute to the safety objectives in a mechanical workshop environment?

- A. It guarantees that no injuries will occur in the future
- B. It helps reduce the severity of injuries until professionals take over ✓
- C. It replaces the need for professional medical treatment entirely
- D. It removes all potential hazards from the workplace

Q39 Part B

A refrigerator's compressor is not starting, and voltage is present at the compressor terminals. What is the next logical troubleshooting step regarding the wiring?

- A. Replace the wiring harness without testing
- B. Check for continuity in the start relay wiring circuit ✓
- C. Change the overload protector immediately
- D. Inspect the thermostat for physical damage

Q40 Part B

An ice-cream manufacturer must maintain a constant low temperature and prevent product dehydration during storage. Which cold storage type best meets these criteria?

- A. General warehouse storage
- B. Chilled storage without humidity control
- C. Frozen storage with humidity control ✓
- D. Ventilated storage at ambient temperature

Q41 Part B

If air at 25°C dry bulb temperature and 50% relative humidity is heated at constant moisture content, what happens to its relative humidity?

- A. It decreases ✓
- B. It reaches saturation
- C. It remains unchanged
- D. It increases

Q42 Part B

In a Zener diode voltage regulator circuit, what is the expected behavior of the output voltage across the load if the input voltage rises above the Zener breakdown voltage?

- A. It becomes zero
- B. It increases continuously
- C. It becomes negative
- D. It remains nearly constant ✓

Q43 Part B

Which of the following best describes the function of a Megger in electrical work?

- A. It is used to measure insulation resistance between conductors ✓
- B. It is used to measure the total length of electrical cables
- C. It is used to determine the thickness of electrical wires
- D. It is used to check the amount of power drawn-out in a circuit

Q44 Part B

A worker argues that head protection is unnecessary in their specific zone because there are no active overhead tasks. As a safety officer, what is the most valid justification for enforcing mandatory head protection?

- A. Unseen accidental impacts can still occur, so head protection is essential ✓
- B. Allow workers to decide based on their own risk assessment
- C. Require head protection only where visible risks exist
- D. Rely on the past safety records to decide whether head protection should be used or not

Q45 Part B

Which electronic component is commonly used for simple voltage regulation circuits?

- A. Transformer for amplifying weak electronic control circuit signals.
- B. SCR for converting AC supply into controlled DC output voltage.
- C. Zener diode for maintaining nearly constant output voltage level. ✓
- D. Capacitor for generating high-frequency oscillations in control circuits.



Q46 Part B

In a direct cool refrigerator, which physical principle primarily drives the movement of cold air from the freezer section to the fresh food section?

- A. Pressure difference created by the compressor suction line
- B. Capillary action through the insulation foam
- C. Density difference caused by temperature gradient ✓
- D. Forced convection generated by an evaporator fan

Q47 Part B

What is the primary function of a desoldering braid (Wicking braid) in PCB repair work?

- A. It melts solder joints using electric heating for fast removal process.
- B. It applies flux on joints to improve solder flow during joining process.
- C. It absorbs molten solder from PCB pads using capillary action effect. ✓
- D. It mechanically scrapes solder from components using abrasive action.

Q48 Part B

Which statement is correct about a Direct Expansion (DX) central air-conditioning system?

- A. A DX system circulates air without cooling
- B. A DX system uses refrigerant for direct cooling, not chilled water ✓
- C. A DX system always operates with higher humidity
- D. A DX system uses water for cooling, not refrigerant

Q49 Part B

While servicing a refrigerator evaporator, an accumulator is found to have excessive oil inside. What is the most appropriate troubleshooting step to address this issue?

- A. Increase the refrigerant charge to flush excess oil from the system
- B. Adjust the expansion valve to reduce oil carryover into the accumulator
- C. Clean or replace the accumulator to restore proper oil separation ✓
- D. Bypass the accumulator to prevent oil accumulation in the unit

Q50 Part B

A technician observes liquid refrigerant carryover into the compressor. Which adjustment should be prioritized to prevent this condition?

- A. Decrease the amount of sub cooling at the condenser outlet
- B. Increase the amount of sub cooling at the evaporator outlet
- C. Decrease the amount of super heating at the evaporator outlet
- D. Increase the amount of super heating at the evaporator outlet ✓

Q51 Part B

Which combination of properties makes hermetically sealed compressors especially suitable for domestic refrigerators?

- A. Easier access for maintenance and rapid cooling performance
- B. Flexible mounting options with easier component change and less motor noise
- C. Prevention of refrigerant leakage and protection from contaminants ✓
- D. Lower energy consumption and reduced vibration

Q52 Part B

During troubleshooting, what is the most important step to verify if an Overload Protector (OLP) in a refrigerator compressor circuit is functioning correctly?

- A. Check for voltage at compressor terminals using a multimeter
- B. Check for continuity across overload protector terminals using a multimeter ✓
- C. Check the capacitor value with an analog meter
- D. Check the compressor windings with a clamp meter

Q53 Part B

Which color label identifies a water extinguisher in fire safety equipment?

- A. Black label with a grey band
- B. Blue label with a white band
- C. Yellow label with a green band
- D. Red label without any colored band ✓



Q54 Part B

In a spanner used to loosen a tight nut, the effort is applied at the handle end, the fulcrum is at the bolt, and the load is at the nut. If the handle length is increased while the load remains constant, what is the effect on mechanical advantage?

- A. Mechanical advantage decreases
- B. Mechanical advantage remains the same
- C. Mechanical advantage becomes zero
- D. Mechanical advantage increases ✓

Q55 Part B

How does latent heat load differ from sensible heat load in air conditioning design?

- A. Latent load is about building size; sensible load is about occupancy
- B. Latent load involves moisture removal; sensible load involves temperature control ✓
- C. Latent load requires larger compressors; sensible load needs smaller fans
- D. Latent load increases energy efficiency; sensible load reduces efficiency

Q56 Part B

Which type of cooling tower uses a fan to force air through the water to enhance cooling efficiency?

- A. Crossflow cooling tower
- B. Closed circuit cooling tower
- C. Natural draft cooling tower
- D. Mechanical draft cooling tower ✓

Q57 Part B

Which component in a train air conditioning system primarily removes heat from the passenger compartment?

- A. Evaporator coil ✓
- B. Expansion valve
- C. Compressor
- D. Condenser coil

Q58 Part B

Which scenario would result in the lowest relative humidity in an air conditioned room?

- A. Low temperature with low moisture content
- B. Low temperature with high moisture content
- C. High temperature with high moisture content
- D. High temperature with low moisture content ✓

Q59 Part B

Which situation most justifies selecting a mini screwdriver over a standard-size one when assembling an electronic circuit board with dense components?

- A. When large components require robust tightening force and space is available
- B. When the working area has no space restrictions and small tightening force is required
- C. When access is limited due to closely packed parts and small fasteners are used ✓
- D. When fasteners are of the standard size and ample space is available

Q60 Part B

If the diameter of a circular plate is doubled, how does the area change?

- A. Area remains the same
- B. Area becomes eight times larger
- C. Area becomes sixteen times larger
- D. Area becomes four times larger ✓

Q61 Part B

Which instrument is commonly used for insulation resistance testing?

- A. Megger ✓
- B. Ammeter
- C. Wattmeter
- D. Voltmeter

Q62 Part B

What distinguishes a maintenance log from an equipment inventory list in refrigeration maintenance?

- A. A maintenance log details service history, while inventory lists track assets ✓
- B. A maintenance log records warranty periods, while inventory lists show purchase costs
- C. A maintenance log lists spare parts, while inventory lists record repairs
- D. A maintenance log tracks technician attendance, while inventory lists show tools used



Q63 Part B

Which cutting tool is most suitable for producing a straight, burr-free edge on a galvanized sheet while minimizing material waste?

- A. Using a well-aligned guillotine shear with sharp blades ✓
- B. Using a coarse grain abrasive cutting wheel at high speed
- C. Employing hand snips with rapid cutting motion
- D. Applying a cold chisel along a marked line

Q64 Part B

Why is the vapour compression cycle preferred over the absorption refrigeration cycle in commercial refrigerators?

- A. It requires no refrigerant and is completely maintenance-free
- B. It operates silently and requires no moving mechanical parts
- C. It can use waste heat from industrial processes as its energy source
- D. It provides higher efficiency for continuous operation ✓

Q65 Part B

Which of the following defines the coefficient of performance of a vapor compression refrigeration system?

- A. Ratio of pressure drop in evaporator to temperature drop in evaporator
- B. Ratio of Input work in compressor to heat absorbed in evaporator
- C. Ratio of refrigerant mass flow rate in evaporator to input work in compressor
- D. Ratio of heat absorbed in evaporator to input work in compressor ✓

Q66 Part B

Which electrical property enables a conductor to allow current flow easily?

- A. High insulation
- B. High resistivity
- C. High conductivity ✓
- D. High reactance

Q67 Part B

A mechanic uses a chain pulley block with a velocity ratio of 6 to lift a 360 kg load. The effort applied is 80 kg. What is the mechanical efficiency of the machine, (Take $g = 9.8 \text{ m/s}^2$)?

- A. Mechanical efficiency is 83%
- B. Mechanical efficiency is 75% ✓
- C. Mechanical efficiency is 54%
- D. Mechanical efficiency is 68%

Q68 Part B

According to industry standards, which best practice must be followed to maintain condenser efficiency and ensure technician safety during maintenance?

- A. Operate the system at maximum pressure during cleaning
- B. Disconnect power supply before cleaning or servicing the condenser ✓
- C. Remove refrigerant before inspecting the condenser coil
- D. Use water directly on electrical connections to clean

Q69 Part B

What is the main function of an electronic control system in an air-conditioning unit?

- A. To regulate system operation by processing sensor data ✓
- B. To manually switch the system on and off
- C. To control only the refrigerant flow
- D. To generate power for the compressor

Q70 Part B

What is the function of a swash plate in a swash plate compressor?

- A. It acts as a refrigerant filter to trap contaminants
- B. It converts rotary motion into reciprocating motion ✓
- C. It is used to rotate the cooling fan in the evaporator
- D. It compresses the refrigerant directly to vapor



Q71 Part B

What is the main purpose of leak testing in a cold storage plant refrigeration system?

- A. To clean the condenser coils
- B. To measure the storage room temperature
- C. To detect any refrigerant escaping from the system ✓
- D. To check the pressure levels in the compressor

Q72 Part B

What is the function of a drier in a domestic refrigerator system?

- A. To cool the refrigerant before compression
- B. To remove moisture from the refrigerant ✓
- C. To reduce refrigerant pressure in the system
- D. To regulate refrigerant flow in the system

Q73 Part B

In an engineering drawing for a compressor housing, how should a concealed internal oil passage be represented in the orthographic side view?

- A. By using thin continuous lines extending beyond the passage
- B. By using alternating long and short dashes to mark the passage
- C. By using continuous thick lines along the visible outline
- D. By using uniformly spaced short dashed lines indicating the concealed outline ✓

Q74 Part B

When two sheets of metal are joined using a rivet, what is the main reason for forming a 'shop head' on the opposite side of the factory head?

- A. It increases the rivet's total length for adjustment
- B. It locks the rivet in place to secure both sheets ✓
- C. It serves as a decorative feature on metal surfaces
- D. It reduces vibration without locking the joint

Q75 Part B

Why are chillers often used in commercial buildings instead of split air conditioners?

- A. Chillers can cool water for centralized air-conditioning systems ✓
- B. Chillers are easier to install in small rooms
- C. Chillers supply heated air during winter
- D. Chillers require less maintenance than split ACs



Part B

75 Questions • Answer Key

Q1 Part B

If the secondary winding of an ignition coil has an open circuit or poor ground connection, what is the most likely effect?

- A. Engine will misfire
- B. The high voltage spark will not be generated efficiently ✓
- C. The primary winding voltage will increase
- D. The high voltage spark will be generated efficiently

Q2 Part B

A ballast resistor is used in a circuit to:

- A. Increase supply voltage
- B. Limit circuit current to a safe value ✓
- C. Convert AC into DC
- D. Store electrical energy

Q3 Part B

Which application best demonstrates the practical use of outside callipers in automotive work?

- A. Measuring internal bore diameter of engine cylinders
- B. Marking reference lines on fabricated metal surfaces
- C. Checking uniform shaft diameter at different locations ✓
- D. Measuring drilled hole depth during machining work

Q4 Part B

Which engine problem is indicated by high carbon monoxide levels in the exhaust?

- A. Air-fuel mixture is too rich in the engine ✓
- B. Worn spark plugs in the ignition system
- C. Poor tire alignment during operation
- D. Low coolant level in the radiator

Q5 Part B

Which tool is typically used to tighten fittings on refrigerant hoses?

- A. Hammer or mallet
- B. Wrench or spanner ✓
- C. Screwdriver or tester
- D. File or rasp

Q6 Part B

Why is emery paper preferred over sandpaper for finishing metal surfaces in marking and measuring tasks?

- A. Emery paper absorbs oil better than sand paper
- B. Emery paper is harder and more durable ✓
- C. Emery paper produces less friction during use
- D. Emery paper is specifically designed for cleaning wood surfaces

Q7 Part B

Which component directly connects the engine crankshaft to the automatic transmission in a torque converter system?

- A. Clutch
- B. Governor
- C. Oil pump
- D. Drive plate ✓

Q8 Part B

Which of the following workshop observations would suggest a steering column is NOT collapsible?

- A. It is built from one continuous solid rod ✓
- B. It is divided into several connected parts
- C. It uses an intermediate collapsible piece
- D. It has a flexible joint near the base



Q9 Part B

If a mechanic finds that the engine does not start even though the battery is fully charged, which electrical connection or component should be checked next?

- A. Faulty ignition switch contacts
- B. Loose battery terminal** ✓
- C. Blown main starter fuse
- D. Corroded solenoid switch connection

Q10 Part B

A technician measures only the outside diameter of a rim. What mistake has been made in defining the rim size?

- A. Omitted the width of the rim** ✓
- B. Included tread depth only
- C. Measured the inner circumference
- D. Used tyre sidewall measurement

Q11 Part B

Which warning sign on the dashboard may indicate a seat belt pretensioner issue?

- A. A radio warning message is shown
- B. A seat belt warning light remains on** ✓
- C. An air conditioning warning appears
- D. A headlight warning flashes

Q12 Part B

How does a worn-out piston ring influence hydrocarbon emissions in the exhaust?

- A. Reduces emission temperature
- B. Filters hydrocarbons from exhaust
- C. Allows unburnt fuel to enter exhaust** ✓
- D. Improves engine compression

Q13 Part B

What is the primary function of a proportioning valve in a front disc, rear drum brake system?

- A. To restrict fluid pressure to the rear brakes during hard braking** ✓
- B. To restrict fluid pressure to the front brakes during hard braking
- C. To act as a warning device for brake failure
- D. To increase fluid pressure to the rear brakes at all times

Q14 Part B

Under what condition will the shift valve delay a gear shift in automatic transmission?

- A. If the vehicle is in idling state.
- B. If the vehicle is braking heavily.
- C. If the vehicle is accelerating gently.
- D. If the vehicle is accelerating quickly.** ✓

Q15 Part B

A failure analysis shows a big-end bearing with excessive scoring and shaft damage. Which property was likely insufficient in the bearing material?

- A. Good thermal conductivity
- B. High hardness of the bearing
- C. Embeddability of the bearing material** ✓
- D. High tensile strength of the bearing

Q16 Part B

An engine consumes excessive oil and oil is found in the combustion chamber. What action should be taken?

- A. Replace the main bearings
- B. Use oil of higher viscosity
- C. Remove excess oil
- D. Replace the piston rings** ✓

Q17 Part B

To improve both engine efficiency and emission control in a diesel engine, which piston ring function must be prioritized during maintenance?

- A. Maintaining piston lubrication and cooling efficiency
- B. Improving piston alignment and minimizing noise
- C. Ensuring proper sealing of combustion gases and oil regulation** ✓
- D. Increasing piston speed and reducing heat buildup

Q18 Part B

Which part of a composite headlight is most likely to be made from plastic rather than glass?

- A. Holder
- B. Lens** ✓
- C. Reflector
- D. Bulb



Q19 Part B

Which of the following component links both the steering arms together in the conventional steering system?

- A. The drop arm links both the steering arms
- B. The drag link rod links both the steering arms
- C. The track rod connects both the steering arms. ✓
- D. The stabilizer bar links both the steering arms

Q20 Part B

What are the likely consequences of air leaking into a lift pump inlet during operation?

- A. Engine power increases
- B. Emissions are improved
- C. Engine may run irregularly ✓
- D. Engine runs cooler

Q21 Part B

Which technology ensures better fuel economy and emission control in modern petrol vehicles?

- A. Single Point Fuel Injection system
- B. Carburettor Fuel Supply system
- C. Common Rail Direct Injection system
- D. Multi Point Fuel Injection system ✓

Q22 Part B

Which component supplies current to the rotor windings in most alternators?

- A. Slip rings and brushes ✓
- B. Ignition switch contacts
- C. Diodes and rectifier
- D. Voltage regulator unit

Q23 Part B

Why must the secondary pulley shaft in a **Continuously Variable Transmission (CVT)** be manufactured precisely?

- A. Resist chemical corrosion
- B. Allow flexibility during operation
- C. Adjust its length automatically
- D. Ensure accurate torque transmission ✓

Q24 Part B

The abbreviation SMF in SMF battery refers to:

- A. Standard Magnetic Fuse
- B. Stored Mechanical Force
- C. Semi Metallic Frame
- D. Sealed Maintenance Free ✓

Q25 Part B

A vehicle's Diagnostic Trouble Code (DTC) is read as a generic code. What does this imply about the fault?

- A. The problem is unique to that vehicle model
- B. The code is not recognized by the code reader, needs update
- C. The issue is defined by industry standards and not unique to the manufacturer ✓
- D. The issue is defined by manufacturer and not unique to the industry standards

Q26 Part B

A technician needs to synchronize the extension speed of two hydraulic cylinders operating under different loads. Which application of flow control valves is most effective?

- A. Using a pressure relief valve to stabilize system pressure for both cylinders
- B. Adjusting pump output to increase overall system pressure for both cylinders
- C. Installing flow control valves in the lines to both cylinders to balance fluid flow ✓
- D. Placing a flow control valve only in the return line from both cylinders

Q27 Part B

How do some run-flat tyres support vehicle weight after a puncture?

- A. By containing a rubber foam insert inside the tyre
- B. By using stiffer sidewalls that can support the vehicle ✓
- C. By reinforcing the tread with steel mesh
- D. By having an extra air reservoir in the rim

Q28 Part B

Which part connects the electric motor to the wheels in an electric vehicle?

- A. Air conditioning unit
- B. Tail light
- C. Display panel
- D. Transmission system ✓



Q29 Part B

In a pure intrinsic semiconductor, where is the Fermi level located?

- A. Near the power supply voltage
- B. Inside the conduction band
- C. Near the middle of the forbidden energy gap ✓
- D. Inside the valence band

Q30 Part B

What happens to the vehicle's rear ride height when the rubber air cylinder is pressurized in a load-adjustable shock absorber?

- A. The rear ride height remains unchanged
- B. The rear ride height decreases
- C. The rear ride height becomes uneven side to side
- D. The rear ride height increases ✓

Q31 Part B

When the accelerator pedal is fully depressed, what happens during kick-down operation in an automatic transmission?

- A. The current gear is maintained for stability
- B. The transmission is disengaged to coast
- C. A lower gear is selected to increase acceleration ✓
- D. A higher gear is selected to save fuel

Q32 Part B

Why is torque specification important when tightening bolts during diesel engine assembly?

- A. It ensures that any arbitrary amount of torque can be applied manually to achieve bolt tightening
- B. It ensures that the hand tightening alone is always sufficient for all bolts to meet torque specifications
- C. It ensures bolts are neither too loose nor too tight for engine safety ✓
- D. It ensures bolts have a clearance fit with the nuts and saves time in assembly

Q33 Part B

What is indicated if the parking lamp glows continuously in a vehicle with ABS and Electronic Brake-force Distribution (EBD)?

- A. Normal EBD operation
- B. Low Brake fluid level
- C. Defective EBD operation ✓
- D. A door is left open

Q34 Part B

Which part of the rack and pinion steering system is responsible for moving the rack?

- A. The track-rod
- B. The steering wheel
- C. The pinion ✓
- D. The wheels

Q35 Part B

Which method is recommended for safely cleaning toxic dust from vehicle components in a workshop?

- A. Dry sweeping with a broom
- B. Compressed air blowing
- C. Wiping by hand with cloth
- D. Vacuum cleaning equipment ✓

Q36 Part B

A technician lifts a box using a hoist. What type of energy is primarily involved in lifting?

- A. Electrical energy
- B. Potential energy ✓
- C. Chemical energy
- D. Kinetic energy

Q37 Part B

Why is it important for the oil cooler to maintain the oil at an optimal temperature range?

- A. To prevent the oil from changing its color during operation.
- B. To cool the combustion gases in the engine cylinders.
- C. To ensure the oil maintains proper viscosity for lubrication. ✓
- D. To increase the oil level in the crankcase automatically.

Q38 Part B

Which state does the refrigerant enter the compressor in an automobile HVAC system?

- A. Low-pressure gas ✓
- B. High-pressure liquid
- C. Low-pressure liquid
- D. High-pressure gas



Q39 Part B

What does a higher octane rating in gasoline primarily indicate about the fuel?

- A. It improves exhaust emission quality
- B. It increases the engine cooling effect
- C. It resists knocking during combustion ✓
- D. It boosts the fuel energy content

Q40 Part B

Which type of vehicle commonly uses **Liquefied Petroleum Gas (LPG)** as its primary fuel source?

- A. Heavy trucks
- B. City taxi cabs ✓
- C. High-performance sports cars
- D. Agricultural tractors

Q41 Part B

What is the standard figure to represent a shaft in a cross-sectional engineering drawing?

- A. Triangle
- B. Circle ✓
- C. Rectangle
- D. Square

Q42 Part B

How is the air gap between the brake pads and the disc restored when the brake is released in a floating caliper disc brake?

- A. By the motion of the locating studs
- B. By the outer brake pad spring
- C. By the force of the piston sealing ring ✓
- D. By renewed hydraulic pressure

Q43 Part B

What is a common symptom of a failing electric vehicle battery?

- A. High oil consumption
- B. Knocking engine sound
- C. Reduced driving range ✓
- D. Unusual exhaust smoke

Q44 Part B

On a technical drawing, the intersection of two axes commonly represents what?

- A. The surface finish type
- B. The hole diameter
- C. The material specification
- D. The center point of a part ✓

Q45 Part B

When performing alternator maintenance, you replace a component that connects the rotor to the external circuit. Which part is this?

- A. Rectifier assembly
- B. Slip rings ✓
- C. Stator winding
- D. Voltage regulator

Q46 Part B

What is a critical factor to consider when selecting a taper reamer for aligning two components with a tapered pin?

- A. Matching the taper angle of the pin and reamer ✓
- B. Ensuring equal tool length to the pin
- C. Selecting the hardest available material
- D. Matching the flute count to the pin

Q47 Part B

Which unit assists the clutch in performing gear shifts in automatic transmissions?

- A. Brake pad system
- B. Torque converter assembly ✓
- C. Planetary gear sets
- D. Steering column linkage

Q48 Part B

A fan runs for 6 hours per day and consumes the rated power of 75 watts. How much energy will it consume in two days?

- A. 75 watt-hours
- B. 825 watt-hours
- C. 900 watt-hours ✓
- D. 150 watt-hours



Q49 Part B

Why is it important to use a V block when drilling a round rod?

- A. It cools the workpiece
- B. It changes the drill size
- C. It prevents the rod from rolling ✓
- D. It increases drilling speed

Q50 Part B

Which tool is most appropriate for checking battery terminal tightness during routine automobile maintenance?

- A. A rubber head hammer
- B. A spanner of correct size ✓
- C. A clean paintbrush
- D. A flathead screwdriver

Q51 Part B

A mechanic is diagnosing a vehicle with poor acceleration and suspects a fuel system issue. Which test would best confirm whether incorrect fuel pressure is the cause?

- A. Listen for the fuel pump sound during ignition
- B. Inspect the injectors for clogging and leaks
- C. Measure pressure at the rail and compare to specifications ✓
- D. Replace the fuel filter and observe improvement

Q52 Part B

Why are hydraulic systems used in automobile power steering mechanisms?

- A. They increase engine speed during turns
- B. They reduce driver effort when turning the wheel ✓
- C. They decrease fuel consumption at high speed
- D. They control the lighting circuits in vehicles

Q53 Part B

A vehicle battery repeatedly becomes discharged while driving. Which charging system component is most likely faulty?

- A. Alternator failing to charge the battery properly ✓
- B. Fuel pump reducing fuel supply to the engine
- C. Ignition coil producing weak spark during ignition
- D. Starter motor causing delayed engine cranking

Q54 Part B

If spurt holes are blocked, what is the most likely immediate effect on engine operation?

- A. Sudden improvement in fuel combustion quality
- B. Rapid increase in coolant flow to cylinder walls
- C. Immediate rise in oil pressure throughout the system
- D. Increased friction in moving engine components ✓

Q55 Part B

Which of the following is NOT a characteristic of extension lines?

- A. They are thin in appearance
- B. They are continuous without gaps
- C. They extend beyond dimension lines
- D. They are drawn thicker than visible lines ✓

Q56 Part B

When might a diesel actuator require recalibration?

- A. After new battery is fitted
- B. When replacing tires
- C. After fuel system repairs ✓
- D. When changing engine oil

Q57 Part B

Which piston ring is designed to maintain proper tension and fit of other rings in the groove?

- A. Expander ring ✓
- B. Oil control ring
- C. Scraper ring
- D. Compression ring

Q58 Part B

What principle does the height sensor use to function in an electronically controlled air suspension system?

- A. Pressure principle
- B. Electromagnetic induction principle ✓
- C. Thermal expansion principle
- D. Piezoelectric effect principle



Q59 Part B

In a workshop calculation, you need to find the side of a square base with an area of 64 cm^2 . What is the correct length?

A. The side of the base is 8 cm



B. The side of the base is 9 cm

C. The side of the base is 7 cm

D. The side of the base is 6 cm

Q60 Part B

Which symptom can indicate improper alignment of the piston assembly?

A. Irregular wear on piston skirt



B. Fuel dilution in oil sump

C. High coolant loss from engine

D. Increased oil pressure reading

Q61 Part B

If two vehicles have the same motor but one carries more passengers, which will need higher tractive effort on the same road?

A. Vehicle with newer battery brand

B. Vehicle with brighter paint color

C. Vehicle with more passengers



D. Vehicle with different tyre tread pattern

Q62 Part B

Which part of a depth micrometer ensures stable positioning during measurement?

A. The spindle that extends downward

B. The ratchet that applies pressure

C. The broad base that rests on the surface



D. The thimble used to rotate the spindle

Q63 Part B

Which practice best ensures driver safety during road testing of vehicles after major repairs?

A. Monitoring engine sounds during the complete test

B. Depending on previous records before the road test

C. Inspecting vehicle systems without using safety gear

D. Following safety checks and wearing proper gear

**Q64 Part B**

If the Engine Control Unit (ECU) detects a fault, how can the specific problem area be identified?

A. By checking engine spark plugs

B. By checking engine oil viscosity

C. By checking compression pressure

D. By a code provided by the ECU

**Q65 Part B**

Why is it important for the thermostat to begin opening at a specific temperature during engine operation?

A. Closes only when temperature exceeds safe limit

B. Ensures engine reaches and maintains optimal temperature



C. Permits random coolant flow regardless of heat

D. Allows thermostat to remain fully open at all times

Q66 Part B

When using a depth micrometer, which constructional aspect helps keep the instrument stable and reduce measurement error?

A. The thimble resists external vibrations

B. The ratchet stop absorbs vibration impacts

C. The rods stabilize the entire instrument

D. The rigid base minimizes movement during use

**Q67 Part B**

Which failure is most likely if the camshaft drive gears are worn out?

A. Alternator will generate excess current

B. Fuel delivery will be blocked

C. Valve timing will become inaccurate



D. Coolant will leak from the radiator

Q68 Part B

Which scenario best demonstrates the advantage of electronic adjustable shock absorbers on different road conditions?

A. Using only manual adjustments without electronics

B. Changing the dampening rate according to road conditions



C. Maintaining a fixed soft setting for all driving conditions

D. Keeping the dampening rate unchanged regardless of speed



Q69 Part B

Which exhaust emission produced from sulphur present in automotive fuel contributes significantly to acid rain formation?

- A. Sulphur oxides** ✓
- B. Unburnt hydrocarbons
- C. Nitrogen oxides
- D. Carbon monoxide

Q70 Part B

If the centrifugal advance mechanism fails and does not advance the ignition timing, what is a likely result?

- A. Engine may lose power at lower speeds
- B. Engine will run at maximum efficiency
- C. Engine may lose power at higher speeds** ✓
- D. Engine will overheat quickly

Q71 Part B

Which engine cooling method removes heat by circulating a liquid around the cylinder walls and transferring it to a radiator?

- A. Exhaust cooling method using outlet gases
- B. Air cooling method using cooling fins
- C. Water cooling method using liquid coolant** ✓
- D. Oil cooling method using lubricating oil

Q72 Part B

If the potentiometer in the vane-type air flow sensor fails, what is a likely result?

- A. The ECU receives inaccurate airflow data** ✓
- B. The sensor measures fuel pressure in place of air
- C. The injectors are directly controlled by the potentiometer
- D. The ECU ignores all sensor inputs

Q73 Part B

When adjusting the speed of a drilling machine, what is generally decreased for harder materials?

- A. The depth of the hole drilled
- B. The rotational speed of the drill** ✓
- C. The length of the drill tool
- D. The feed rate of the material

Q74 Part B

Which impact is most directly associated with the use of extractors in a vehicle's exhaust system under sustained high engine speeds?

- A. Reduced exhaust temperature during operation
- B. Improved noise insulation in the cabin
- C. Increased overall engine size
- D. Enhanced exhaust gas flow at high rpm** ✓

Q75 Part B

Which of the following is a sign of a faulty starter solenoid?

- A. Clicking sound but engine does not turn over** ✓
- B. Strong fuel smell during ignition
- C. Engine cranks faster than normal
- D. Dashboard lights are brighter than normal



Part B

75 Questions · Answer Key

Q1 Part B

In an automobile alternator, if one rectifier diode becomes open-circuited, what is the most likely effect on battery charging?

- A. Battery charging current reduces and AC ripple increases.** ✓
- B. Alternator produces only AC output without any mechanical effect.
- C. Ignition system voltage becomes fully stabilized automatically.
- D. Battery receives smooth DC charging with no change in output.

Q2 Part B

Which tool is commonly used to tighten cylinder head bolts during diesel engine assembly?

- A. Torque wrench is used to tighten cylinder head bolts** ✓
- B. Combination spanner is used for cylinder head bolts
- C. Adjustable wrench is best for all types of bolt tightening
- D. Soft mallet is ideal for tightening cylinder head bolts

Q3 Part B

Which ECU-controlled feature adjusts the intake air path into the engine?

- A. Idle speed control
- B. Variable intake manifold** ✓
- C. Evaporative emission container
- D. Air: Fuel ratio

Q4 Part B

Which action should be taken first when fuel is accidentally spilled on a workshop floor?

- A. Moving nearby tools without removing the spill
- B. Opening fuel containers to improve air circulation
- C. Applying absorbent material and cleaning the area** ✓
- D. Continuing work until the current task is finished

Q5 Part B

What is the main function of the anvil in the construction of a micrometer?

- A. Provides a stationary measuring surface** ✓
- B. Displays the main scale reading
- C. Rotates the spindle
- D. Adjusts the measuring pressure

Q6 Part B

If the length of the insulator nose is long, what is the direct effect on the spark plug heat range?

- A. The plug will transfer heat faster
- B. The plug will run hotter** ✓
- C. The plug will foul easily
- D. The plug will run cooler

Q7 Part B

What could be a consequence of operating a diesel engine without a functioning vibration damper?

- A. Increased combustion efficiency under load
- B. Stable camshaft timing at all speeds
- C. Improved fuel atomization in injectors
- D. Crankshaft failure due to excessive stress** ✓

Q8 Part B

During a workshop repair, which sign would suggest a failed gasket in a manual transmission case?

- A. Difficulty shifting between gears
- B. Unusual noise coming from inside the case
- C. Visible fluid seeping from between the case and cover plate** ✓
- D. Vibration felt during gear changes



Q9 Part B

What action do the pistons perform once they are moved by the hydraulic fluid?

- A. They pump the hydraulic fluid back into the reservoir and slow down the vehicle.
- B. They retract the brake pads to release the brakes.
- C. They move against the brake pads, pressing them against the rotating brake disc. ✓
- D. They rotate the brake disc and slow down the vehicle.

Q10 Part B

Which SAE viscosity grade is most suitable for a heavy-duty diesel engine operating continuously under high-load conditions in hot summers and moderately cold winters?

- A. SAE 15W-40 ✓
- B. SAE 5W-20
- C. SAE 40
- D. SAE 10W-30

Q11 Part B

A student hypothesizes that using ethanol-blended gasoline requires a different stoichiometric air-fuel ratio than pure gasoline. Which consideration supports this claim?

- A. Oxygen content in fuel blend ✓
- B. Color of gasoline blend
- C. Evaporation rate of fuel
- D. Octane rating of the fuel

Q12 Part B

At what point inside the torque converter is the flow called the 'coupling point'?

- A. When the impeller rotates faster than the turbine
- B. When the stator is locked on its shaft
- C. When the vehicle is idling at low speed
- D. When the impeller and turbine reach the same speed ✓

Q13 Part B

Which of these is the best footwear for personal safety in an automotive workshop?

- A. Canvas shoes
- B. Steel-toed shoes ✓
- C. Rubber slippers
- D. Sandals

Q14 Part B

Which component of vehicle exhaust is most closely linked to hydrocarbon emissions?

- A. Nitrogen oxides
- B. Excess water vapor
- C. Carbon monoxide
- D. Unburned fuel vapors ✓

Q15 Part B

What is a key reason for selecting carbon fiber reinforced carbon composite for racing car brake pads?

- A. It is more cost-effective than all metals
- B. It can handle extreme pressures without failing
- C. It is more fuel efficient than other materials
- D. It can handle extreme temperatures without failing ✓

Q16 Part B

Which feature is designed on pistons to reduce friction with the cylinder wall?

- A. A pin bore is designed on pistons to reduce friction
- B. A skirt is designed on pistons to reduce friction ✓
- C. A dome is designed on pistons to reduce friction
- D. A groove is designed on pistons to reduce friction

Q17 Part B

According to Ohm's law, current in a conductor is directly proportional to:

- A. Voltage ✓
- B. Resistance
- C. Resistivity
- D. Power

Q18 Part B

Which signal is used to indicate special movement instructions for emergency vehicles at an intersection?

- A. A flashing blue signal is used for emergency vehicles ✓
- B. A flashing yellow signal is used for emergency vehicles
- C. A flashing red signal is used for emergency vehicles
- D. A flashing green signal is used for emergency vehicles



Q19 Part B

Which of the following best describes the driver's experience in a four-wheel steering vehicle during a sharp turn?

- A. Movement becomes unstable during sharp turns
- B. More effort is required to initiate a turn
- C. Response to steering input is delayed
- D. Less effort is needed to steer sharply ✓

Q20 Part B

Why is it important to use insulated tools when servicing hybrid electric vehicles?

- A. To avoid scratching metal parts
- B. To prevent oil spills in engine bay
- C. To prevent accidental electric shock ✓
- D. To reduce the weight of tools

Q21 Part B

Which part of the charging system detects changes in battery voltage and adjusts output accordingly?

- A. Regulator unit ✓
- B. Starter motor
- C. Fuse box
- D. Ignition coil

Q22 Part B

When connecting phase windings in a star configuration, what is formed at the common point?

- A. A neutral terminal is formed at the common point ✓
- B. A negative terminal is formed at the common point
- C. A disruptive ground loop shared at one connection
- D. A positive terminal is formed at the common point

Q23 Part B

During which engine operating condition does the alternator supply maximum current to the battery?

- A. During engine starting
- B. At higher engine speeds ✓
- C. At engine idle only
- D. When the engine is off

Q24 Part B

Which construction type is most commonly used in modern passenger vehicles for its durability and handling?

- A. Radial ply construction ✓
- B. Tubeless construction
- C. Bias ply construction
- D. Solid rubber construction

Q25 Part B

Which component directly transmits movement to the front wheels in a recirculating ball and nut system?

- A. The drop arm transmits movement to the front wheels. ✓
- B. The ball nut transmits movement to the front wheels.
- C. The worm transmits movement to the front wheels.
- D. The sector transmits movement to the front wheels.

Q26 Part B

Why are gear ratios arranged in a specific sequence in manual transmissions?

- A. To maximize engine noise at all speeds
- B. To confuse the driver while shifting gears
- C. To reduce the vehicle's fuel tank capacity
- D. To provide smooth acceleration and efficient speed control ✓

Q27 Part B

Which part works closely with actuators to ensure correct fuel injection?

- A. Electronic Control Unit (ECU) ✓
- B. Air filter assembly
- C. Radiator fan blade
- D. Gear lever handle

Q28 Part B

During a precision tapping job, an operator notices the tap slipping within the wrench. Which corrective action should be taken to resolve this using an adjustable tap wrench?

- A. Retighten the jaws to secure the tap firmly in the wrench ✓
- B. Switch to a fixed tap wrench for the operation
- C. Replace the tap with a new one of the same size
- D. Apply greater force while turning the tap



Q29 Part B

What does a typical immobilizer system use to verify authorized access?

- A. Manual window crank handle
- B. Engine oil dipstick
- C. Coded electronic key or fob ✓
- D. Standard metal ignition key

Q30 Part B

Why is the body of a flat chisel slightly tapered towards the cutting edge?

- A. To provide hand grip
- B. To add striking surface
- C. To prevent sticking in work ✓
- D. To increase striking force

Q31 Part B

What feature can be changed in a manual adjustable-rate shock absorber to control oil flow?

- A. The amount of oil used
- B. The size of the spring inside
- C. The position of the valves in the piston ✓
- D. The shape of the piston head

Q32 Part B

Which device in a clean diesel exhaust system is responsible for reducing NO_x pollutants chemically?

- A. Diesel oxidation catalyst
- B. Urea injection system ✓
- C. Air filter device
- D. Turbocharger assembly

Q33 Part B

Which is the lightest among the following commonly used workshop materials?

- A. Steel rod
- B. Aluminum rod ✓
- C. Iron rod
- D. Copper rod

Q34 Part B

Which material property is most critical for the packing material in absorptive mufflers to maximize sound absorption efficiency?

- A. High electrical conductivity
- B. Moderate surface hardness
- C. Low density and water resistance
- D. High porosity and thermal stability ✓

Q35 Part B

Why is a flywheel essential for starting a diesel engine equipped with a manual transmission?

- A. It cools the engine oil during initial cycles
- B. It supplies electrical current to the glow plugs
- C. It generates fuel pressure for the injectors
- D. It provides inertia for easier engine rotation during cranking ✓

Q36 Part B

Which of the following is a likely cause of low engine power output?

- A. Engine oil high viscosity
- B. Low oil level in the sump
- C. Defective injector ✓
- D. Engine oil low viscosity

Q37 Part B

Which method of heat transfer is most responsible for removing excess engine heat in a water-cooled diesel engine's radiator system?

- A. Air conduction through engine block
- B. Conduction of heat through engine block
- C. Radiation from engine surfaces
- D. Convection of coolant through radiator tubes ✓

Q38 Part B

Internal combustion engines offer which advantage in terms of start-up?

- A. Internal combustion engines start without a compression process
- B. Internal combustion engines start without cranking
- C. Internal combustion engines have quick start-up time ✓
- D. Internal combustion engines have slow start-up time



Q39 Part B

What is the role of the adjustment spring in a thermostatic expansion valve?

A. To set the superheat value ✓

B. To filter the refrigerant

C. To transmit pressure

D. To sense refrigerant heat

Q40 Part B

What should be done if oil is mixed with water in oil sump and the engine does not start?

A. Repair the pitted valve seat

B. Clean the exhaust ports

C. Replace ruptured cylinder head gasket ✓

D. Replace cracked valve seat

Q41 Part B

What should be checked before using a divider to ensure accuracy in workshop practice?

A. Both legs are of equal length ✓

B. The surface finish is shiny

C. The divider is heavy

D. The color of the divider

Q42 Part B

How does the use of nylon or rayon cords contribute to the reduction of hysteresis in tyres?

A. They provide flexibility and recover quickly ✓

B. They reduce the tread's grip on wet roads

C. They make the tyre rigid and stiff

D. They increase the overall tyre weight

Q43 Part B

What is a practical effect of using helical gears in a vehicle's steering mechanism?

A. Steering becomes harder to turn

B. Steering transmits less force to the wheels

C. Steering feels harder and has less vibration

D. Steering feels smoother and has less vibration ✓

Q44 Part B

What is the primary purpose of gasoline's volatility in a motor vehicle fuel system?

A. To reduce exhaust emissions automatically

B. To ensure rapid vaporization for ignition ✓

C. To increase the octane rating directly

D. To prevent corrosion of metal parts

Q45 Part B

How does high humidity in the workshop air affect drying of paint on vehicle surfaces?

A. Causes immediate rusting

B. Slows down the drying process ✓

C. Speeds up the drying process

D. Changes paint color instantly

Q46 Part B

Why is the vernier scale constructed with divisions slightly different from those on the main scale in a vernier caliper?

A. To make the vernier scale divisions identical to the main scale divisions.

B. To make the vernier scale divisions twice as large as the main scale divisions.

C. To allow precise matching of a vernier division with a main scale division at specific points. ✓

D. To ensure the vernier scale is always smaller than the main scale.

Q47 Part B

What happens to the boiling point of coolant when the pressure inside the cooling system increases?

A. The boiling point of coolant remains unchanged

B. The boiling point of coolant increases ✓

C. The boiling point of coolant decreases

D. The boiling point of coolant fluctuates

Q48 Part B

A vehicle's thermostat is working erratically, leading to overheating. What should be done?

A. Replace water pump

B. Repair thermostat

C. Open radiator shutter

D. Replace thermostat ✓



Q49 Part B

How does the condenser assist the ignition coil after the contact breaker points separate?

- A. It enables the high voltage surge through the primary winding
- B. It enables the high voltage surge through the secondary winding ✓
- C. It slows down the current in the primary circuit
- D. It triggers the spark plug to fire directly

Q50 Part B

What is the role of eddy currents in an electromagnetic retarder?

- A. To generate thermal energy to lock the vehicle brakes
- B. To create magnetic drag without physical contact ✓
- C. To create magnetic drag through direct physical contact
- D. To maintain a stationary magnetic field in the stator

Q51 Part B

A technician needs a quick approximate measurement of a machined slot in workshop practice. Which task best represents the use of a steel rule?

- A. Marking reference positions near slot edges
- B. Comparing internal bore sizes of cylindrical parts
- C. Guiding straight layout lines on metal surfaces
- D. Checking slot width against a given dimension ✓

Q52 Part B

Which of the following component is most likely worn or failed if there is excessive lateral chassis movement in a rigid non drive rear suspension?

- A. Coil spring
- B. Upper control arm
- C. Tracking bar ✓
- D. Shock absorber

Q53 Part B

A lathe machine performs work at a constant rate. What does this indicate about its power output?

- A. The power output is decreasing
- B. The power output is constant ✓
- C. The power output is zero
- D. The power output is increasing

Q54 Part B

If the length of a conductor is doubled while keeping other factors constant, its resistance will:

- A. Become zero
- B. Become half
- C. Remain unchanged
- D. Double ✓

Q55 Part B

If a technician is asked to estimate the distance a vehicle can travel after a full recharge or refuel, what is the term used to describe this value?

- A. Horsepower
- B. Fuel economy
- C. Driving range ✓
- D. Charge time

Q56 Part B

What does a simple zig-zag line typically symbolize in automobile engineering drawings?

- A. A horn in a circuit
- B. A fuse in a circuit
- C. A bulb in a circuit
- D. A resistor in a circuit ✓

Q57 Part B

Why does an automatic transmission vehicle require a torque converter in stop-and-go driving situations?

- A. Increases the braking force during stops
- B. Directly locks the engine to the wheels
- C. Eliminates the need for transmission fluid
- D. Smooth engine power transmission at low speed ✓

Q58 Part B

During which stroke of the engine cycle are nitrogen oxides produced in the highest amount?

- A. Compression stroke
- B. Intake stroke
- C. Exhaust stroke
- D. Power stroke ✓



Q59 Part B

How can a properly sealed gasket improve manual transmission longevity and care?

- A. Synchronizes gear shifting
- B. Requires frequent replacement
- C. Increases gear wear over time
- D. Reduces maintenance by preventing leaks ✓

Q60 Part B

On an engineering drawing, what does a circle with two parallel lines inside typically indicate?

- A. A ball bearing ✓
- B. A ground connection
- C. A junction box
- D. A fuse

Q61 Part B

When used in hydraulic power packs, internal gear pumps are preferred because they:

- A. Filter out particles at extremely high pressure
- B. Separate air from oil in the reservoir
- C. Circulate coolant efficiently through the pack
- D. Provide consistent flow for actuator control ✓

Q62 Part B

Which piston pin arrangement normally requires thrust washers least often?

- A. Taper pin type
- B. Fixed pin type
- C. Fully floating with circlips ✓
- D. Semi-floating clamped rod type

Q63 Part B

Which feature distinguishes a heavy load vehicle from a light load vehicle?

- A. Aerodynamic shape
- B. High payload capacity ✓
- C. Steering wheel
- D. Headlights

Q64 Part B

Which component in an electric vehicle stores electrical energy for propulsion?

- A. Carburetor set
- B. Alternator unit
- C. Fuel tank set
- D. Battery pack ✓

Q65 Part B

How does an electronic fuel injection (EFI) system protect an overspeeding engine using fuel?

- A. Temporarily cuts fuel injection ✓
- B. Causes immediate acceleration
- C. Lowers fuel pump voltage
- D. Accelerates combustion

Q66 Part B

Which step is essential before using an inch tap to obtain the correct internal thread size?

- A. Drill a hole of correct size for the tap ✓
- B. Mark the center with a prick punch
- C. Apply lubricant to the tap before use
- D. Use a die to test the tap size

Q67 Part B

What movement does the shackle perform when the vehicle passes over a bump or ditch?

- A. It moves forward to accommodate the spring's elongation
- B. It moves backward to accommodate the spring's elongation ✓
- C. It stays fixed in one position to accommodate the spring's elongation
- D. It moves vertically to support the axle

Q68 Part B

What is the correct action after fuel is accidentally spilled on a workshop floor?

- A. Absorb the fuel and wipe the area immediately ✓
- B. Flush the area thoroughly using running water
- C. Allow the fuel to dry naturally before cleaning
- D. Cover the area and continue normal workshop activity



Q69 Part B

A solenoid actuator converts electrical energy into:

- A. Optical energy
- B. Chemical energy
- C. Thermal insulation
- D. Linear magnetic actuation ✓

Q70 Part B

What is the main function of an oil pressure relief valve in a diesel engine lubrication system?

- A. It cools the engine oil during operation
- B. It limits maximum oil pressure in the system ✓
- C. It blocks oil flow completely if pressure is high
- D. It filters contaminants from the oil

Q71 Part B

Which component in the EFI wiring system is responsible for effective atomization characteristics during cold starting condition?

- A. Air flow sensor
- B. Spiral coil spring
- C. Cold start valve ✓
- D. Fuel regulator

Q72 Part B

Why must the starter motor disengage from the flywheel after the engine starts?

- A. To prevent damage to the starter and flywheel ✓
- B. To improve fuel efficiency during driving
- C. To adjust ignition timing automatically
- D. To increase battery life during operation

Q73 Part B

A hydraulic system is designed to lift heavy loads but requires fluid to flow in only one direction to prevent backflow. Which application most appropriately uses a non-return valve?

- A. Mounting a non return valve in a control valve line for flow regulation
- B. Fitting a non return valve in the reservoir return line for fluid direction
- C. Inserting a non return valve in the pump discharge line to stop reverse fluid flow ✓
- D. Placing a non return valve in the system inlet line to enhance pressure

Q74 Part B

Which scenario best describes zero work being done?

- A. Pushing a trolley across the floor
- B. Pulling a rope to lift a load
- C. Lifting a box onto a table
- D. Holding a suspended weight without moving it ✓

Q75 Part B

In most vehicles, where is the headlight relay typically located?

- A. Mounted on the headlight housing
- B. Inside the glove compartment
- C. In the fuse box under the hood ✓
- D. Attached to the battery terminal



Part B

75 Questions · Answer Key

Q1 Part B

What is the main function of an indexing plate in a dividing head setup?

- A. To hold the workpiece
- B. To clamp the workpiece
- C. To control spindle speed
- D. To assist in precise divisions ✓

Q2 Part B

A machinist needs to slot multiple identical parts quickly. Which machine vice feature best supports efficient, repeatable clamping?

- A. Single position locking system
- B. Quick-release jaw mechanism ✓
- C. Manual alignment indicator
- D. Fixed jaw only vice

Q3 Part B

A measuring instrument must be selected for verifying the small diameter (d) of a finely finished Morse taper. Which option provides the most accurate and reliable measurement for this application?

- A. A steel rule marked in millimeters
- B. A micrometer calibrated for small diameters ✓
- C. A vernier caliper with standard jaws
- D. A thread gauge for comparing different profiles

Q4 Part B

A file is not removing material efficiently. What is the likely cause?

- A. Handle is too long
- B. Teeth are clogged with debris ✓
- C. File is too light weight
- D. File is painted

Q5 Part B

During the setup of a CNC lathe for a first part check, the machinist is instructed to use the single-block mode. What is the primary reason for activating single-block mode at this stage?

- A. To verify each program block individually for errors ✓
- B. To monitor the machine motion for vibrations only
- C. To check the coolant flow rate during operation
- D. To optimize spindle speed automatically

Q6 Part B

A detailed drawing includes a note: M12 × 1.75. What does the 1.75 specify in screw thread representation?

- A. The pitch of the thread in millimeters ✓
- B. The thread angle measured in degrees
- C. The total length of the threaded portion
- D. The major diameter of the screw thread

Q7 Part B

In marking operations, a V-block is mainly used to:

- A. Measure diameter directly
- B. Measure surface roughness
- C. Mark centres of round bars ✓
- D. Support square plates

Q8 Part B

A machinist needs to calculate the displacement of the follower at 90° cam rotation in a plate cam with uniform velocity motion and a maximum lift of 20 mm over 180°. What will be the follower displacement at 90°?

- A. 20 mm
- B. 15 mm
- C. 5 mm
- D. 10 mm ✓



Q9 Part B

When should an operator use the Emergency Stop button on the CNC VMC panel during machining?

- A. If the program requires routine setup adjustment
- B. If the program requires routine process adjustment
- C. If the program needs editing or recalibration
- D. If there is a risk of injury or machine damage ✓

Q10 Part B

When using MPG mode on a CNC lathe, what does rotating the handwheel achieve?

- A. Changes tool length offset values in the system
- B. Increases spindle speed proportionally to rotation
- C. Moves the selected machine axis in small increments ✓
- D. Selects between different part programs loaded

Q11 Part B

Why is centre punching necessary on curved or cylindrical surfaces?

- A. Curved surfaces increase drilling speed automatically
- B. Drill bit tends to slip more easily on curved surfaces ✓
- C. Curved surfaces always contain soft metal layers
- D. Curved surfaces reduce hardness of metals

Q12 Part B

A CNC turning operation is set to cut an external metric thread on a steel workpiece. If the thread pitch and minor diameter are already specified, which parameter must be accurately programmed in the tool path to ensure the correct thread profile and depth?

- A. Spindle RPM setting
- B. Coolant flow rate adjustment
- C. Tool nose radius compensation
- D. Thread depth per pass value ✓

Q13 Part B

In a cylindrical grinding operation, an operator needs to remove material from the entire surface of a short, stepped workpiece in a single pass. Which method should be selected for efficient operation?

- A. Plunge grinding with stationary table ✓
- B. Traverse grinding with reciprocating table
- C. Creep feed grinding for cylindrical surfaces
- D. Centerless grinding for long parts

Q14 Part B

In piloted counterbore nomenclature, what does the term 'body' refer to?

- A. The cutting portion that enlarges the hole ✓
- B. The threaded part for attachment
- C. The handle
- D. The cylindrical guide at the tip

Q15 Part B

What is generally done after drawing the two strokes of an arrowhead?

- A. The enclosed space is neatly filled and darkened ✓
- B. The enclosed space is shaded with random marks
- C. The enclosed space is left completely empty
- D. The enclosed space is removed by erasing lines

Q16 Part B

What is the main reason for wearing gloves when giving first aid for bleeding?

- A. To help stop the bleeding
- B. To protect against infection ✓
- C. To make hands feel comfortable
- D. To keep hands free from dirt

Q17 Part B

As the angle increases beyond 45 degrees, what happens to the tangent value?

- A. Tangent value becomes zero
- B. Tangent value increases above 1 ✓
- C. Tangent value remains constant
- D. Tangent value decreases below 1

Q18 Part B

A machinist needs to cut a rectangular pocket using CNC VMC. Which sequence best ensures accurate straight edges using linear interpolation?

- A. Use G00 to move rapidly around the rectangular pocket without programming coordinates.
- B. Use G03 to create all edges of rectangle as curved segments continuously with different radii.
- C. Program each side of the rectangle using G01 with defined start and end coordinates. ✓
- D. Apply G02 to create all sides of rectangle as arcs with one radius value and fixed center.



Q19 Part B

Which machining problem can be minimized by correctly grinding a lathe cutting tool?

- A. Overheating of the lathe machine
- B. Premature tool wear ✓
- C. Rusting of the tool
- D. Vibration of lathe

Q20 Part B

A CNC machinist completes a first part check and notes the outer diameter is correct, but the length is slightly off. What does this suggest about tool offset correction?

- A. Increase the spindle speed for better accuracy
- B. The Z-axis tool offset needs adjustment, not the X-axis ✓
- C. The X-axis tool offset needs to be decreased
- D. Modify the program header for new coordinates

Q21 Part B

Dark lines are observed on the surface of a ground workpiece after finishing. What is the most likely cause of these burn marks during the grinding operation?

- A. Wheel speed is too slow
- B. Wheel is too soft for the material
- C. Wheel is too hard for the material ✓
- D. Sufficient coolant flow

Q22 Part B

If both left-hand and right-hand angles are required to be cut on a plate in a single setup, which tool and approach is most suitable?

- A. Using a double angle milling cutter in a single pass ✓
- B. Using a side and face cutter for each angle separately
- C. Using an end mill with repeated passes for each side
- D. Using a single angle milling cutter with two setups

Q23 Part B

Why is depreciation included in the machine hour rate calculation?

- A. It pays operator wages
- B. It times repairs accurately
- C. It covers power expenses
- D. It spreads asset cost over use ✓

Q24 Part B

Which characteristic is NOT commonly linked with ceramic cutting tool materials?

- A. High toughness ✓
- B. Heat resistance
- C. High hardness
- D. Wear resistance

Q25 Part B

A steel plate is 20 mm thick and 45 mm wide. What is the length of the diagonal across the plate?

- A. 49.24 mm ✓
- B. 47.20 mm
- C. 45.00 mm
- D. 51.00 mm

Q26 Part B

Which of the following best describes the main advantage of using temporary clamps in CNC VMC work-holding?

- A. They are permanently attached to the machine table for stability
- B. They eliminate the need for aligning the workpiece before machining
- C. They allow quick setup changes and reusability for different jobs ✓
- D. They provide the strongest possible holding force during machining

Q27 Part B

What is the primary function of feedback devices in CNC machines?

- A. To store CNC programs as a memory in tape
- B. To lubricate moving machine parts at friction points
- C. To supply power to the servo motors for optimum speed
- D. To monitor and report actual position to the control unit ✓

Q28 Part B

Which statement about the distance from the center in a spiral compared to that in a helix is true?

- A. Both have constant radii
- B. Helix's radius shrinks inward
- C. Spiral's radius changes, helix's radius stays same ✓
- D. Both radii increase



Q29 Part B

Which standard recommends the use of single-stroke lettering in engineering drawings?

- A. ISO : 9001-2000
- B. BS : 8888-2010
- C. IS : 1234-1999
- D. IS : 9609-2001 ✓

Q30 Part B

Which of the following statements best describes the vertical milling attachment?

- A. It offers automatic indexing operation
- B. It enables gear cutting on horizontal machines
- C. It converts horizontal to vertical spindle orientation ✓
- D. It provides rotary table movement

Q31 Part B

Which measuring method is used to examine the concentric alignment of a chuck mounted on a back plate?

- A. Using feeler guage
- B. Using calipers
- C. Visual inspection by the eyes
- D. Using Dial indicator ✓

Q32 Part B

Which protective equipment is essential during a system failure response?

- A. Workshop caps
- B. Insulated gloves ✓
- C. Aprons
- D. Regular cotton gloves

Q33 Part B

Which of the following tool angles affects chip flow during turning operations?

- A. Relief angle
- B. Rake angle ✓
- C. Clearance angle
- D. Point angle

Q34 Part B

What is the formula used to calculate the hourly depreciation of a machine?

- A. $(\text{Cost of Machine} - \text{Replacement Cost}) \div \text{Total Machine Working Hours}$
- B. $(\text{Cost of Machine} + \text{Scrap Value}) \div \text{Total Machine Working Hours}$
- C. $(\text{Cost of Machine} - \text{Scrap Value}) \div \text{Total Machine Working Hours}$ ✓
- D. $(\text{Cost of Machine} \div \text{Scrap Value}) \times \text{Total Machine Working Hours}$

Q35 Part B

Before starting the grinding operation, an operator inspects the wheel for safe operation. Which check is most critical to prevent wheel burst accidents?

- A. Verify the tailstock pressure is set to manufacturer recommendations
- B. Ensure the wheel dresser remains sharp and properly cleaned
- C. Check the coolant system carefully for leaks around the machine area
- D. Conduct a ring test to check for cracks before mounting the wheel ✓

Q36 Part B

Which operation most benefits from using a V-block with a clamp?

- A. Filing flat surfaces
- B. Grinding a rectangular plate
- C. Drilling a hole through a round bar ✓
- D. Measuring internal diameter

Q37 Part B

While setting up a CNC lathe for a new job, it is observed that the tool tip does not align with the programmed workpiece zero point after changing to a longer tool. Which parameter should be adjusted in the machine controller to ensure accurate machining dimensions?

- A. Spindle speed setting
- B. Tool length offset value ✓
- C. Coolant flow rate
- D. Feed rate adjustment



Q38 Part B

In unidirectional dimensioning, how are dimensions placed on the drawing sheet?

- A. Dimensions are placed so they can be read from the bottom edge. ✓
- B. Dimensions are placed so they can be read from multiple edges.
- C. Dimensions are placed so they can be read from random directions.
- D. Dimensions are placed so they can be read from diagonal angles.

Q39 Part B

Which of the following tasks is NOT suitable for a bench-type drilling machine?

- A. Drilling large diameter holes in heavy beams ✓
- B. Drilling small holes in sheet metals
- C. Performing counter-sinking operations on light workpieces
- D. Making holes in thin plastic sheets

Q40 Part B

If you replaced a left-hand helix with a right-hand helix in a reversing motion device, what problem might occur?

- A. Thread may loosen ✓
- B. Thread changes pitch
- C. Thread binds more
- D. Thread stays tight

Q41 Part B

A workshop facing repeated incidents of misplaced hazardous materials should prioritize which advanced housekeeping measure?

- A. Posting warning notices around designated hazardous storage
- B. Providing handling instruction programs for workshop employees
- C. Switching to sealed material containers with safety labeling
- D. Establishing color-coded storage with end-of-shift inspections ✓

Q42 Part B

What is the primary factor in selecting nose radius for a single-point tool?

- A. Chip flow direction
- B. Desired surface finish ✓
- C. Cutting speed needed
- D. Tool material used

Q43 Part B

During installation of a new spindle head on a vertical milling machine, what is the most critical step to ensure reliable operation and long-term accuracy?

- A. Lubricating the spindle quill and machine parts after installation
- B. Aligning the spindle head precisely with the vertical machine axis ✓
- C. Adjusting the table longitudinal stops for travel limits
- D. Tightening all spindle head mounting bolts uniformly

Q44 Part B

A precise gear tooth profile is to be cut on a milling machine. Which milling attachment should be selected to accurately divide the workpiece for this operation?

- A. Dividing head attachment ✓
- B. Rotary table attachment
- C. Vertical milling attachment
- D. Slotting attachment

Q45 Part B

While preparing a hardened plain carbon steel die, a machinist must ensure uniform grain structure and relieve internal stresses before hardening. Which sequence of heat treatments should be followed to achieve this?

- A. Spheroidizing followed by tempering
- B. Direct quenching without prior normalization
- C. Annealing followed by quenching
- D. Normalizing followed by quenching ✓

Q46 Part B

Why are V-blocks often used in pairs when supporting long cylindrical workpieces?

- A. To reduce the cost of fixtures
- B. To increase cutting speed
- C. To measure thickness of the workpiece
- D. To provide balanced support and alignment ✓



Q47 Part B

If a worker cannot find a tool quickly, which principle of Five S is likely not being followed?

- A. Standardize
- B. Shine
- C. Sort
- D. Set in order

**Q48 Part B**

If the spindle speed is doubled but the wheel diameter remains the same, what happens to the cutting speed in grinding?

- A. The cutting speed will become four times
- B. The cutting speed will be reduced to half
- C. The cutting speed will also be double
- D. The cutting speed will remain the same

**Q49 Part B**

What is the main purpose of heat treatment in metals?

- A. To add weight to the metal
- B. To improve mechanical properties
- C. To reduce the cost of metal
- D. To change color of the metal

**Q50 Part B**

In a ram type slotter, what is the main function of the column?

- A. To provide reciprocating motion
- B. To support the ram and table
- C. To rotate the tool
- D. To cut the slot

**Q51 Part B**

Which of the following is a direct benefit of using absolute programming in CNC VMC operations?

- A. Less setup time
- B. Shorter programs
- C. Easier error detection
- D. Faster spindle speed

**Q52 Part B**

If a drawing specifies a fillet weld with unequal leg lengths, what must the welder ensure during fabrication?

- A. Substitute the specified fillet weld with a standard butt joint configuration.
- B. Produce a finished fillet weld with both legs matching the specified lengths.
- C. Fabricate the weld with equal leg dimensions regardless of drawing guidelines.
- D. Disregard the required leg measurements and focus entirely on the weld throat.

**Q53 Part B**

What is one limitation of using the tailstock offset method for taper turning in terms of workpiece setup?

- A. It requires use of rapid feed during the turning operation process
- B. It requires swiveling of the compound rest during setup work
- C. It requires use of a special chuck for mounting workpiece
- D. It requires the workpiece to be held strictly between centers

**Q54 Part B**

Which of the following best describes the main difference between annealing and normalizing in heat treatment?

- A. Annealing uses water quenching, while normalizing uses oil quenching
- B. Annealing cools metal slowly in furnace, while normalizing cools metal in air
- C. Annealing is used after welding, while normalizing is used before welding
- D. Annealing hardens mild steel, while normalizing softens stain-less steel

**Q55 Part B**

A CNC machine is programmed to move the tool from point X (10, 20) to point Y (50, 60) using linear interpolation. What will be the nature of the tool path between these two points ?

- A. The tool will move in a straight-line path connecting point X and point Y.
- B. The tool will follow a curved path between the two points.
- C. The tool will move in an arc trajectory from point X to point Y.
- D. The tool will move step-by-step, first along the X-axis and then along the Y-axis.



Q56 Part B

Given the ratio 3:4::6:8, which operation verifies the proportion?

- A. $3 - 4 = 6 - 8$
- B. $3/8 = 6/4$
- C. $3 \times 8 = 6 \times 4$ ✓
- D. $3 + 8 = 6 + 4$

Q57 Part B

What is the defining characteristic of multi-point cutting tools?

- A. Having more than one cutting edge ✓
- B. Used for end cutting action
- C. Having single cutting edge
- D. Used for side cutting action

Q58 Part B

During CNC lathe setup, the spindle speed override is set to 50%. What advantage does this provide to the operator?

- A. It sets the feed rate for roughing operation
- B. It automatically finishes the part up to final length
- C. It selects the correct tool set for the job
- D. It allows safer observation during trial cutting ✓

Q59 Part B

While calculating plate cam motion, which parameter is essential for determining the displacement of the follower at any given cam rotation angle?

- A. The spindle rotation on which the cam is attached
- B. The distance from the camshaft center to the cam profile at a specific angle ✓
- C. The material used to manufacture the plate cam
- D. The hardness of the tip of the follower used in the cam mechanism

Q60 Part B

A machinist is grinding a 200 mm long shaft with a feed of 2 mm per revolution at a speed of 40 revolutions per minute. What is the machining time required for one pass?

- A. 4.0 minutes
- B. 2.5 minutes ✓
- C. 1.0 minute
- D. 3.5 minutes

Q61 Part B

In a three-wire method of thread measurement, wires are selected based on the thread pitch. What may result from using wires larger than the calculated size?

- A. The wires will provide a tighter fit and better results
- B. The measurement will be more accurate due to increased contact area
- C. The wires will not fit properly, leading to inaccurate measurement ✓
- D. The wires will measure the root diameter instead of the pitch diameter

Q62 Part B

Which of the following best defines 'downtime' in manufacturing?

- A. A period during which routine maintenance is performed
- B. A period during which machines are not in production ✓
- C. A period during which machines achieve maximum output
- D. A period during which operators take scheduled breaks

Q63 Part B

Which application is most suitable for a triangular file?

- A. Cutting threads
- B. Boring holes
- C. Polishing flat surfaces
- D. Sharpening saw teeth ✓

Q64 Part B

A machine has an original cost of 100,000, scrap value of 10,000, and total working hours of 10,000. What is its hourly depreciation?

- A. 11
- B. 12
- C. 10
- D. 9 ✓



Q65 Part B

Which condition would most likely cause uneven lubrication in a splash lubrication system?

- A. Improper alignment of the ring oiler with the oil level** ✓
- B. Maintaining correct shaft rotation for oil distribution
- C. Using clean oil in the reservoir for lubrication system
- D. Maintaining proper oil viscosity for smooth circulation

Q66 Part B

Which file is best suited for filing internal corners?

- A. Flat file
- B. Triangular file** ✓
- C. Square file
- D. Round file

Q67 Part B

A force of 10 newtons moves an object 2 metres. How much work is done?

- A. 8 joules
- B. 5 joules
- C. 12 joules
- D. 20 joules** ✓

Q68 Part B

When comparing piloted counterbore and countersink tools, which statement is correct?

- A. Piloted counterbores create flat-bottomed holes, while countersinks create conical holes.** ✓
- B. Both piloted counterbores and countersinks create only tapered holes.
- C. Both piloted counterbores and countersinks create only through-holes.
- D. Piloted counterbores create conical holes, while countersinks create flat-bottomed holes.

Q69 Part B

The pilot diameter in a piloted counterbore is designed to match which feature?

- A. The diameter of the existing hole** ✓
- B. The diameter of the fastener head
- C. The length of the counterbore
- D. The shank diameter

Q70 Part B

What is the primary purpose of entering workpiece offset data in the CNC VMC console during setup?

- A. To define the position of the workpiece origin for machining process** ✓
- B. To calibrate the coolant flow rate during machining process
- C. To set the tool length value for the current tool for machining process
- D. To adjust the spindle speed for the operation of the machining process

Q71 Part B

Why is interchangeability important in mass production according to Bureau of Indian Standards (BIS) guidelines?

- A. It ensures all parts are made from identical materials
- B. It allows replacement of parts without custom adjustments** ✓
- C. It ensures all parts are made with zero tolerances
- D. It guarantees zero defects in every manufactured part

Q72 Part B

During a CNC lathe roughing operation, excessive tool wear and uneven stock removal are observed. Which adjustment will help to improve machining consistency and tool life?

- A. Adjusting feed and depth during cutting** ✓
- B. Increasing spindle speed during cutting
- C. Changing tool nose radius for a sharper edge
- D. Applying coolant flow during operation

Q73 Part B

A machinist attempts to adjust the vertical height of a table by using saddle in a milling machine. What mistake is being made?

- A. Saddle does not provide vertical movement** ✓
- B. Saddle controls spindle speed
- C. Saddle is fixed to column
- D. Saddle does not support worktable



Q74 Part B

Which of the following is the primary function of lubricants in grinding operations?

- A. To increase rotational speed of grinding wheel
- B. To supply the extra coolant to the workpiece
- C. To remove metallic chips from the work area
- D. To reduce friction between tool and workpiece ✓

Q75 Part B

What is the main purpose of a color code in the context of lubrication management?

- A. To identify lubricants and match them with application points ✓
- B. To combine different lubricants for improved machine operation
- C. To measure lubricant viscosity and performance characteristics
- D. To classify equipment according to maintenance schedules



Part B

75 Questions · Answer Key

Q1 Part B

In the tailstock offset method for taper turning, what is the primary function of the tailstock?

A. To set the alignment for creating a taper ✓

B. To support threading operations

C. To adjust spindle speed during operation

D. To set tool feed direction

Q2 Part B

If a flash fire occurs during hot work, what should be the worker's IMMEDIATE response?

A. Trying to hide the incident temporarily to avoid interrupting ongoing workshop operations

B. Activating the nearest fire alarm and evacuating the area according to emergency procedures ✓

C. Attempting to extinguish the flash fire alone before informing nearby workers or supervisors

D. Completing the current hot work activity before taking action against the fire emergency

Q3 Part B

If the volume of a cube is 3375 cm^3 , what is the length of one side?

A. 12 cm

B. 20 cm

C. 18 cm

D. 15 cm ✓

Q4 Part B

Which application is best suited for carbide drills?

A. Manual metal bending

B. Finishing internal surfaces of plastic materials

C. High-speed machining of tough materials ✓

D. Drilling wood objects only

Q5 Part B

Which lighting is commonly used in workshops for safe movement during a power failure?

A. Task lighting

B. Decorative lighting

C. Emergency lighting ✓

D. Ambient lighting

Q6 Part B

A machinist is experiencing periodic marks on the surface of a workpiece during cylindrical grinding. After checking for machine looseness and wheel balance, which adjustment should be prioritized to eliminate chatter if the marks persist?

A. Increase the rigidity of the workpiece support ✓

B. Increase the grinding wheel speed

C. Decrease the feed rate of the grinding wheel

D. Switch to a softer grade grinding wheel

Q7 Part B

Why does BIS tolerance notation specify hole designation before shaft designation in fits?

A. To represent the actual size obtained after machining

B. To specify the tolerance magnitude of shaft before hole

C. To identify the inspection sequence during measurement

D. To indicate the hole basis or shaft basis relationship used for the fit ✓

Q8 Part B

In an open-loop CNC control system, what happens if there is a load disturbance during machining?

A. The system slows down to adjust the error

B. The system sends an alarm to the operator to stop

C. The system automatically compensates the disturbance

D. The system cannot detect or correct the error ✓



Q9 Part B

A student claims that a V-block can be used for holding flat jobs as effectively as round jobs. Why is this statement incorrect?

- A. Flat jobs are too heavy
- B. V-blocks damage flat jobs
- C. Flat jobs lack surface contact in the V-block ✓
- D. V-blocks are only made for large jobs

Q10 Part B

A machinist wants to divide a workpiece into 8 equal parts using direct indexing. How many holes should be moved between each division on a 24-hole plate?

- A. Move 4 holes each time
- B. Move 2 holes each time
- C. Move 6 holes each time
- D. Move 3 holes each time ✓

Q11 Part B

Which of the following is NOT usually a cause of machine downtime?

- A. Continuous production run ✓
- B. Equipment failure
- C. Power supply interruption
- D. Scheduled maintenance

Q12 Part B

A steel plate has a mass of 8.516 kg. If its volume is 1089 cm³, what is the density in gm/cm³?

- A. 8.00
- B. 8.50
- C. 7.25
- D. 7.82 ✓

Q13 Part B

A heat treatment process is required to maximize the shock resistance of a tool used for impact operations. Which process should be applied to achieve the required property enhancement?

- A. Quenching without tempering
- B. Tempering after quenching ✓
- C. Full annealing at high temperature
- D. Normalizing to refine grain structure

Q14 Part B

Which of the following is a multipoint cutting tool?

- A. Lathe tool
- B. Milling cutter ✓
- C. Boring bar
- D. Parting tool

Q15 Part B

A trainee accidentally activates the automatic tool changer while a hand is near the turret. What is the safest immediate action using panel controls?

- A. Decrease the axis movement speed using the override dial
- B. Press the cycle pause button to hold program execution
- C. Activate the emergency stop to instantly cut machine movement ✓
- D. Switch to manual mode on the panel controls

Q16 Part B

Which type of drilling machines is specifically designed to accommodate multiple spindles so that different drilling operations can be performed at the same time?

- A. Bench drilling machine
- B. Gang drilling machine ✓
- C. Radial drilling machine
- D. Upright drilling machine

Q17 Part B

Why should a reamer never be rotated backwards during removal from a hole?

- A. It will improve the surface finish
- B. It prevents chip removal
- C. It damages the cutting edges and accuracy ✓
- D. It reduces tool temperature

Q18 Part B

Which part of the lathe is mounted on the left end of the bed?

- A. Tool post
- B. Tailstock
- C. Carriage
- D. Headstock ✓



Q19 Part B

When setting up for a heavy milling operation, why is it important to ensure that the overarm and ram are securely locked in position?

- A. Extends table travel distance
- B. Prevents unwanted movement during cutting ✓
- C. Improves coolant flow rate
- D. Increases spindle rotation speed

Q20 Part B

Which grade of pencil is recommended for single-stroke lettering in engineering drawings?

- A. HB grade ✓
- B. 2H grade
- C. B grade
- D. F grade

Q21 Part B

Tools are required to resist wear and function reliably during repetitive operations. Which property is most commonly enhanced through heat treatment to fulfill this requirement?

- A. Toughness
- B. Elasticity
- C. Machinability
- D. Wear resistance ✓

Q22 Part B

Which type of encoders is most commonly used in CNC VMC machines for precise position measurement?

- A. Optical sensor
- B. Linear encoder
- C. Limit switch
- D. Rotary encoder ✓

Q23 Part B

During a straddle milling operation, chatter marks are observed on both parallel surfaces after machining. Which adjustment would most likely reduce this defect?

- A. Using a coarser feed rate
- B. Raising the spindle speed substantially
- C. Increasing the table feed significantly
- D. Reducing the cutter overhang on the arbor ✓

Q24 Part B

Which statement correctly explains the purpose of setting a work offset in CNC VMC programming?

- A. A work offset modifies the tool length during program setup in CNC VMC for accurate machining.
- B. A work offset changes the home position of the CNC machine for each tool used for accurate machining.
- C. A work offset establishes the relationship between the machine zero and the part zero for accurate machining. ✓
- D. A work offset is used exclusively during tool change operations in CNC VMC for accurate machining.

Q25 Part B

Which fluid is typically used to improve aluminum machining on a lathe machine?

- A. Soluble oil-based coolant ✓
- B. Synthetic cutting fluid
- C. Kerosene without additives
- D. Pure water as a coolant

Q26 Part B

A mechanic observes rust spots on a file despite storage. What maintenance step was likely skipped?

- A. Application of light oil before storage ✓
- B. Sharpening the file teeth
- C. Use of a plastic handle
- D. Polishing with emery cloth

Q27 Part B

If the contact surfaces of a V-block become worn, the most appropriate action is to:

- A. Increase clamping force
- B. Replace or recondition the V-block ✓
- C. Paint the surface
- D. Ignore the wear

Q28 Part B

When using the reciprocating table method, what is the primary movement of the surface grinder table relative to the grinding wheel?

- A. Rotary circular motion
- B. Side-to-side linear motion
- C. Up-and-down vertical motion
- D. Back-and-forth linear motion ✓



Q29 Part B

What does the term 'machine hour rate' refer to in costing?

- A. The factory overhead cost incurred per machine hour ✓
- B. The total operating profit earned per machine day
- C. The total machine-related cost allocated for one year
- D. The total machine-generated revenue earned per shift

Q30 Part B

In a puncher type slotter, what is the primary movement of the cutting tool?

- A. Reciprocating vertically ✓
- B. Moving diagonally
- C. Oscillating in circles
- D. Rotating horizontally

Q31 Part B

When a taper turning attachment is used instead of swiveling the compound rest, what machining capability is significantly enhanced?

- A. It allows for cutting threads on the workpiece
- B. It reduces the hardness of the workpiece material
- C. It makes the tool holder lighter for easier handling
- D. It enables the production of long tapers accurately ✓

Q32 Part B

Which method of cylindrical grinding is used when the workpiece is supported between centers and rotated?

- A. Infeed center-less method
- B. Through feed grinding method
- C. End feed grinding method
- D. Traverse grinding method ✓

Q33 Part B

Given a 10 mm twist drill and a recommended feed of 0.15 mm/rev, what is the total feed after 20 revolutions?

- A. 0.75 millimeters
- B. 1.50 millimeters
- C. 3.00 millimeters ✓
- D. 2.00 millimeters

Q34 Part B

Which scenario requires the use of multiple auxiliary views in orthographic projection?

- A. An object with all surfaces parallel to principal planes.
- B. A part with several surfaces inclined at different angles. ✓
- C. A rectangular block with entirely flat and straight faces.
- D. A cylinder with its axis perpendicular to all planes.

Q35 Part B

Which unsafe practice can lead to electrical accidents in a workshop?

- A. Using dry hands when operating switches
- B. Checking voltage before equipment use
- C. Wearing safety shoes during work
- D. Bypassing safety interlocks on machines ✓

Q36 Part B

Which PPE is appropriate for protecting against electrical hazards in a workshop?

- A. Cotton gloves
- B. Latex gloves
- C. Leather gloves
- D. Insulated gloves ✓

Q37 Part B

Where must the title block be located on an engineering drawing sheet according to the prescribed standard?

- A. Bottom left-hand corner
- B. Top right-hand corner
- C. Top left-hand corner
- D. Bottom right-hand corner ✓

Q38 Part B

In a CNC turning center, the operator finds that sharp corners in the programmed part are automatically blended with a small radius. Which tool compensation setting should be checked to restore sharp corners?

- A. Spindle power setting during finishing
- B. Tool change position in the turret
- C. Tool radius offset value for the current tool ✓
- D. Coolant pressure adjustment during cutting



Q39 Part B

While operating a CNC lathe, an unexpected tool movement causes the tool to contact the chuck. What type of machine damage is most likely to occur from this collision?

- A. Spindle bearing failure
- B. Chuck jaw deformation** ✓
- C. Bed misalignment
- D. Coolant leakage

Q40 Part B

How does the pitch (number of teeth per inch) of a hacksaw blade affect its cutting ability?

- A. Pitch material only affects blade lifespan
- B. Pitch only affects heat generation during cutting
- C. Coarser pitch is better for all materials
- D. Finer pitch produces smoother cuts** ✓

Q41 Part B

While operating a CNC lathe, an unexpected tool movement causes the tool to contact the chuck. Which type of machine damage is most likely to occur from this collision?

- A. Tool magazine jamming during tool change
- B. Unstable spindle speed during cycles
- C. CNC controller software errors
- D. Turret misalignment or damage** ✓

Q42 Part B

Why is a feedback device such as an encoder important in the closed-loop control of CNC VMC machines?

- A. It operates independently without any feedback from the machine to adjust its speed.
- B. It sets the initial speed of the spindle but does not monitor its position.
- C. It allows the controller to correct errors in tool movement during machining.** ✓
- D. It displays the position information on the screen for the operator for information.

Q43 Part B

Which term refers to the number of teeth per inch on a file?

- A. Shape
- B. Cut** ✓
- C. Pitch
- D. Length

Q44 Part B

Which tool is most commonly used for cutting keyways on a slotting machine?

- A. Formed tool type
- B. Round nose tool
- C. Diamond point tool
- D. Single point tool** ✓

Q45 Part B

Which feature distinguishes a helix from a simple spiral?

- A. A helix always starts at a single point, while a spiral does not.
- B. A helix extends in three dimensions around an axis, while a spiral lies flat in one plane.** ✓
- C. A helix forms a closed loop, while a spiral always remains open-ended.
- D. A helix and a spiral both lie in a single plane but differ in size.

Q46 Part B

When producing a plate cam, why is it necessary to use a template or pattern during manufacturing?

- A. It ensures that the heat treatment process does not lead to warping
- B. It increases the hardness of the material used in cam manufacturing
- C. It ensures the cam profile is accurately reproduced to the required profile** ✓
- D. It speeds up the process and ensures the correct setup for milling

Q47 Part B

A machinist selects tempering as the next step after hardening a steel component. Which property is most likely to improve as a result of tempering in this heat treatment process?

- A. Strength decreases with finer grain structure
- B. Hardness increases with reduced ductility
- C. Toughness increases while brittleness decreases** ✓
- D. Grain size increases with no change in ductility



Q48 Part B

During a cylindrical grinding operation, an operator observes closely spaced, repetitive marks on the surface of the workpiece. Which of the following is most likely responsible for the formation of these chatter marks?

- A. Incorrect work speed causing burns
- B. Loose spindle bearings causing vibration ✓
- C. Wheel loading resulting in glazing
- D. Excessive coolant flow on the wheel

Q49 Part B

Which property of the coolant fluid is most critical to ensure both effective cooling and lubrication during vertical milling operations?

- A. The coolant must have high electrical conductivity for machine safety.
- B. The coolant must be brightly colored for easy visibility while machining.
- C. The coolant must have suitable viscosity and thermal conductivity for machining. ✓
- D. The coolant must be able to produce foam to protect the workpiece from chips.

Q50 Part B

During a milling operation, what aspect of the spindle ensures accurate machining and surface finish on the workpiece?

- A. Increasing spindle speed beyond recommended levels
- B. Using a heavy-duty spindle for large cutters
- C. Only using lubricated spindle bearings
- D. Proper alignment and minimal runout of the spindle ✓

Q51 Part B

A production line experiences repeated delays due to waiting for maintenance staff to fix machines. As a machinist, what process change would best minimize down time in this scenario?

- A. Increasing the number of maintenance staff on call
- B. Training operators to perform routine maintenance tasks ✓
- C. Extending machine warranty agreements for repairs
- D. Rescheduling shifts to match maintenance staff availability

Q52 Part B

Which part(s) of the milling cutter is/are primarily used for cutting in face milling operations?

- A. Arbor shaft face
- B. Machine spindle body
- C. Cutter face edges ✓
- D. Cutter side edges

Q53 Part B

A machinist wants to create a gear with 20 teeth using simple indexing. Which setting should be used on a standard 40:1 dividing head?

- A. Two full rotations ✓
- B. Five full rotations
- C. Four full rotations
- D. Ten full rotations

Q54 Part B

Which part of a cylindrical grinder holds and rotates the workpiece during the grinding operation?

- A. Tailstock
- B. Grinding wheel
- C. Carriage
- D. Headstock ✓

Q55 Part B

How does natural deterioration of component affect production?

- A. It eliminates maintenance requirements for equipment
- B. It improves production speed and operating efficiency
- C. It reduces equipment downtime during production activities
- D. It leads to more production interruptions and stoppages ✓

Q56 Part B

Which operation would most benefit from using a half round file over a square file?

- A. Shaping a hexagonal hole
- B. Leveling a flat surface
- C. Blending a curved groove ✓
- D. Making a sharp corner



Q57 Part B

When does a parallelogram become a rectangle?

- A. When the two adjacent sides become equal in length.
- B. When the two diagonal lines become perpendicular.
- C. When all four boundary sides become unequal in length.
- D. When all four internal angles become right angles. ✓

Q58 Part B

If a bench vice shows uneven clamping pressure, which maintenance step should be performed first?

- A. Increase the lubrication amount
- B. Replace the entire vice
- C. Reduce the handle length
- D. Check jaw alignment and tighten mounting bolts ✓

Q59 Part B

A machine with a power rating of 2 kW operates continuously for 5 hours. What is the total electrical energy consumed by the machine during this period?

- A. 0.4 kWh
- B. 10 kWh ✓
- C. 7 kWh
- D. 2.5 kWh

Q60 Part B

In a milling operation, the actual cycle time is consistently higher than the estimated cycle time. Which factor is most likely causing this discrepancy if all other parameters remain constant?

- A. Machine speed is always constant
- B. Material properties remain the same during operation
- C. Operator skill is unchanged
- D. Frequent tool changes are causing delays ✓

Q61 Part B

Which material is least likely to be affected by rapid temperature changes during cutting?

- A. Ceramic tool material
- B. High-speed steel (HSS) ✓
- C. Cast alloy steel
- D. Carbon tool steel

Q62 Part B

During preventive maintenance, unusual wear is observed on the gripping arms of the ATC in a CNC VMC. Which operational issue is most likely to occur if this wear is not addressed promptly?

- A. ATC may not recognize the correct tool number
- B. Coolant may not be delivered during tool changes
- C. Incorrect spindle speed may be selected during tool change
- D. Tools may be dropped or not securely loaded into the spindle ✓

Q63 Part B

The main factor influencing a lathe's firmness under load is:

- A. Spindle bore diameter
- B. Spindle speed range
- C. Bed width and design ✓
- D. Swing over bed

Q64 Part B

During CNC VMC milling, an operator must program the machine to activate coolant flow before starting the spindle for a heat-sensitive operation. Which ISO M code should be programmed before spindle start to ensure coolant is delivered to the cutting zone?

- A. M08 ✓
- B. M09
- C. M05
- D. M03

Q65 Part B

A machinist observes that the spindle motor of a CNC lathe is overheating after prolonged use. Which aspect of the spindle drive system should be primarily checked to address this issue?

- A. Drive belt alignment
- B. Lubrication system condition
- C. Electrical wiring insulation
- D. Cooling mechanism efficiency ✓



Q66 Part B

If a machinist must grind a non-ferrous metal, which grinding wheel would be most appropriate to use?

- A. Cubic boron nitride wheel is best for non-ferrous metals
- B. Silicon carbide wheel is suitable for non-ferrous metals ✓
- C. Aluminum oxide wheel is ideal for non-ferrous metals
- D. Diamond wheel is used for non-ferrous metals

Q67 Part B

After resolving an axis over-travel on a CNC lathe, which action should be performed before resuming the program?

- A. Ignore the zero return process and continue machining
- B. Change the workpiece and start a new setup
- C. Restart the program immediately from where it stopped
- D. Verify axis position and reference zero return if needed ✓

Q68 Part B

A machinist is required to finish a hole in a hard alloy component. Which reamer material should be selected?

- A. Copper
- B. Carbide ✓
- C. Brass
- D. Mild Steel

Q69 Part B

A 1:40 taper is to be turned using the compound rest. If the workpiece is 200 mm long, what is the approximate compound rest angle required?

- A. 1.15 degrees
- B. 0.36 degrees
- C. 0.72 degrees ✓
- D. 1.43 degrees

Q70 Part B

What is the main function of the spindle in a bench vice?

- A. To increase friction on the workpiece
- B. To protect the jaws
- C. To convert rotary motion into linear motion ✓
- D. To support the base

Q71 Part B

When changing from a shorter to a longer tool on a CNC lathe, which adjustment must be made to maintain machining accuracy?

- A. Update the work table offset value
- B. Select a different part program
- C. Update the tool length offset value ✓
- D. Adjust the spindle feed rate

Q72 Part B

How much is 1 calorie in joules?

- A. 2.500 joules
- B. 4.186 joules ✓
- C. 1.000 joules
- D. 10.000 joules

Q73 Part B

In a scenario where a CNC vertical machining center is required to maintain extremely tight tolerances over an extended production run, which closed-loop control component is directly responsible for identifying and reporting deviations from the programmed tool path?

- A. Spindle motor drive
- B. Position feedback transducer ✓
- C. Power supply module
- D. Coolant distribution unit

Q74 Part B

Why should regular inspections be performed on equipment?

- A. To identify potential problems before major failures occur ✓
- B. To reduce maintenance records and documentation efforts
- C. To increase machine output and production efficiency
- D. To complete routine inspection checklists within schedule

Q75 Part B

When interpreting a job drawing, how can you distinguish a split pin from a solid pin based on conventional representation?

- A. A split pin appears as a circle with center dot
- B. A split pin shows two legs with a visible gap ✓
- C. A split pin uses crossing lines in the drawing
- D. A split pin uses zigzag lines for representation



Part B

75 Questions • Answer Key

Q1 Part B

Given two planes, Plane X is specified as parallel to Plane Y with a tolerance of 0.02 millimeters. If the distance between the planes varies by 0.03 millimeters, what does this indicate?

- A. The planes are within the parallelism tolerance
- B. The planes are perpendicular
- C. The parallelism specification is not met ✓
- D. The parallelism is acceptable

Q2 Part B

Which part of a conventional lathe is responsible for holding and rotating the workpiece during machining?

- A. Carriage
- B. Bed
- C. Tailstock
- D. Headstock ✓

Q3 Part B

Which hammer is commonly used for peening and riveting operations in metalworking?

- A. Sledge hammer
- B. Claw hammer
- C. Ball-peen hammer ✓
- D. Mallet

Q4 Part B

A machinist is selecting a fit for a shaft and hole based on Bureau of Indian Standards (BIS) guidelines. What factor does BIS emphasize?

- A. Weight of the component
- B. Dimensional compatibility for assembly ✓
- C. Thermal expansion rate
- D. Surface roughness grade

Q5 Part B

In first-angle projection, where is the top view placed in relation to the front view on a drawing sheet?

- A. To the left of the front view
- B. To the right of the front view
- C. Below the front view ✓
- D. Above the front view

Q6 Part B

If two parts manufactured at different factories are assembled successfully due to Bureau of Indian Standards (BIS) standards, which principle is being demonstrated?

- A. Interchangeability ✓
- B. Strength testing
- C. Corrosion resistance
- D. Unique manufacturer specifications

Q7 Part B

Which line type is used to indicate the root of an internal screw thread on a job drawing?

- A. A thick continuous line
- B. A thick chain line
- C. A thin continuous line ✓
- D. A thick dashed line

Q8 Part B

Which statement about adjustable boring tools is CORRECT?

- A. They can machine different hole diameters ✓
- B. They are used to create threads in a hole
- C. They are best for drilling blind holes
- D. They are designed to make square holes

Q9 Part B

Which description best matches the shape of a cone mandrel used on a lathe?

- A. A tapered cylindrical body with pointed ends ✓
- B. A hollow tube with openings at both ends
- C. A flat circular disk with smooth surfaces
- D. A cube having equal sides



Q10 Part B

A lathe has a lead screw pitch of 2 millimeters. To cut a thread with a pitch of 1.5 millimeters, what should be the ratio of the driver gear to the driven gear?

- A. The driver gear to driven gear ratio should be 3 to 1
- B. The driver gear to driven gear ratio should be 1.5 to 2 ✓
- C. The driver gear to driven gear ratio should be 2 to 1.5
- D. The driver gear to driven gear ratio should be 2 to 3

Q11 Part B

If a technician wants to increase the power output of a drill, what should they focus on?

- A. Increasing the time taken for each task
- B. Reducing the amount of work done
- C. Increasing the work done per unit time ✓
- D. Lowering the speed of the drill

Q12 Part B

If a surface finish symbol is given as a straight line, what does it communicate to the machinist?

- A. Applying a surface coating is necessary
- B. Machining must be applied to the surface ✓
- C. No further machining is needed for the surface
- D. Machining is strictly prohibited for the surface

Q13 Part B

A supervisor wants to redesign the activity log format to better capture quality control data. Which addition will most improve the log's usefulness for this purpose?

- A. Adding a column for inspection result and defect description for each task ✓
- B. Rearranging the order of worker names in each row
- C. Summarizing lunch break durations in a separate section
- D. Including more color-coded sections for visual appeal and to minimize the mistakes

Q14 Part B

You need to estimate the amount of paint required to fill a rectangular tank. Which calculation is most relevant?

- A. Calculate the tank's volume ✓
- B. Calculate the tank's perimeter
- C. Calculate the tank's area
- D. Calculate the tank's height

Q15 Part B

What does the graduation on the sleeve (main scale) of a metric outside micrometer usually represent?

- A. 5 mm divisions
- B. 1 mm and 0.5 mm divisions ✓
- C. 2 mm divisions
- D. 0.1 mm divisions

Q16 Part B

If the height of a circular segment is increased while keeping the chord the same, what happens to the area of the segment?

- A. The area of the segment becomes zero
- B. The area of the segment decreases
- C. The area of the segment remains unchanged
- D. The area of the segment increases ✓

Q17 Part B

Why is computer numerical control (CNC) machining preferred for batch production of complex parts?

- A. It requires different machines for each shape
- B. It relies on operator's judgment for each part
- C. It demands manual drawing for every part
- D. It enables precise replication with minimal errors ✓

Q18 Part B

Which statement best describes the difference in setup time between computer numerical control (CNC) and conventional lathes?

- A. CNC lathes generally have shorter setup time ✓
- B. Conventional lathes are fully computerized
- C. CNC lathes require more manual alignment
- D. Conventional lathes always use automatic tool changers

Q19 Part B

How does a wedge clamp holder secure the cutting insert?

- A. By tightening the insert with a spring-loaded hammer action
- B. By applying force via a wedge to lock the insert ✓
- C. By magnetic attraction in precision insert clamping
- D. By using suction force to hold the insert



Q20 Part B

If the pitch of an ISO thread is 1.5 mm, what is the distance between one thread crest and the next crest?

- A. 2 mm
- B. 1.5 mm ✓
- C. 1 mm
- D. 0.5 mm

Q21 Part B

Which dimensional condition correctly represents a component exactly at its high limit?

- A. The measured dimension equals the tolerance value specified
- B. The measured dimension equals the maximum permissible size specified ✓
- C. The measured dimension equals the minimum permissible size specified
- D. The measured dimension equals the nominal dimension of design

Q22 Part B

Which operation is typically faster on a computer numerical control (CNC) lathe compared to a conventional lathe?

- A. Manual threading
- B. Single-piece craftsmanship
- C. Repetitive batch production ✓
- D. Fixture setting

Q23 Part B

Which of the following is a primary cause of tool wear during computer numerical control (CNC) turning operations?

- A. Variation in coolant delivery direction
- B. Elastic deformation of the machine structure
- C. Improper tool post alignment during machining
- D. Abrasive and adhesive interactions at the tool-workpiece interface ✓

Q24 Part B

Which combination best describes the typical composition of tungsten carbide used in tool materials?

- A. Tungsten carbide and iron binder
- B. Tungsten carbide and vanadium binder
- C. Tungsten carbide and chromium binder
- D. Tungsten carbide and cobalt binder ✓

Q25 Part B

Which thread system is commonly associated with a 55-degree thread angle in conventional charts?

- A. Whitworth ✓
- B. Metric
- C. Unified
- D. British Association

Q26 Part B

If a machinist needs to cut a taper where the axis of the taper is not parallel to the machine bed, what type of angle must be calculated?

- A. Compound angle ✓
- B. Right angle
- C. Included angle
- D. Single angle

Q27 Part B

If a lathe operates at a spindle speed of 300 revolutions per minute and the feed per revolution is 0.2 millimeter, what is the feed rate?

- A. 60 millimeter per minute ✓
- B. 600 millimeter per minute
- C. 150 millimeter per minute
- D. 1.5 millimeter per minute

Q28 Part B

Which of the following is the most typical and primary application of a sledge hammer in workshop practice?

- A. Delivering powerful blows to large chisels during metal breaking operations
- B. Producing deep impact blows for loosening large rusted mechanical assemblies
- C. Applying high-force strikes for dismantling tightly fitted machine structures
- D. Driving heavy wedges or stakes into large metal or structural components ✓



Q29 Part B

A workshop manager wants to reduce long-term health problems caused by metal dust produced during machining operations. Which action is the most effective for improving occupational health safety?

- A. Rotating workers between tasks to limit individual exposure
- B. Using only personal protective equipment for all workers
- C. Implementing local exhaust ventilation systems at dust-generating machines ✓
- D. Posting warning signs near all dust-producing machines

Q30 Part B

Which statement best describes a good practice for setting lubrication intervals in preventive maintenance?

- A. Lubricate only after a breakdown occurs
- B. Use manufacturers guidelines for each machine type ✓
- C. Set the same interval for every machine to prevent maintenance
- D. Double the interval to save lubricant

Q31 Part B

Which constructional feature allows a sledge hammer to be swung effectively with both hands?

- A. Replaceable soft hammer faces for delicate work
- B. Serrated gripping surfaces on hammer head
- C. Long handle designed to provide large striking arc ✓
- D. Small compact hammer head for easy control

Q32 Part B

Which combination of fields ensures proper tracking of machine usage in an activity log format?

- A. Machine serial number and installation date
- B. Machine model and maintenance schedule
- C. Machine model and manufacturer name
- D. Machine identification and usage time ✓

Q33 Part B

What can happen if the parting tool is set above the centerline of the workpiece?

- A. Poor chip removal and increased tool wear ✓
- B. No need for coolant
- C. Improved cutting accuracy
- D. Higher spindle power required

Q34 Part B

You are tasked to improve the surface finish of parts on a Computer Numerical Control (CNC) turning centre. Which feedback device parameter should you prioritize?

- A. Resolution of the position feedback device ✓
- B. Color of the control panel display
- C. Diameter of the lead screw
- D. Size of the hydraulic pump

Q35 Part B

What does EHS stand for in Preventive Maintenance?

- A. Engineering, Health, and Systems
- B. Energy, Hazard, and Security
- C. Ecology, Health, and Standards
- D. Environment, Health, and Safety ✓

Q36 Part B

Which component links the cone pulley to the spindle in a cone pulley headstock of a lathe?

- A. The back gear mechanism ✓
- B. The tool post
- C. The apron of the lathe
- D. The feed rod

Q37 Part B

Which part of the tool holder secures the cutting tool and helps maintain rigidity during turning?

- A. Chip breaker
- B. Lubrication port
- C. Ratchet
- D. Clamping mechanism ✓



Q38 Part B

What does a sectioned assembly view reveal to the technician?

- ☒ A. Internal construction and fit of parts
- ☐ B. Details of electrical circuits
- ☐ C. Lubrication routes inside the system
- ☐ D. Only the external shape of assembly

Q39 Part B

Which unit is commonly used to measure energy in workshop calculations?

- ☐ A. Watt
- ☐ B. Newton
- ☒ C. Joule
- ☐ D. Meter

Q40 Part B

If the surface finish symbol indicates a required roughness of 3.2 micrometre and prohibits material removal, which is the correct representation?

- ☐ A. A check-mark with a horizontal line and the number 3.2 above
- ☐ B. A check-mark with a triangle and the number 3.2 inside
- ☐ C. A check-mark with both a circle and horizontal line and the number 3.2 beside
- ☒ D. A check-mark with a circle at the corner and the number 3.2 below

Q41 Part B

Which one of the following is NOT a standard screw thread form?

- ☐ A. ACME thread
- ☐ B. Whitworth thread
- ☒ C. Hexagonal thread
- ☐ D. Metric thread

Q42 Part B

Which material is commonly used for manufacturing transfer caliper legs?

- ☒ A. Hardened steel
- ☐ B. Polished wood
- ☐ C. Brass metal
- ☐ D. Aluminum alloy

Q43 Part B

In groove chip breakers, which parameter combination most influences the chip curling process?

- ☒ A. Groove depth and groove position
- ☐ B. Tool material and cutting speed
- ☐ C. Feed rate and the groove length
- ☐ D. Rake angle and the tool hardness

Q44 Part B

Which chip form is most desirable when using a chip breaker during machining?

- ☐ A. Tangled chips forming knots
- ☐ B. Long continuous chips
- ☒ C. Small curled or broken chips
- ☐ D. Spiral chips with sharp edges

Q45 Part B

A mechanical workshop maintains a daily activity log to record the tasks performed by each operator. Which information is primarily recorded for each entry in this standardized activity log format?

- ☒ A. Time interval and Operations performed
- ☐ B. Material specification and part numbers
- ☐ C. Description of the mechanical fault
- ☐ D. Machine identification number

Q46 Part B

A cutting tool is made by sintering tungsten carbide grains with cobalt as a binder. What is the role of cobalt in this composite?

- ☒ A. Cobalt acts as a binder providing toughness to the tool
- ☐ B. Cobalt increases the electrical conductivity of the tool
- ☐ C. Cobalt reduces the thermal conductivity of the tool
- ☐ D. Cobalt increases the hardness of the tool material

Q47 Part B

Which type of cutting tool is best suited for maintaining dimensional accuracy while turning a thin rod on an automatic lathe?

- ☐ A. A knurling tool for the surface pattern creation
- ☒ B. A box tool with integrated steady rest fingers
- ☐ C. A standard single point turning tool
- ☐ D. A fixed boring bar for the internal operations



Q48 Part B

If the depth of cut is doubled while cutting speed and feed remain constant, how does tool wear behaviour change?

- A. Tool wear increases due to higher cutting forces and temperature** ✓
- B. Tool wear remains nearly unchanged as speed is constant
- C. Tool wear decreases due to improved chip evacuation
- D. Tool wear reduces due to lower friction at the interface

Q49 Part B

Which statement correctly describes the shape of a half center used in a lathe?

- A. It has a hole in the center
- B. It has one side flat and one side pointed** ✓
- C. It is conical on both ends
- D. It is completely round on both sides

Q50 Part B

A lathe with an imperial lead screw is used to cut a metric thread. Which component must be added to the gear train to achieve the correct thread pitch?

- A. A gear with 100 teeth for conversion
- B. A translation gear with 127 teeth** ✓
- C. A gear with 80 teeth for conversion
- D. A gear with 120 teeth for conversion

Q51 Part B

On a job drawing, which joint would you select for joining a pipe to a flat surface, such as a tank wall?

- A. Flanged joint** ✓
- B. Socket joint
- C. Union joint
- D. Spigot joint

Q52 Part B

What is a key function of a computer numerical control (CNC) system in a turning centre?

- A. Automated axis movement coordination** ✓
- B. Direct manual tool handling
- C. Physical gear shifting
- D. Hand-operated spindle rotation

Q53 Part B

Which part of the tool maker's button ensures accurate alignment when measuring from different faces of a workpiece?

- A. Cylindrical body** ✓
- B. Washer
- C. Flat face
- D. Central hole

Q54 Part B

Which component is essential for changing the direction of movement in a drive train during thread cutting?

- A. Feed rod
- B. Lead screw
- C. Reversing gears** ✓
- D. Change gears

Q55 Part B

Which fire extinguisher is suitable for controlling a small electrical fire in a workshop?

- A. Use a foam extinguisher
- B. Use sand to cover the fire
- C. Use a water extinguisher
- D. Use a CO₂ fire extinguisher** ✓

Q56 Part B

Which sequence best describes the arrangement for cutting metric threads on an imperial lathe using a gear train?

- A. Driver gear, intermediate gear, conversion gear, driven gear** ✓
- B. Conversion gear, driven gear, driver gear, intermediate gear
- C. Driven gear, conversion gear, driver gear, intermediate gear
- D. Intermediate gear, driver gear, driven gear, conversion gear

Q57 Part B

Which process is used to make steel harder and more wear-resistant in a workshop?

- A. Tempering
- B. Annealing
- C. Normalizing
- D. Quenching** ✓



Q58 Part B

Which parameter is considered a key machine specification for a computer numerical control (CNC) turning centre?

- A. Toolbox size
- B. Coolant reservoir type
- C. Control panel color
- D. Swing over bed ✓

Q59 Part B

Why are half millimeter graduations provided on the sleeve of a metric micrometer?

- A. To increase spindle rotation speed
- B. To measure thread pitch
- C. To improve reading accuracy between whole millimeters ✓
- D. To lock the spindle during measurement

Q60 Part B

Which part of a lathe must be lubricated regularly to ensure smooth carriage movement?

- A. Tool post
- B. Spindle nose
- C. Bed guideways ✓
- D. Tailstock barrel

Q61 Part B

What shape is the end of a thread tool for cutting a square thread?

- A. Flat ✓
- B. Round
- C. Pointed
- D. V-shape

Q62 Part B

Which type of workpiece is most suitable for taper turning by the tailstock offset method on a lathe?

- A. A threaded rod held only in a chuck
- B. A short, thick workpiece with a large diameter
- C. A long, slender shaft supported between centers ✓
- D. A flat rectangular plate clamped on the faceplate

Q63 Part B

Which component of an adjustable reamer is used to adjust its cutting diameter?

- A. The shank of the reamer
- B. The nut on the reamer ✓
- C. The blades of the reamer
- D. The handle of the reamer

Q64 Part B

Which statement correctly describes the use of a bottoming tap?

- A. It is used for making threads in through holes
- B. It is used for finishing threads in blind holes ✓
- C. It creates larger threads than a plug tap
- D. It is used for starting threads in deep holes

Q65 Part B

Which step in the Five S concept involves removing items that are not needed from the workspace?

- A. Sustain
- B. Shine
- C. Sort ✓
- D. Set in Order

Q66 Part B

What is the correct formula to calculate the indexing movement for one division using a 40-tooth worm wheel?

- A. Indexing movement = 40 divided by number of divisions ✓
- B. Indexing movement = number of divisions divided by 40
- C. Indexing movement = 40 multiplied by number of divisions
- D. Indexing movement = 40 plus number of divisions

Q67 Part B

What is the usual effect of increasing the end clearance angle of a cutting tool on tool life?

- A. It can reduce tool life due to weaker cutting edge ✓
- B. It always improves tool life by reducing friction
- C. It makes the tool harder to grind
- D. It has no effect on tool life



Q68 Part B

If the pitch of an Acme thread is 4 mm, what is the calculated thread depth?

- A. 1.50 mm
- B. 2.01 mm ✓
- C. 1.90 mm
- D. 2.50 mm

Q69 Part B

Why is good housekeeping necessary in a workshop environment?

- A. It makes the workshop noisier
- B. It allows work to be done faster
- C. It increases the cost of repairs
- D. It helps prevent accidents and injuries ✓

Q70 Part B

Which feature of a screw thread determines how far a nut moves along the bolt in one complete revolution?

- A. Root
- B. Lead ✓
- C. Pitch
- D. Crest

Q71 Part B

Which parameter best describes the arithmetic mean of the absolute values of the surface profile deviations from the mean line within the evaluation length?

- A. Waviness
- B. Root mean square roughness
- C. Roughness average ✓
- D. Maximum profile height

Q72 Part B

If the driver gear rotates at 120 rpm and the gear ratio is 3 : 1, what is the speed of the driven gear?

- A. 40 rpm ✓
- B. 60 rpm
- C. 30 rpm
- D. 360 rpm

Q73 Part B

During CNC turning operations, the machine suddenly stops, and an alarm indicates "Spindle Overload". Which of the following is the most likely cause of this fault?

- A. The workpiece material is softer than expected.
- B. The cutting tool is dull or improperly mounted. ✓
- C. The machine is idle, and no program is running.
- D. The coolant system is operating normally.

Q74 Part B

Which statement correctly explains a characteristic of a stepped mandrel when compared with a plain mandrel?

- A. A stepped mandrel is always shorter than a plain mandrel
- B. A stepped mandrel is only used for soft materials
- C. A stepped mandrel cannot be used on a lathe
- D. A stepped mandrel has multiple diameters along its length ✓

Q75 Part B

What is the main principle of unidirectional dimensioning in engineering drawing?

- A. Dimensions are placed in both directions depending on the feature
- B. All dimensions are placed so that they can be read from the bottom of the sheet ✓
- C. Dimensions are placed evenly on the drawing sheet for maintaining the proper gaps
- D. All dimensions are placed so that they can be read from the right side of the sheet



Part B

75 Questions · Answer Key

Q1 Part B

How is the degree of taper adjusted on a taper turning attachment?

- A. By repositioning the tailstock
- B. By adjusting the feed rate
- C. By altering the angle of the guide bar ✓
- D. By changing the spindle speed

Q2 Part B

Why might a company avoid switching completely to computer numerical control (CNC) technology?

- A. Reduced need for technical knowledge
- B. Guaranteed increase in manual skill requirements
- C. High training costs for operators and programmers ✓
- D. Elimination of all maintenance needs

Q3 Part B

Which combination of parameters is best for achieving a fine surface finish during turning?

- A. Low feed rate and high cutting speed ✓
- B. High feed rate and high cutting speed
- C. Low feed rate and low cutting speed
- D. High feed rate and low cutting speed

Q4 Part B

Which type of V-Block is designed with a single V-groove on the top face and a single square slot on both sides to accommodate a U-clamp during a concentricity inspection setup?

- A. Single-level, single-groove V-block ✓
- B. Single-level, double-groove V-block
- C. Matched-pair V-block
- D. Double-level, single-groove V-block

Q5 Part B

Which method can improve the accuracy of job estimation?

- A. Ignoring previous records
- B. Reviewing historical data ✓
- C. Guessing material costs
- D. Overlooking labor hours

Q6 Part B

Which process parameter most directly affects the surface roughness achieved by honing?

- A. Abrasive grit size used in honing stones. ✓
- B. Spindle speed maintained during operation.
- C. Stone pressure applied during honing process.
- D. Workpiece material hardness level selected.

Q7 Part B

A buttress thread has a major diameter of twenty millimeters and a thread depth of three millimeters. What is the core diameter?

- A. Core diameter is twelve millimeters
- B. Core diameter is seventeen millimeters
- C. Core diameter is sixteen millimeters
- D. Core diameter is fourteen millimeters ✓

Q8 Part B

Why is it important to check both plan and elevation views in a bolt drawing before installation?

- A. For checking manufacturer's logo
- B. To ensure correct bolt positioning ✓
- C. Only to check thread details
- D. Because one view is enough

Q9 Part B

When choosing a letter drill, what does the letter designation represent?

- A. The material the drill can cut
- B. The recommended cutting speed
- C. The diameter of the drill ✓
- D. The overall length of the drill



Q10 Part B

If a batch of similar parts with varying dimensions must be produced, which programming type offers highest flexibility?

A. Parametric programming



B. Manual programming

C. Conversational programming

D. Direct numerical programming

Q11 Part B

Which component must be disengaged before operating the back gear mechanism in a lathe?

A. The chuck

B. The lead screw

C. The tailstock

D. The bull gear pin

**Q12 Part B**

A factory implements strict field definition standards for interchangeability. What is the likely result?

A. Greater variation in finished products

B. Increased need for manual fitting

C. Consistent quality and easy part replacement



D. Reduced assembly speed

Q13 Part B

A machinist needs to locate two holes exactly 50 millimeters apart using tool maker's buttons each 10 millimeters in diameter. What should be the measured distance between the outer surfaces of the two buttons?

A. The measured distance should be 60 millimeters between the outer surfaces of the two buttons.



B. The measured distance should be 40 millimeters between the outer surfaces of the two buttons.

C. The measured distance should be 55 millimeters between the outer surfaces of the two buttons.

D. The measured distance should be 50 millimeters between the outer surfaces of the two buttons.

Q14 Part B

Which system allows for quick changing of tools in computer numerical control turning operations?

A. Tailstock

B. Manual clamping system

C. Modular tooling system



D. Fixed tooling system

Q15 Part B

Which maintenance strategy reduces unexpected equipment downtime the most?

A. Run to failure

B. Corrective maintenance

C. Preventive maintenance



D. Deferred maintenance

Q16 Part B

What is the safest way to walk on a workshop floor?

A. Step over wires on the floor

B. Use mobile phones for light

C. Walk quickly to avoid hazards

D. Wear suitable safety shoes at all times

**Q17 Part B**

Which tool is most commonly used in a workshop to measure the length of an object accurately?

A. Steel rule



B. File

C. Chisel

D. Hammer

Q18 Part B

If a drawing specifies a circularity tolerance of 0.01 millimeter, what is the maximum allowed deviation from a perfect circle for the feature?

A. 0.005 millimeter at any cross section

B. 0.02 millimeter at any cross section

C. 0.05 millimeter at any cross section

D. 0.01 millimeter at any cross section

**Q19 Part B**

When setting up for metric thread cutting on an imperial lathe, what extra component is often needed in chain gear calculation?

A. Use of cutting fluid or coolant

B. A transposing gear in the gear train



C. Extra lead screw oiling

D. Changing the tool point angle



Q20 Part B

Which of the following best describes the relationship between Bureau of Indian Standards (BIS) standards and tolerances?

- A. BIS eliminates tolerance requirements
- B. BIS sets acceptable tolerance ranges ✓
- C. BIS ignores tolerance considerations
- D. BIS increases tolerance values arbitrarily

Q21 Part B

What is the main identifying feature of a right hand cutting tool in terms of its cutting edge?

- A. It cuts when moving vertically downward
- B. It cuts when moving from tailstock to headstock ✓
- C. It cuts when moving vertically upward
- D. It cuts when moving from headstock to tailstock

Q22 Part B

A job drawing shows multiple rivets arranged along a straight line. What does this indicate about the rivet pattern?

- A. Plates are joined in a staggered pattern
- B. Plates are joined in a random pattern
- C. Plates are joined in a circular pattern
- D. Plates are joined in a linear pattern ✓

Q23 Part B

Which type of drill is most suitable for making a hole in a concrete wall while retaining a solid cylindrical sample from the center?

- A. Core drill ✓
- B. Center drill
- C. Twist drill
- D. Countersink

Q24 Part B

Which modification to the basic surface finish symbol signifies that material must be removed during the process?

- A. Adding a bar to the basic symbol ✓
- B. Adding a square to the basic symbol
- C. Adding a dot to the basic symbol
- D. Adding a circle to the basic symbol

Q25 Part B

If a component requires a fast linear motion with less rotation, which thread type is preferred?

- A. Fine thread with small lead
- B. Single start thread with fine pitch
- C. Single start thread with small lead
- D. Double start thread with larger lead ✓

Q26 Part B

A machinist sets the workpiece zero incorrectly by 2 mm in the X-axis. What will be the most likely result?

- A. All machined features will be offset by 1 mm in the X-direction
- B. All machined features will be offset by 2 mm in the X-direction ✓
- C. All machined features will be offset by 4 mm in the X-direction
- D. The tool will automatically compensate for the error

Q27 Part B

What is the primary purpose of using slip gauges in accurate length build-up?

- A. Checking flatness of precision surfaces using contact method
- B. Setting reference dimensions for calibrating measuring instruments
- C. Combining gauge blocks to obtain a precise required dimension ✓
- D. Verifying dimensional tolerances of finished components

Q28 Part B

What problem can occur if a water-based coolant contains too much water during machining?

- A. It may not provide sufficient lubrication ✓
- B. It may reduce machine noise
- C. It may become excessively thick
- D. It may become sticky during use

Q29 Part B

Which equation is used to calculate the pitch for a buttress thread if the lead is known?

- A. Pitch = Number of Starts divided by Lead
- B. Pitch = Lead divided by Number of Starts ✓
- C. Pitch = Lead added to Number of Starts
- D. Pitch = Lead multiplied by Number of Starts



Q30 Part B

Which of the following is the primary constituent of ceramic alumina cutting tools?

- A. Tungsten carbide
- B. Silicon carbide
- C. Magnesium oxide
- D. Aluminium oxide

**Q31 Part B**

Which statement about the helix angle in triple start threads is correct if the pitch remains unchanged?

- A. The helix angle increases compared to a single start thread
- B. The helix angle remains unchanged
- C. The helix angle decreases compared to a single start thread
- D. The helix angle becomes zero

**Q32 Part B**

In DNC system interfacing, which device serves as the main data storage for CNC programs?

- A. Personal computer
- B. Machine tool
- C. Printer
- D. Controller

**Q33 Part B**

Which type of computer numerical control (CNC) programming is best suited for simple part geometries and quick setup?

- A. Post-processed programming
- B. Automatic programming
- C. Manual programming
- D. Parametric programming

**Q34 Part B**

Which term best describes the maximum stress that a material can withstand and still return to its original shape after removal of the force?

- A. Yield point
- B. Breaking point
- C. Ultimate strength
- D. Elastic limit

**Q35 Part B**

What happens to the work done if a technician pushes a cart with the same force but doubles the distance?

- A. Work done becomes zero
- B. Work done remains the same
- C. Work done is doubled
- D. Work done is halved

**Q36 Part B**

Why is the cutting speed reduced when machining hard materials on a lathe?

- A. To avoid rapid tool wear and maintain safety
- B. To reduce the need for coolant
- C. To make the material softer for machining
- D. To increase the size of chips produced

**Q37 Part B**

A machinist programs a computer numerical control (CNC) lathe in incremental mode to move the tool 10 mm right and then 5 mm up from its current location. Where will the tool end up relative to its last position?

- A. 15 mm right and 5 mm up from the home position
- B. 10 mm right and 5 mm up from the previous position
- C. 10 mm right and 5 mm up from the workpiece origin
- D. At the original start position of CNC turning machine

**Q38 Part B**

Which process chart is most suitable for recording the movement of materials in a workshop?

- A. Flow process chart
- B. Man process chart
- C. Inspection process chart
- D. Operation process chart

**Q39 Part B**

If a sine bar with 200 millimeter roller centers is raised by 50 millimeter using slip gauges, what is the sine of the angle set?

- A. 0.20
- B. 4
- C. 0.25
- D. 0.40



Q40 Part B

Which type of mandrel is best suited for holding a workpiece having a uniform internal diameter during turning operations?

- A. Expansion mandrel
- B. Step mandrel
- C. Plain mandrel ✓
- D. Cone mandrel

Q41 Part B

Which step should be performed first when using a divider to transfer a measurement from a scale to a drawing?

- A. Draw the light construction lines on the sheet firstly
- B. Check the drawing for measurement errors before start
- C. Mark points at both ends of the line
- D. Open the divider to the required length on the scale ✓

Q42 Part B

A sectional view in a foundation drawing is used to show:

- A. Machine speed
- B. Internal foundation details ✓
- C. Production rate
- D. Cost of construction

Q43 Part B

During troubleshooting, why is single-block mode preferred over continuous execution?

- A. It automatically corrects programming mistakes
- B. It detect errors observing each individual command ✓
- C. It completes the job faster then any other mode
- D. It reduces the need for operator supervision

Q44 Part B

When a driving plate is used on a lathe, which component commonly helps transmit motion from the spindle to the workpiece?

- A. Tool post
- B. Catch plate ✓
- C. Face plate
- D. Steady rest

Q45 Part B

Which mechanism is responsible for feeding tools into the workpiece in a multi spindle automatic lathe?

- A. Hydraulic pump
- B. Cam mechanism ✓
- C. Gearbox selector
- D. Lead screw assembly

Q46 Part B

Which aspect is considered a drawback of computer numerical control (CNC) machines in terms of workforce?

- A. Improved manual dexterity required
- B. Reduced need for skilled manual operators ✓
- C. Enhanced physical effort required
- D. Increased demand for unskilled labor

Q47 Part B

Which production system benefits the most from interchangeability achieved through standardization?

- A. Single-piece production with customized dimension
- B. Prototype manufacturing with manual fitting procedures
- C. Mass production with automated assembly operations ✓
- D. Experimental manufacturing with variable dimensions

Q48 Part B

While setting up a lathe for a knurling operation, the spindle speed should be:

- A. The same speed used for facing operations
- B. Higher than turning speed for the same material
- C. Lower than turning speed for the same material ✓
- D. The maximum speed available on the lathe

Q49 Part B

A production line requires drilling multiple holes of varying diameters on a cylindrical workpiece, while ensuring rapid repositioning and accurate alignment. Which type of jig would best suit this scenario?

- A. Plate jig
- B. Channel jig
- C. Template jig
- D. Box jig ✓



Q50 Part B

If a lead screw has a pitch of 3 mm, what does this indicate for one complete rotation of the screw?

- A. The screw diameter is 3 mm
- B. The thread height is 3 mm
- C. The nut advances 3 mm per rotation ✓
- D. The screw rotates 3 times per second

Q51 Part B

A factory needs to ensure quick assembly and disassembly of parts using even threads. Which property of even threads makes this possible?

- A. Even threads allow for rapid axial movement per revolution. ✓
- B. Even threads always require fine pitch for accuracy.
- C. Even threads have increased friction for locking at different speeds.
- D. Even threads decrease the need for lubrication.

Q52 Part B

How can improper clamping affect the part quality in CNC turning?

- A. It improves tool life
- B. It causes dimensional inaccuracies ✓
- C. It increases spindle speed
- D. It reduces coolant flow

Q53 Part B

Which instrument is used to check for a short circuit before repairing electrical equipment in a workshop?

- A. A hammer with a wooden grip
- B. A pair of insulated pliers
- C. A screwdriver with a plastic handle
- D. A multimeter set to continuity mode ✓

Q54 Part B

Which feature allows a straight peen hammer to spread a metal in one direction?

- A. Narrow elongated peen aligned with hammer handle ✓
- B. Wide flat face distributing force evenly
- C. Cylindrical body of hammer head
- D. Smooth wooden handle absorbing shock

Q55 Part B

Which part of an outside micrometer contains the main scale used for measurement reading?

- A. Sleeve (barrel) ✓
- B. Frame
- C. Ratchet stop
- D. Thimble

Q56 Part B

Which characteristic is unique to a single start thread compared to a multiple start thread?

- A. Advances one pitch distance per revolution ✓
- B. Contains more than one groove
- C. Has a variable pitch
- D. Advances two pitch distances per revolution

Q57 Part B

If a conveyor belt moves at a constant speed, what is true about its velocity?

- A. The velocity is decreasing
- B. The velocity is increasing
- C. The velocity is constant ✓
- D. The velocity is changing direction

Q58 Part B

Which of the following best describes the purpose of using a modified rake angle in a single point cutting tool?

- A. To control tool wear during cutting
- B. To select the appropriate lip angle for machining
- C. To set the tool height above the workpiece
- D. To improve chip flow and reduce cutting forces ✓

Q59 Part B

What is the immediate effect of setting the tool below the center height in a turning operation?

- A. Uniform tool wear throughout edge
- B. Increased rubbing on workpiece ✓
- C. Reduced spindle speed during cut
- D. Improved chip formation process



Q60 Part B

Which advantage does computer numerical control (CNC) have when producing a large number of identical parts compared to conventional machines?

- A. Longer cycle time compared to conventional machining
- B. Reduced setup time for each part** ✓
- C. Higher variation between parts due to manual intervention
- D. Increased dependence on operator skill for each part

Q61 Part B

What does a personal safety sign showing a white helmet on a blue background indicate to workers?

- A. It shows the location of helmet storage
- B. It warns workers about falling objects
- C. It indicates helmets are not allowed
- D. It tells workers to wear a safety helmet** ✓

Q62 Part B

How does proper cutting fluid affect chip removal during tapping?

- A. It dissolves chips into the fluid
- B. It keeps chips inside the tapped hole
- C. It creates more chips for disposal
- D. It helps flush out chips from the tap flutes** ✓

Q63 Part B

If a thread of length 30 mm is to be cut with a pitch of 1.5 mm, how many complete threads will be formed?

- A. 18 threads
- B. 15 threads
- C. 22 threads
- D. 20 threads** ✓

Q64 Part B

Why is the hammer head hardened and tempered during manufacturing?

- A. To improve corrosion resistance of hammer surface
- B. To resist wear and prevent brittle fracture during striking** ✓
- C. To increase elasticity of hammer head during impact
- D. To reduce weight of hammer head for easier handling

Q65 Part B

Why is an outside micrometer preferred over a vernier caliper for some measurements?

- A. It provides higher accuracy and precision** ✓
- B. It measures only length
- C. It can measure internal dimensions easily
- D. It is larger in size

Q66 Part B

Which expression correctly represents the speed ratio when a driver gear has 15 teeth and the driven gear has 45 teeth?

- A. Driven gear speed = Driver speed $\times (45/15)$
- B. Driven gear speed = Driver speed $\times (15/45)$** ✓
- C. Driven gear speed = Driver speed $\times (30/45)$
- D. Driven gear speed = Driver speed $\times (45/30)$

Q67 Part B HINDI

कार्यशाला में किसी भारी वस्तु को सुरक्षित रूप से उठाने का सही तरीका क्या है?

- A. पैरों को सीधा रखते हुए और पीठ को झुकाते हुए
- B. घुटनों को मोड़कर और पीठ को सीधा रखते हुए** ✓
- C. लोड को उठाते समय शरीर को घुमाकर
- D. केवल उंगलियों की सहायता से हाथों से उठाकर

Q68 Part B

A machinist needs to cut a thread with 18 threads per inch using a universal dividing head. If the dividing head has a worm ratio of 40 to 1, how many full turns of the index crank are required for one revolution of the workpiece?

- A. 10 full turns
- B. 40 full turns** ✓
- C. 20 full turns
- D. 18 full turns

Q69 Part B

Where is the feed rod generally positioned on a conventional lathe machine?

- A. Parallel to the lead screw** ✓
- B. Above the tailstock
- C. Inside the spindle
- D. Beneath the chuck



Q70 Part B

Which material is most commonly used for constructing the top surface of a marking table?

- A. Wood with a polished surface
- B. Mild steel with a painted finish
- C. Aluminium with a brushed finish
- D. Cast iron with a ground finish



Q71 Part B

If a technician knows the base and height of a right triangle, which trigonometric ratio helps them find the angle at the base?

- A. Secant
- B. Sine
- C. Cosine
- D. Tangent



Q72 Part B

Which component provides feedback in a closed loop computer numerical control (CNC) machine control system?

- A. Position transducer
- B. Relay module
- C. Limit switch
- D. Power supply



Q73 Part B

Which technical form is required when defective products are identified and segregated for rework or disposal in the workshop?

- A. Tool calibration sheet
- B. Production plan form
- C. Delivery challan
- D. Non-conformance report



Q74 Part B

What is the standard ratio of length to width for a typical engineering drawing board?

- A. The standard ratio is two to one for a drawing board
- B. The standard ratio is three to two for a drawing board
- C. The standard ratio is $\sqrt{\text{two}}$ to one for a drawing board
- D. The standard ratio is four to one for a drawing board



Q75 Part B

Which formula is used to calculate the tool thickness for square thread cutting?

- A. Tool thickness = Pitch – Lead
- B. Tool thickness = $0.5 \times \text{Pitch}$
- C. Tool thickness = $2 \times \text{Pitch}$
- D. Tool thickness = Pitch + Lead



Part B

75 Questions • Answer Key

Q1 Part B

If a force acts on a body but no displacement occurs, the work done is:

- A. Negative always
- B. Maximum
- C. Zero ✓
- D. Infinite

Q2 Part B

What is typically achieved by using a lower gear in a tractor manual transmission?

- A. Increased torque at the wheels ✓
- B. Lower engine temperature
- C. Increased fuel tank capacity
- D. Decreased torque and higher speed

Q3 Part B

Why should piston rings be checked for cracks before fitting?

- A. To prevent carbon buildup on rings
- B. To ensure smooth piston rotation
- C. To avoid premature engine failure ✓
- D. To reduce friction during operation

Q4 Part B

According to IS:1444-1989, which drawing board designation has size $1500 \times 1000 \times 25$ mm?

- A. D3
- B. D1
- C. D2
- D. D0 ✓

Q5 Part B

When troubleshooting oil pressure drops, why should the oil filter be inspected?

- A. A filter can cause air leaks in tires
- B. A blocked filter can cause low oil pressure ✓
- C. A filter can control coolant circulation
- D. A filter can affect alternator output

Q6 Part B

Which valve must close tightly to ensure proper compression in a diesel engine?

- A. Both Inlet and exhaust valves ✓
- B. Only inlet valve
- C. Only exhaust valve
- D. Only fuel injector

Q7 Part B

A digital multimeter measures current by developing a proportional voltage across a:

- A. Transformer winding
- B. Capacitor plate
- C. Shunt resistance ✓
- D. Relay coil

Q8 Part B

How does the differential lock affect the motion of the drive wheels?

- A. It automatically adjusts air pressure in the tires
- B. It forces both drive wheels to rotate at the same speed ✓
- C. It makes one drive wheel rotate in reverse
- D. It causes one wheel to stop rotating in all cases

Q9 Part B

Which component transmits power from the engine to implements in a power tiller?

- A. Main clutch lever
- B. Power take off shaft ✓
- C. Steering lever
- D. Front stand



Q10 Part B

Which part works together with the camshaft to achieve variable valve timing?

- A. The valve spring stiffness
- B. The valve lubrication system
- C. The valve magnetic mechanism
- D. The valve actuator mechanism ✓

Q11 Part B

In a tractor power tiller, which configuration is most likely to minimize power loss during transmission from the engine to wheel?

- A. Belt drive with adjustable tension pulleys
- B. Chain drive with variable pitch sprockets
- C. Hydraulic transfer using single circuit fluid
- D. Direct shaft drive with constant mesh gearing ✓

Q12 Part B

What is the suggested remedy for a faulty regulator in an alternator?

- A. Lubricate
- B. Replace ✓
- C. Rectify
- D. Tighten

Q13 Part B

Which sequence correctly represents the four-stroke cycle in a spark ignition engine?

- A. Suction, exhaust, compression, power
- B. Suction, power, compression, exhaust
- C. Suction, compression, exhaust, power
- D. Suction, compression, power, exhaust ✓

Q14 Part B

Which of these conditions can cause reading errors in a dial indicator?

- A. Parallax error ✓
- B. Zero error elimination
- C. Automatic error correction
- D. Magnetic field immunity

Q15 Part B

How does the ball and socket joint contribute to the durability of a tractor's steering system?

- A. Reduces wear by allowing free movement under load ✓
- B. Locks the steering components in place
- C. Prevents any movement in the steering assembly
- D. Increases friction for better grip in steering

Q16 Part B

A mechanic is repairing a gearbox and finds the original gasket is missing. Which approach would best replace the function of the missing gasket?

- A. Apply liquid gasket material to the mating faces ✓
- B. Wrap with adhesive tape around the joint
- C. Tighten the bolts as much as possible for fit
- D. Use grease instead of a sealing material

Q17 Part B

What is the normal condition of the ignition warning lamp after the engine starts?

- A. It turns off if charging is normal ✓
- B. It continues glowing brightly
- C. It flashes continuously
- D. It changes colour repeatedly

Q18 Part B

In third angle projection, the object lies:

- A. Above Horizontal Plane (H.P.) and in front of Vertical Plane (V.P.)
- B. Above Horizontal Plane (H.P.) and behind Vertical Plane (V.P.)
- C. Below Horizontal Plane (H.P.) and behind Vertical Plane (V.P.) ✓
- D. Below Horizontal Plane (H.P.) and in front of Vertical Plane (V.P.)

Q19 Part B

Which part supports the camshaft inside the engine block?

- A. Springs support the camshaft inside the engine block.
- B. Pulleys support the camshaft inside the engine block.
- C. Gears support the camshaft inside the engine block.
- D. Bearings support the camshaft inside the engine block. ✓



Q20 Part B

Which type of tyre tread pattern has teeth-like edges?

A. Saw tooth tread



B. Lug tread

C. Diamond tread

D. Highway tread

Q21 Part B

Which statement best describes the construction of a double ended hydraulic cylinder?

A. Has a rod only on one side of the cylinder

B. Uses a single central seal for both chambers

C. Contains two pistons in one tube assembly

D. Has piston rods extending from both sides of the cylinder

**Q22 Part B**

Which of the following does the camshaft use to convert rotational motion into linear motion for valve operation?

A. Gears

B. Cam lobes



C. Pulleys

D. Bearings

Q23 Part B

What safety concern is associated with a faulty high-pressure diesel fuel line?

A. Risk of electrical short circuit

B. Emission of engine noise

C. Coolant leakage risk

D. Risk of fuel spray

**Q24 Part B**

In overhead transmission lines, insulators are used to:

A. Reduce conductor resistance

B. Produce magnetic shielding

C. Increase conductor current

D. Prevent leakage current to earth

**Q25 Part B**

Which of the following is NOT an effect of heat?

A. Change in size

B. Change in gravitational force



C. Change in state

D. Change in temperature

Q26 Part B

Which statement correctly differentiates heat and temperature based on their SI units?

A. Both heat and temperature are measured in kelvin

B. Heat is measured in joule while temperature is measured in kelvin



C. Heat is measured in kelvin while temperature is measured in joule

D. Both heat and temperature are measured in joule

Q27 Part B

How does the construction of multilayer metallic gaskets benefit their use in engines with frequent load changes?

A. They provide insulation from engine heat

B. They reduce the need for joint lubrication

C. They prevent corrosion of fasteners

D. They compensate for flange movement during operation

**Q28 Part B**

A worker notices clutter blocking an emergency exit. What is the best immediate course of action according to good housekeeping practices?

A. Wait for a supervisor to give instructions

B. Move the clutter to another part of the workshop

C. Remove the clutter and report the hazard



D. Ignore the clutter and continue working

Q29 Part B

A student needs to drill several identical holes in a metal plate using a bench drilling machine. Which feature would help achieve consistent results?

A. Changing the drill bit after each hole

B. Using the depth stop to control drilling depth



C. Varying the feed pressure continuously

D. Adjusting the table height for each hole



Q30 Part B

A technician notices excessive smoke from a diesel engine. Which Electronic Control Unit (ECU)-related issue could cause this?

- A. Blocked air filter system
- B. Incorrect fuel delivery** ✓
- C. Low tire pressure level
- D. Faulty alternator output

Q31 Part B

What is a non-functional dimension?

- A. A dimension essential for assembly operation
- B. A dimension related only to colour finishing
- C. A hidden dimension used in sectional views
- D. A dimension not essential for the function of the component** ✓

Q32 Part B

During discharging of lead acid battery, which substance is formed at both battery plates?

- A. Lead acetate
- B. Lead sulfate** ✓
- C. Lead carbonate
- D. Lead bromide

Q33 Part B

When smoothing a rough metal surface, which file type would provide a faster finish?

- A. Double cut file** ✓
- B. Rasp file
- C. Single cut file
- D. Triangular file

Q34 Part B

Which of the following best describes the relationship between the radiator pressure cap and coolant loss prevention?

- A. It adds coolant to the reservoir automatically
- B. It restricts airflow into the engine compartment
- C. It blocks debris from entering the radiator
- D. It keeps coolant from boiling and escaping as vapor** ✓

Q35 Part B

A fitter is required to file the inner curvature of a pipe and its flat edge. Which file is most suitable?

- A. Needle file
- B. Round file
- C. Half round file** ✓
- D. Flat file

Q36 Part B

A workshop must finish ceramic parts with extremely tight tolerances and mirror-like surfaces. Which lapping abrasive should be chosen?

- A. Diamond paste** ✓
- B. Boron carbide slurry
- C. Silicon carbide cream
- D. Aluminum oxide powder

Q37 Part B

Which process is directly managed by the camshaft in a diesel engine?

- A. Spark generation
- B. Valve actuation** ✓
- C. Fuel atomization
- D. Coolant circulation

Q38 Part B

How does MoRTH (Ministry of Road Transport and Highways) impact the safety of road users in India?

- A. Regulating vehicle insurance companies
- B. Inspecting railway tracks for safety
- C. Issuing driving licenses to citizens
- D. Implementing road safety measures** ✓

Q39 Part B

A tractor operator notices that the wheels are not turning equally when steering. Which component is likely malfunctioning?

- A. Steering wheel grip has worn out over time
- B. Fuel pump is not maintaining pressure properly
- C. A linkage may not be transmitting motion correctly** ✓
- D. Axle lubrication is insufficient for smooth motion



Q40 Part B

What does the compensation port in a master cylinder do during brake release?

- A. Opens to maintain fluid level
- B. Releases pressure to the reservoir ✓
- C. Closes to block air entry
- D. Seals the piston from dust

Q41 Part B

Which factor has contributed most significantly to the growth of the tractor industry in India in recent years?

- A. Manual labor availability has declined
- B. Urbanization has remained constant
- C. Export demand for tractors has decreased
- D. Mechanization of agriculture has increased ✓

Q42 Part B

Why are tractor wheels often larger at the rear compared to those at the front?

- A. To enhance steering precision
- B. To reduce load on the engine
- C. To improve stability and traction ✓
- D. To decrease tyre wear in fields

Q43 Part B

What is the remedy for a loose drive belt causing charging problems?

- A. Replace stator winding
- B. Tighten wheel bolts
- C. Replace battery terminal
- D. Adjust belt tension ✓

Q44 Part B

The hitching device mainly helps in:

- A. Engine lubrication
- B. Implement attachment ✓
- C. Wheel balancing
- D. Fuel injection

Q45 Part B

In a practical scenario, why might a technician choose a reactive muffler over an absorptive one?

- A. It is more effective at reducing low-frequency engine sounds ✓
- B. It lasts longer in high-temperature environments
- C. It needs less maintenance over time
- D. It increases engine power output

Q46 Part B

Which innovation most significantly increased mass production in the early automobile industry?

- A. Wooden chassis frames
- B. Handcrafted carriages
- C. Steam-powered engines
- D. Moving assembly line ✓

Q47 Part B

In a real-life workshop scenario, how could improper use of a drill vice affect the outcome of a drilling operation?

- A. It may result in inaccurate holes and potential safety hazards ✓
- B. It makes the drilling machine operate more quietly
- C. It increases the spindle speed automatically
- D. It extends the life of the drill bit significantly

Q48 Part B

What could happen if incompatible brake fluids are mixed in a tractor?

- A. Hydraulic lift arms may move slowly
- B. Seals may be damaged and braking performance may be reduced ✓
- C. Cooling system may overheat rapidly
- D. Engine oil pressure may drop sharply

Q49 Part B

A screw extractor failed to remove a broken screw because the hole was drilled off-center. What is the main risk in this situation?

- A. Damaging the original threaded hole ✓
- B. Softening the broken screw
- C. Breaking the screw extractor
- D. Sticking the extraction tool



Q50 Part B

Which of the following is a correct use of a centre punch during layout work?

- A. Sharpening tool edges
- B. Tightening bolts and nuts
- C. Measuring sheet thickness
- D. Creating indentation for drill bit ✓

Q51 Part B

Valve overlap in diesel engines is primarily used to:

- A. Improve scavenging and cylinder filling ✓
- B. Lubricate the crankshaft bearings
- C. Decrease temperature in the cylinder
- D. Clean the spark plugs automatically

Q52 Part B

Two ideal capacitors of $6\ \mu\text{F}$ and $3\ \mu\text{F}$ are connected in series. Their equivalent capacitance is:

- A. $2\ \mu\text{F}$ ✓
- B. $1\ \mu\text{F}$
- C. $18\ \mu\text{F}$
- D. $9\ \mu\text{F}$

Q53 Part B

Which cooling system is least suitable for use in areas with high humidity?

- A. Air cooling system
- B. Dry cooling system
- C. Evaporative cooling system ✓
- D. Liquid cooling system

Q54 Part B

In an NPN transistor operating in cut-off region, what happens to the collector current?

- A. Collector current reaches maximum value
- B. Collector current becomes zero or only leakage current flows ✓
- C. Collector current continuously increases with temperature
- D. Collector current becomes half of the rated value

Q55 Part B

Which front axle type allows the wheels to move up and down independently to adapt to uneven ground?

- A. Rigid front axle
- B. Four-wheel drive front axle
- C. Oscillating front axle ✓
- D. Adjustable front axle

Q56 Part B

If you must recommend a fit up inspection step for a complex joint in gas welding, which would ensure the highest joint integrity?

- A. Measuring only the uniformity of gap
- B. Checking only the alignment of pieces
- C. Inspecting only the joint surface cleanliness
- D. Checking both alignment and uniform gap ✓

Q57 Part B

Which maintenance problem is linked to overloading tractor implements during field work?

- A. Frequent bolt loosening in joints ✓
- B. Lower grease consumption rates
- C. Slower battery discharge rate
- D. Cleaner hydraulic fluid lines

Q58 Part B

Which application is most suitable for brazed joints rather than welded joints in industrial manufacturing?

- A. Brazed joints are ideal for fusing thick aluminum sheets.
- B. Brazed joints are ideal for joining thin-walled copper tubes. ✓
- C. Brazed joints are ideal for assembling large cast iron components.
- D. Brazed joints are ideal for connecting heavy steel plates.

Q59 Part B

Which material is commonly used to manufacture diesel tanks in automobiles?

- A. Mild steel ✓
- B. Zinc
- C. Cast iron
- D. Copper



Q60 Part B

Why are bearing shells designed with a specific thickness and shape in diesel engines?

- A. To increase coolant speed
- B. To ensure proper load distribution ✓
- C. To optimize exhaust gas flow
- D. To maximize fuel injection

Q61 Part B

Which feature distinguishes a centre punch from a prick punch in terms of construction?

- A. Longer overall length
- B. Knurled hand grip
- C. Blunter point angle ✓
- D. Steel material body

Q62 Part B

In a tractor hydraulic system, where would you typically use a 2-2 way valve?

- A. For simple on/off fluid control applications ✓
- B. For proportional direction control
- C. For pressure-compensated flow division
- D. For controlling multiple actuators simultaneously

Q63 Part B

While giving first aid for a suspected fracture, what is the most critical step before moving the injured person?

- A. Apply cold packs to reduce swelling
- B. Check for bleeding and bandage the wound
- C. Ask the person to move the injured part
- D. Immobilize the injured area with a splint or support ✓

Q64 Part B

Why is a gear type oil pump used more commonly than a plunger type in diesel engines?

- A. Gear type is more suitable for small engines
- B. Plunger type operates at lower speeds
- C. Gear type offers continuous and reliable flow ✓
- D. Plunger type cannot withstand high temperatures

Q65 Part B

Which symptom indicates the presence of bad brake fluid?

- A. Sudden steering stiffness
- B. Soft or spongy brake pedal ✓
- C. Rapid loss of tire pressure
- D. Increase in engine knocking sound

Q66 Part B

A student marks a line with a scribe, but the line is barely visible. What might be the most likely cause?

- A. Scribe tip is blunt or worn out ✓
- B. Metal surface is too oily
- C. Measuring tape was used instead
- D. Ruler engravings are faint

Q67 Part B

When refueling a hot diesel engine, what is the safest practice?

- A. Add fuel quickly to avoid delays
- B. Refuel with engine running to save time
- C. Open radiator cap before refueling
- D. Allow the engine to cool before refueling ✓

Q68 Part B

What causes ignition in a compression ignition engine?

- A. Spark plug activation
- B. High temperature of compressed air ✓
- C. Low temperature of compressed air
- D. External flame

Q69 Part B

Which part of the Vernier caliper is used to measure inside diameters?

- A. Lower jaws
- B. Locking screw
- C. Depth rod
- D. Upper jaws ✓



Q70 Part B

A control circuit must implement the logic function $Y = (A \cdot B) + C$. How should the switches be connected?

- A. All three switches (A, B, and C) must be wired in a single common parallel block.
- B. Switches A and B are wired in series, and this entire branch is wired in parallel with Switch C. ✓
- C. All three switches (A, B, and C) must be wired in a continuous single series line.
- D. Switches A and B are wired in parallel, and this entire branch is wired in series with Switch C.

Q71 Part B

Why is glass wool preferred over other materials for absorptive mufflers?

- A. Prevents corrosion of the muffler shell
- B. Acts as a filter for exhaust gases
- C. Reflects sound waves efficiently
- D. Resists high temperatures ✓

Q74 Part B

Which type of bar section is represented in the given figure?

- A. Angle bar section
- B. Channel bar section ✓
- C. Circular bar section
- D. Flat bar section

Q75 Part B

What is the fraction form of $87\frac{1}{2}\%$?

- A. $\frac{15}{16}$
- B. $\frac{5}{6}$
- C. $\frac{7}{8}$ ✓
- D. $\frac{11}{12}$

Q72 Part B

Why do cushion springs help reduce wear on clutch components?

- A. They improve the heat resistance of the clutch
- B. They increase the thickness of clutch plates
- C. They distribute engagement force more evenly ✓
- D. They reduce the need for lubrication

Q73 Part B

How does the diameter of an exhaust pipe affect engine performance and efficiency?

- A. Smaller size improves air filtration
- B. Any size functions equally well
- C. Proper size maintains optimal gas flow ✓
- D. Larger size increases brake power



Part B

75 Questions • Answer Key

Q1 Part B

Which tool is primarily used to create straight layout lines on metal surfaces?

- A. Vernier caliper with divider
- B. Outside micrometer with try square
- C. Scriber with steel rule ✓
- D. Centre punch with hammer

Q2 Part B

When reversing a tractor with a mounted cultivator, what effect can an incorrect top link adjustment have?

- A. It can cause the implement to lift unevenly ✓
- B. It can increase the gear ratio sharply
- C. It can drop the hydraulic fluid level
- D. It can change the injector sequence

Q3 Part B

Which of the following is a safety step before adjusting the drawbar?

- A. Release the clutch lever
- B. Open the fuel tank
- C. Rev up the engine
- D. Engage the parking brake ✓

Q4 Part B

What is a significant impact of Ministry of Road Transport and Highways (MoRTH's) regulatory initiatives on highway safety?

- A. Implementing uniform signage across states ✓
- B. Supervising driver training schools
- C. Regulating taxi permit allocation
- D. Issuing pollution control certificates

Q5 Part B

According to IEC 60445 wiring colour codes, the neutral conductor is identified by:

- A. Blue ✓
- B. Brown
- C. Red
- D. Green-yellow

Q6 Part B

Which property is most important for a cylinder sleeve material?

- A. High wear resistance ✓
- B. High electrical conductivity
- C. High transparency
- D. High friction

Q7 Part B

Why are diodes used in the alternator circuit?

- A. To increase the magnetic field strength
- B. To store electrical charge
- C. To allow current flow in one direction only ✓
- D. To reduce mechanical losses

Q8 Part B

During a practical assessment, a student sharpens a centre punch at 45 degrees instead of the recommended angle. What is a likely result of this error?

- A. The punch tip will wear out quickly ✓
- B. The punch will become stronger
- C. The punch will lose its weight
- D. The marks will be deeper and clear

Q9 Part B

Why is calibration necessary for a micrometer?

- A. To measure the reading up to the three decimal point
- B. To ensure accurate measurement readings ✓
- C. To change the measuring range of the tool
- D. To increase the size of the instrument



Q10 Part B

Which factor is most improved by using synthetic oils in diesel engine lubrication systems?

- A. Resistance to breakdown at higher temperatures** ✓
- B. Ability to attract moisture into the system
- C. Formation of abrasive particles
- D. Speed of oil degradation

Q11 Part B

Which situation best demonstrates a limitation of paper gaskets in sealing applications?

- A. Sealing a coolant system with high pressure and heat** ✓
- B. Sealing a non-pressurized valve cover
- C. Temporary repair for a small oil leak
- D. Covering a low-stress inspection panel

Q12 Part B

What is the effect on back pressure if the exhaust pipe diameter is too small?

- A. Only decreases back pressure
- B. Eliminates back pressure
- C. Only increases back pressure** ✓
- D. Has no effect on back pressure

Q13 Part B

Why are bearing shells made slightly thinner in the middle, than at the ends?

- A. To accommodate thermal expansion** ✓
- B. To reduce overall engine weight
- C. To increase structural strength
- D. To improve noise reduction

Q14 Part B HINDI

एक अश्वशक्ति (horse power), _____ के बराबर होती है।

- A. 6000 kgf metre/min
- B. 4500 kgf metre/min** ✓
- C. 3000 kgf metre/min
- D. 1500 kgf metre/min

Q15 Part B

Why is a 4-3 way valve preferred for controlling the direction of a double-acting actuator?

- A. It is smaller than other valve types
- B. It can reverse flow and provide a neutral position** ✓
- C. It only allows one-way fluid movement
- D. It increases pressure automatically

Q16 Part B

An operator notices excessive soot in the flame during welding. What adjustment should be made?

- A. Lower both gases at the same rate
- B. Reduce the oxygen supply to the flame
- C. Add more acetylene to the flame
- D. Increase the oxygen supply to the flame** ✓

Q17 Part B

What is the main advantage of split (dual) brake pedals in tractors according to the context?

- A. They increase the power of the braking system
- B. They allow independent braking for better turning ability** ✓
- C. They provide consistent braking on rough terrain
- D. They reduce the need for regular maintenance

Q18 Part B

How does the chemical structure of synthetic oils affect their performance in diesel engines?

- A. It increases the possibility of sludge formation
- B. It decreases the oil's ability to resist thermal breakdown
- C. It enables superior molecular uniformity for consistent lubrication** ✓
- D. It encourages irregular molecular arrangement for inconsistent results

Q19 Part B

Aluminium is used in overhead transmission lines because it has:

- A. High resistance and high weight
- B. Zero electrical conductivity
- C. Good electrical conductivity and low weight** ✓
- D. Infinite resistivity



Q20 Part B

Which issue can arise from manufacturing a bearing shell with low-grade material?

- A. Reduced vibration
- B. Improved engine speed
- C. Premature bearing failure ✓
- D. Enhanced oil pressure

Q21 Part B HINDI

एक अनुरक्षण अभियंता को कंपन और तेल दोनों के संपर्क में आने वाले फ्लैंज जोड़ (flange joint) के लिए एक गैस्केट का चयन करना है। इसके लिए किस सामग्री पर विचार किया जाना चाहिए?

- A. संपीड़ित ऐस्बेस्टॉस चादर (Compressed asbestos sheet)
- B. शुद्ध धातु गैस्केट चादर (Pure metal gasket sheet)
- C. रबड़-प्रबलित कॉर्क चादर (Rubber-reinforced cork sheet) ✓
- D. सादे कागज की गैस्केट चादर (Plain paper gasket sheet)

Q22 Part B

What is the main function of variable valve timing in a diesel engine?

- A. To change the timing of piston mechanism system
- B. To provide the lubrication system for smooth operation
- C. To optimize valve opening and closing events ✓
- D. To reduce the overall size of the valve mechanism

Q23 Part B

A technician must drill holes at multiple heights on a construction site with limited access to power outlets. Which portable drilling solution is most suitable?

- A. Using a corded electric bench drill
- B. Using a battery-operated cordless drill ✓
- C. Using a heavy stationary drill press
- D. Using a pneumatic drilling machine

Q24 Part B

How does the Electronic Control Unit (ECU) contribute to emission control in diesel engines?

- A. Increases fuel tank capacity
- B. Enhances radiator fan speed
- C. Adjusts fuel delivery ✓
- D. Modifies gear lever position

Q25 Part B

The introduction of which system has most reduced soil compaction in Indian tractor operations?

- A. Low-pressure radial tires ✓
- B. Triangular caterpillar tracks
- C. Solid rubber treads
- D. Cast iron wheels

Q26 Part B

Which maintenance action is essential for a tractor clutch shaft to function properly?

- A. Applying grease to all clutch components
- B. Tightening all nearby gearbox mounting bolts
- C. Ensuring correct alignment during assembly and repairs ✓
- D. Regular cleaning of the shaft with solvents

Q27 Part B

If only a half round file is available, what limitation might a worker face?

- A. Difficulty accessing sharp internal corners ✓
- B. Excess removal of material
- C. Inability to finish flat surfaces
- D. Inability to work on curved surfaces

Q28 Part B

How does the use of advanced electronic control units (ECUs) in clean diesel technology improve emission performance?

- A. Increases diesel tank size
- B. Optimizes injection timing precisely ✓
- C. Bypasses emission control sensors
- D. Runs injectors at maximum rate

Q29 Part B

How does the use of a recovery system during maintenance support workplace safety?

- A. It automatically shuts off the system during faults
- B. It prevents harmful refrigerant exposure to technicians ✓
- C. It lubricates moving parts inside the unit
- D. It insulates electrical wires from short circuits



Q30 Part B

Which component is primarily responsible for maintaining alignment between the left and right front wheels in a mechanical steering system?

- A. Drag link mechanism
- B. Tie rod assembly** ✓
- C. Steering gear box
- D. Pitman arm lever

Q31 Part B

An operator wants to weld a thin sheet metal using gas welding. Which equipment adjustment is most critical for this task?

- A. Increase gas pressure for deeper penetration
- B. Use large nozzle for wider flame spread
- C. Set low gas pressure with correct nozzle size** ✓
- D. Change mixer setting to higher oxygen ratio

Q32 Part B HINDI

यदि प्रचालन के दौरान ट्रेलर हिच (trailer hitch) की लॉकिंग पिन, पूर्ण रूप से संलग्न (engage) नहीं है, तो इस परिदृश्य में प्राथमिक जोखिम क्या है?

- A. लोड के अधीन ट्रेलर अप्रत्याशित रूप से अलग हो सकता है** ✓
- B. टायरों का वायु दाब तेजी से कम हो सकता है
- C. टिलर इंजन (tiller engine) तीव्रता से अधितप्त हो सकता है
- D. ड्रॉबार (drawbar) मुड़ जाएगा और गलत तरीके से संरेखित हो जाएगा

Q33 Part B

Projection lines or extension lines are usually drawn using:

- A. Continuous thick line
- B. Chain thick line
- C. Dashed thin line
- D. Continuous thin line** ✓

Q34 Part B

In a capacitor, the dielectric material is used to:

- A. Increase current flow
- B. Insulate the plates from each other** ✓
- C. Join the plates together
- D. Reduce supply voltage

Q35 Part B

A file made from which material will provide the best performance for finishing hardened steel parts?

- A. Brass
- B. Tool steel** ✓
- C. Copper
- D. Aluminium

Q36 Part B

Why is it necessary for tractors to have manual transmissions instead of fixed gear systems?

- A. They allow tractors to adapt to varying work conditions** ✓
- B. They are primarily used to reduce engine noise
- C. They eliminate the need for regular brake usage
- D. They ensure tractors always run at a constant speed

Q37 Part B

Which phenomenon primarily causes knocking in spark-ignition (SI) engines and limits their compression ratio?

- A. Excessive temperature of the engine lubrication oil
- B. Too high amount of oxygen causing incomplete combustion
- C. Incomplete vaporization of fuel during injection
- D. Auto-ignition of unburned mixture ahead of flame front** ✓

Q38 Part B

Which emissions are primarily reduced using variable valve timing in diesel engines?

- A. Reduction in nitrogen oxide emissions** ✓
- B. Reduction in hydrogen emissions
- C. Reduction in the sulfur dioxide emissions
- D. Rise in particulate matter emissions

Q39 Part B

If a tractor starter emits grinding noises, what is the likely issue?

- A. Damaged fan blade
- B. Worn starter pinion** ✓
- C. Faulty governor spring
- D. Clogged fuel line



Q40 Part B

Which sequence should be followed when adjusting the pinion in the final drive assembly?

- A. Adjust backlash, check depth, set contact pattern
- B. Check contact pattern, set backlash, adjust depth
- C. Set the depth, adjust the backlash, check contact pattern ✓
- D. Check pattern, adjust depth, set backlash

Q41 Part B

What role does earthing play in electrical installations?

- A. Reduces voltage to devices
- B. Directs fault current to ground ✓
- C. Stores excess electricity
- D. Increases device power

Q42 Part B

Which component is directly affected by changes in compression ratio within the engine cycle?

- A. Alternator
- B. Timing belt
- C. Air filter
- D. Combustion chamber ✓

Q43 Part B

What is the common cross-sectional shape of a connecting rod used in diesel engines?

- A. T-section
- B. Square
- C. I-section ✓
- D. Circular

Q44 Part B

A tractor safety interlock circuit allows engine starting only when both clutch and neutral switches are active. Which logic gate is most suitable for this operation? (Assume active switch means logic HIGH)

- A. OR gate
- B. NOT gate
- C. XOR gate
- D. AND gate ✓

Q45 Part B HINDI

एक ड्राइवर लंबी ड्राइव के बाद रेडिएटर से भाप निकलते हुए देखता है। रेडिएटर के कार्य के संबंध में यह किस प्रकार का संकेत देता है?

- A. रेडिएटर में शीतक द्रव्य अधिक मात्रा में भरा है
- B. रेडिएटर ऊष्मा को प्रभावी तरीके से हटाने में विफल हो रहा है ✓
- C. रेडिएटर, टायर का दाब बनाए रखता है
- D. रेडिएटर ईंधन लाइनों की सफाई कर रहा है

Q46 Part B

Why is speed called a scalar quantity?

- A. It depends only on force
- B. It changes with acceleration only
- C. It has magnitude but no direction ✓
- D. It acts opposite to motion

Q47 Part B

If a machinist wants to drill a precise hole with minimal wandering, which twist drill feature is most critical?

- A. Shank
- B. Flute
- C. Point angle ✓
- D. Margin

Q48 Part B

Which property is essential for materials used in piston rings of diesel engines?

- A. Low corrosion resistance
- B. High wear resistance ✓
- C. High corrosion resistance
- D. Low wear resistance

Q49 Part B

Why is it important to use a die stock rather than gripping the die directly with pliers when threading a rod?

- A. Die stock increases cutting speed only
- B. Die stock is lighter in weight
- C. Die stock provides stability and alignment ✓
- D. Die stock creates more torque than pliers



Q50 Part B HINDI

एक विद्यार्थी ने ड्रिलिंग के लिए पॉइंट मार्क करने हेतु सेंटर पंच का उपयोग किया, लेकिन फिर भी ड्रिल बिट फिसल गई। इसका सबसे संभावित कारण क्या है?

- A. निशान (indentation) बहुत कम गहरा था** ✓
- B. बहुत अधिक बल (force) का उपयोग किया गया था
- C. पंच अत्यधिक कठोरित (hardened) हो गया था
- D. गलत पंच (wrong punch) का चयन किया गया था

Q51 Part B

In the event of a suspected electrical fire in the workshop, which action should be avoided to ensure safety?

- A. Using an electrical-rated fire extinguisher
- B. Evacuating the workshop if smoke increases
- C. Using water to extinguish the electrical fire** ✓
- D. Disconnecting power supply immediately

Q52 Part B

In a tractor, why is it important that brakes are applied equally to both rear wheels?

- A. To increase the fuel efficiency of the tractor
- B. To reduce wear on the engine components
- C. To achieve faster stopping in all conditions
- D. To maintain straight movement while stopping** ✓

Q53 Part B

Hidden edges in two wheeler drawing are generally represented using:

- A. Dashed lines** ✓
- B. Continuous thick lines
- C. Double curved lines
- D. Chain thick lines

Q54 Part B

Which component regulates the timing of diesel injection?

- A. Air intake
- B. Glow plug
- C. Injection pump** ✓
- D. Fuel filter

Q55 Part B

How does periodic testing improve overall safety in lifting operations?

- A. It ensures new equipment is always safe
- B. It helps identify hidden defects early** ✓
- C. It focuses mainly on equipment appearance
- D. It depends on user experience and training

Q56 Part B

What could happen if a tractor is operated in a high gear while pulling a heavy load?

- A. The engine produces more power for the load
- B. The engine switches to a lower gear automatically
- C. The engine may stall due to insufficient torque** ✓
- D. The engine runs more efficiently under load

Q57 Part B

Which of the following is a type of brake booster commonly used in vehicles?

- A. Electromagnetic brake booster
- B. Centrifugal brake booster
- C. Mechanical brake booster
- D. Vacuum brake booster** ✓

Q58 Part B

Which type of projection is commonly used in engineering drawing to represent the exact shape and size of an object?

- A. Isometric projection
- B. Perspective projection
- C. Orthographic projection** ✓
- D. Oblique projection

Q59 Part B

Which type of lamps is commonly used for the rear lights in a tractor?

- A. Spot lamp
- B. Flood lamp
- C. Headlamp
- D. Tail lamp** ✓



Q60 Part B

Why must both tie rod ends be adjusted equally on a tractor during alignment?

- ☒ A. To ensure both wheels track straight ahead
- ☐ B. To create additional toe-in for the wheels
- ☐ C. To provide more toe-out for field turns
- ☐ D. To improve hydraulic fluid performance

Q61 Part B

Which characteristic is essential for the material used in exhaust manifolds?

- ☒ A. High thermal resistance
- ☐ B. High electrical conductivity
- ☐ C. High magnetic permeability
- ☐ D. Low density for lightweight

Q62 Part B

What is the main function of the ignition warning lamp in a tractor electrical system?

- ☐ A. To increase battery voltage
- ☒ B. To indicate charging system faults
- ☐ C. To reduce engine temperature
- ☐ D. To control wheel alignment

Q63 Part B

In a dimensioning system, the ends of a dimension line usually touch:

- ☐ A. Centre lines
- ☒ B. Extension lines
- ☐ C. Hidden outlines
- ☐ D. Hatching lines

Q64 Part B HINDI

'B' तापमान रेटिंग वाला ट्रैक्टर टायर किस प्रकार के उपयोग के लिए सबसे उपयुक्त है?

- ☐ A. हल्के लोड और निम्न चाल के लिए
- ☐ B. केवल ऑफ-रोड उपयोग के लिए
- ☐ C. उच्च चाल और भारी लोड के लिए
- ☒ D. मध्यम चाल और मध्यम लोड के लिए

Q65 Part B

What does the ply rating of a tractor tyre indicate?

- ☐ A. The size and width of the tyre
- ☐ B. The air pressure required in the tyre
- ☐ C. The type of tread pattern on the tyre
- ☒ D. The strength and load-carrying capacity of the tyre

Q66 Part B

What does the valve timing diagram illustrate in a diesel engine?

- ☐ A. The variation of fuel pressure during combustion
- ☐ B. Mechanical designing of inlet and exhaust valves
- ☐ C. Fuel injection pressure variation
- ☒ D. Sequence of valve operations

Q67 Part B

When would a solid die be unsuitable for threading work?

- ☐ A. When using a die stock for support
- ☒ B. When slight size adjustments are needed
- ☐ C. When threading by hand operation
- ☐ D. When threading steel rods

Q68 Part B HINDI

2 m व्यास और 3.5 m ऊँचाई वाले एक बेलनाकार टैंक में पेट्रोल भरा हुआ है। $\pi = 22/7$ का उपयोग करते हुए, इसका आयतन ज्ञात कीजिए।

- ☒ A. 11 m^3
- ☐ B. 9 m^3
- ☐ C. 12 m^3
- ☐ D. 15 m^3

Q69 Part B

What is the basic working principle of a power tiller?

- ☐ A. It works through only hydraulic systems for field movement
- ☐ B. It operates completely using battery-driven mechanisms
- ☒ C. It transmits engine power to wheels and implements
- ☐ D. It uses compressed air systems for field operation



Q70 Part B

Among the following metals, which has the lowest boiling point?

- A. Cobalt
- B. Cadmium ✓
- C. Calcium
- D. Aluminium

Q71 Part B

A thyristor continues to conduct even after the gate pulse is removed. What is the main reason for this behavior?

- A. The thyristor acts like a fuse
- B. Gate current continuously increases
- C. The device latches ON after triggering ✓
- D. Collector-emitter junction remains reverse biased

Q72 Part B

Why might extractors be chosen over a standard exhaust manifold in automotive design?

- A. They decrease the temperature of exhaust gases
- B. They increase performance by optimizing exhaust flow timing ✓
- C. They reduce the overall weight of the vehicle significantly
- D. They lower the manufacturing cost of the exhaust system

Q73 Part B

When would a four post hoist be less advantageous than a two post hoist?

- A. When checking underbody rust ✓
- B. When accessing side body panels
- C. During oil filter replacement
- D. While draining engine coolant

Q74 Part B

Why is an outside micrometer not suitable for measuring deep internal grooves?

- A. It expands to fit into grooves automatically
- B. It is designed for measuring large holes
- C. It measures multiple grooves simultaneously
- D. The spindle cannot reach into grooves ✓

Q75 Part B

Which company is known for introducing the first indigenous tractor in India?

- A. Swaraj Tractors ✓
- B. Escorts Limited
- C. TAFE Tractors
- D. Eicher Tractors



Part B

75 Questions • Answer Key

Q1 Part B

The price of a tool increased from ₹400 to ₹500. Calculate the percentage increase based on the original price.

- A. 20%
- B. 30%
- C. 25%
- D. 35%



Q2 Part B

In a climate-controlled laboratory where aesthetics and minimal electromagnetic interference are priorities, which wiring system is most appropriate?

- A. Casing-capping wiring with plastic covers
- B. Batten wiring with wooden battens
- C. Cleat wiring with ceramic cleats
- D. Concealed conduit wiring with non-magnetic pipes



Q3 Part B

Why is Relay Ladder Logic (RLL) represented in a graphical form similar to relay control circuits in programmable logic controllers (PLCs)?

- A. To increase the memory capacity of programmable logic controllers
- B. To reduce the operating voltage required by PLC hardware
- C. To make PLC programming easier for technicians familiar with relay logic troubleshooting
- D. To replace all electrical wiring connections inside industrial machines



Q4 Part B

A control panel design requires cable markers to be both flame-retardant and resistant to abrasion. Which material is best suited for this requirement?

- A. Vinyl electrical tapes
- B. Polyolefin heat-shrink sleeves
- C. Self-adhesive paper labels
- D. Clip-on plastic tags



Q5 Part B

Find the circumference of a circle having radius 7 cm. Use $\pi=22/7$.

- A. 66 cm
- B. 22 cm
- C. 88 cm
- D. 44 cm



Q6 Part B

Before measuring current with an analog multimeter, how should the meter be connected in a circuit?

- A. Across the power supply
- B. To earth ground
- C. In parallel with the load
- D. In series with the load



Q7 Part B

Which type of lamp is suitable for street lighting due to its high efficiency and long life?

- A. Fluorescent lamp
- B. Mercury vapor lamp
- C. Incandescent lamp
- D. Sodium vapor lamp



Q8 Part B

If three light bulbs are connected in a series circuit and one bulb burns out (opens), what happens to the remaining bulbs?

- A. The other bulbs stop glowing
- B. The other bulbs continue glowing normally
- C. The other bulbs glow brighter
- D. The other bulbs glow dimmer



Q9 Part B

According to the laws of electrolysis, what happens to the mass of substance deposited at an electrode if the quantity of electricity passed through the electrolyte is increased?

- A. The mass deposited remains constant
- B. The mass deposited increases ✓
- C. The mass deposited decreases
- D. The mass deposited changes unpredictably

Q10 Part B

Which step is most crucial for enabling the collection of electric current in a silicon-based solar cell?

- A. Doping wafers with impurities
- B. Sandwiching doped and undoped wafers
- C. Attaching metallic strips to the extreme layers ✓
- D. Cutting silicon into thin wafers

Q11 Part B

Which condition must be met for a DC shunt generator to successfully charge a battery bank?

- A. The generator field resistance must be minimum.
- B. The generator terminal voltage must be equal to the battery voltage.
- C. The armature resistance must be maximum.
- D. The generator terminal voltage must be higher than the battery voltage. ✓

Q12 Part B

In which situation is DC transmission preferred over AC transmission in power networks?

- A. For distribution in city networks
- B. For local substation connections
- C. For rural short transmission lines
- D. For very long-distance underwater cables ✓

Q13 Part B

A factory is being constructed in an area with frequent electrical storms. The engineers must design an earthing system. Which factor is critical to prioritize in their design to ensure safety and equipment protection?

- A. Using a single GI pipe for earthing
- B. Using the thickest possible earthing cable
- C. Increasing the number of earthing rods ✓
- D. Placing earthing rods close together

Q14 Part B

If a lighting circuit is designed for 230 V supply and one lamp is rated for 110 V, what will happen if the lamp is connected directly in parallel with other 230 V lamps?

- A. The 110 V lamp will operate at normal brightness
- B. The 110 V lamp will be operate much brighter than others and continue to do so.
- C. The 110 V lamp will fail quickly due to overvoltage ✓
- D. The 110 V lamp will be dimmer than others

Q15 Part B

What is the purpose of using symbolic representation in engineering drawing?

- A. To communicate information using standardized symbols ✓
- B. To introduce unnecessary complexity into drawings
- C. To decorate drawings using additional geometric shapes
- D. To improve the decorative appearance of drawings

Q16 Part B

The property of a material by which it regains its original shape and size after removal of the deforming force is called:

- A. Brittleness
- B. Elasticity ✓
- C. Plasticity
- D. Hardness

Q17 Part B

A universal motor is brought into the workshop with the complaint of excessive sparking at the commutator under load. Which is the most likely cause to check first?

- A. Damaged field winding
- B. Worn out carbon brushes ✓
- C. Shorted commutator bar
- D. Faulty armature windings

Q18 Part B

A technician needs to select a wire for connecting a 230V control circuit inside a panel. Which specification is most important for this application?

- A. Voltage rating and insulation quality ✓
- B. Color code for identification
- C. Current carrying capacity alone
- D. Flexibility for ease of routing



Q19 Part B

What does the BIS code 2330 primarily indicate?

- A. It indicates a nickel steel with high nickel content** ✓
- B. It identifies a free cutting steel grade type
- C. It represents a plain carbon steel grade material
- D. It denotes a chromium steel used in engineering

Q20 Part B

Which type of substation would be strategically installed on a high-voltage transmission line to improve network reliability by isolating faults without changing voltage levels?

- A. Step-down transformer substation
- B. Switching substation** ✓
- C. Step-up transformer substation
- D. Traction substation

Q21 Part B

An industrial electrician uses an insulation resistance tester on a three-core cable. The measured resistance between core and earth is 900 megaohms. What does this value indicate about the cable's insulation condition?

- A. The cable is unsuitable for industrial environments due to low strength.
- B. The insulation is in good condition and safe for operation.** ✓
- C. The cable has severe moisture ingress and needs drying.
- D. The insulation has broken down and needs immediate replacement.

Q22 Part B

A three-phase synchronous motor is connected to an AC supply. If the field excitation is decreased below the value required for unity power factor operation, what is the expected effect on the motor power factor?

- A. The power factor becomes leading
- B. The power factor becomes lagging** ✓
- C. The power factor remains unity
- D. The motor power factor becomes zero

Q23 Part B

Which type of centrally monitored fire detection and alarm system is used in large commercial public buildings for fire safety?

- A. Conventional heat detector alarm system
- B. Standalone residential smoke detector units
- C. Manual fire alarm call point system only
- D. Addressable fire detection and alarm system** ✓

Q24 Part B

In a series DC circuit, what happens if one component fails or becomes open-circuit?

- A. Current bypasses the failed component
- B. The entire circuit stops working** ✓
- C. Current flows only through working components
- D. Current flows in reverse direction

Q25 Part B

An electrician is planning the wiring for a two-room house. Each room requires one ceiling light and two socket outlets. Which of the following wiring layouts provides the most efficient use of wire while maintaining safety?

- A. Using a single radial circuit for all loads
- B. Combining sockets and lights on one ring circuit
- C. Using a ring circuit for sockets and a radial circuit for lights** ✓
- D. Using two separate ring circuits for each room

Q26 Part B

What is the function of the charging controller in an AC charging system for electric vehicles?

- A. To control the speed of the electric vehicle
- B. To manage charging communication of vehicles** ✓
- C. To provide direct power to the vehicle's motor
- D. To select the type of charging cable used

Q27 Part B

A thread gauge is best suited for which of the following tasks in an ITI fitting shop?

- A. Cleaning the debris off a thread
- B. Checking the pitch of a thread** ✓
- C. Tightening the nut of a bolt
- D. Measuring the diameter of a rod



Q28 Part B

In a delta-connected three-phase system, what is the relationship between line voltage and phase voltage?

- A. Line voltage is zero
- B. Line voltage is twice phase voltage
- C. Line voltage equals phase voltage ✓
- D. Line voltage is less than phase voltage

Q29 Part B

Which device is commonly used as a source of electromotive force in a simple electric circuit?

- A. Electric battery ✓
- B. Fixed resistor
- C. Electric motor
- D. Incandescent lamp

Q30 Part B

Which safety feature in domestic appliances helps prevent electric shock by providing a path for leakage current to the ground?

- A. Neutral wire
- B. Fuse
- C. Insulation
- D. Earthing connection ✓

Q31 Part B

A DC shunt motor is running at full load. Which action will increase its speed beyond its rated value?

- A. Increasing armature resistance
- B. Increasing load on the motor
- C. Decreasing field winding current ✓
- D. Decreasing supply voltage

Q32 Part B

Why are external resistances connected to the rotor circuit of a slip ring induction motor during starting?

- A. To significantly increase the starting torque ✓
- B. To intentionally decrease the supply voltage
- C. To proportionally reduce the stator frequency
- D. To completely eliminate the iron core losses

Q33 Part B

Which of the following parameters must be tested according to quality standards before commissioning a solar power plant?

- A. Module cleaning schedule
- B. Insulation resistance measurement ✓
- C. Cable color coding
- D. Grid voltage setting

Q34 Part B

If the resistance of an earth electrode is measured to be 6 ohms, what should be done according to IEE regulations?

- A. Improve the earthing by adding more rods or pouring water ✓
- B. Increase the supply voltage to the circuit
- C. Use a thinner earth wire
- D. Leave the installation as it is

Q35 Part B

Solar cells are also known as the building blocks of which devices?

- A. Electrical wires
- B. Transformers
- C. Photovoltaic modules ✓
- D. Batteries

Q36 Part B

What is the purpose of the Cable Sheath Continuity Test in underground cables?

- A. To measure the cable insulation resistance
- B. To check the cable conductor resistance
- C. To determine the total cable length
- D. To check if the metallic sheath or armor is continuous ✓

Q37 Part B

Which symbol is used in engineering drawing to show a spot face?

- A. A plain rectangle with no center marks
- B. A circle with a horizontal line under it
- C. A plain circle with no internal marks ✓
- D. A small circle with an internal cross



Q38 Part B

A domestic MCCB is marked 25A, 6 kA, 230V AC. Which fault current will this MCCB safely interrupt?

- A. Any overload up to 25 A
- B. Any current at 230 V AC
- C. Any fault current up to 6,000 A ☒
- D. Any short-circuit above 25A

Q39 Part B

A voltmeter is connected across an open switch in a DC circuit. One side of the switch is connected to the supply voltage, while the other side is connected to the opposite terminal of the supply through a load. Assuming an ideal voltmeter and no current flow, what voltage will the meter read?

- A. The voltmeter will show a fluctuating value
- B. The voltmeter will read zero volts
- C. The voltmeter will read the full supply voltage ☒
- D. The voltmeter will read half the supply voltage

Q40 Part B

Choose the correct sequence of steps needed when calculating the inclination angle for a solar power plant installation.

- A. Set panel angle, determine latitude, account for seasonal changes, assess shading
- B. Determine latitude, assess shading, account for seasonal changes, set panel angle ☒
- C. Account for seasonal changes, set panel angle, assess shading, determine latitude
- D. Assess shading, set panel angle, determine latitude, account for seasonal changes

Q41 Part B

What role do designated storage areas play in factory safety and cleanliness?

- A. They reduce the need for routine cleaning activities
- B. They improve the speed of machine operations daily
- C. They help prevent clutter and maintain workplace order ☒
- D. They monitor employee tasks and work performance

Q42 Part B

A theater lighting designer must ensure that each part of the stage receives the same amount of illumination from overhead lights. If the distance between the lights and the stage is doubled, which action will maintain equal illumination across all areas, according to the laws of illumination?

- A. Use half the number of lights but keep the same intensity
- B. Increase the luminous intensity of each light source by a factor of four ☒
- C. Increase the angle of incidence of the lights
- D. Double the luminous intensity of each light source

Q43 Part B

What is a primary advantage of the Bureau of Indian Standards (BIS) codification system for steels?

- A. It provides information limited to historical steel records
- B. It relates steel grades to important material properties ☒
- C. It relies mainly on visual methods for steel identification
- D. It is accepted uniformly by every country worldwide

Q44 Part B

In an industrial wiring project, you must select an enclosure for outdoor use exposed to rain. Which IP code meets this requirement most appropriately?

- A. IP55 ☒
- B. IP20
- C. IP41
- D. IP30

Q45 Part B

While selecting an institute for training a licensed wireman, which factor should be prioritized to ensure eligibility for the wireman permit?

- A. Opting for the lowest tuition fee
- B. Selecting the institute closest to home
- C. Choosing the shortest training program available
- D. Selecting an accredited institute recognized by the government authority ☒



Q46 Part B

Why is it important to estimate the voltage drop when determining cable size in industrial installations?

- A. To select the insulation color
- B. To reduce installation cost only
- C. To determine maximum current rating
- D. To ensure equipment receives sufficient voltage ✓

Q47 Part B

Which wiring system is technically unsuitable for permanent commercial electrical installations due to its temporary mechanical support arrangement and low durability?

- A. Conduit wiring system
- B. Casing and capping wiring system
- C. Cleat wiring system ✓
- D. Trunking wiring system

Q48 Part B

In context to a cumulatively compounded DC generator, which one statement stated below defines the purpose of the series field winding?

- A. It reduces the mechanical friction of the rotor shaft during high-speed operation.
- B. It provides the initial residual magnetism required to start the voltage buildup process.
- C. It compensates for internal voltage drops by increasing the magnetic flux as the load current increases. ✓
- D. It converts the alternating current induced in the armature into direct current at the terminals.

Q49 Part B

While repairing overhead transmission lines, which type of wire joint is most suitable for joining two stranded conductors with high current carrying requirements?

- A. Britannia joint
- B. Knotted tap joint
- C. Western Union joint
- D. Married joint ✓

Q50 Part B

Which of the following scenarios demonstrates a real-life consequence of ignoring longitude effects in solar power plant design?

- A. Solar panels neglect weather monitoring input
- B. Solar panels are installed at incorrect latitude
- C. Solar panels use unsuitable materials for region
- D. Solar panels receive suboptimal sunlight due to misaligned tracking schedules ✓

Q51 Part B

In a Delta-star connected three-phase transformer, the phase shift between primary and secondary voltages is _____.

- A. 60°
- B. 30° ✓
- C. 0°
- D. 90°

Q52 Part B

A technician receives a residential electrical installation plan and must prepare a material and cost estimate for both lighting and heating circuits. Which process should be followed according to standard electrical estimation practice?

- A. Exclude minor accessories from the estimate to simplify cost calculation.
- B. Estimate costs using approximate quantities for commonly used materials only.
- C. Prepare separate material lists and calculate the total cost for each circuit individually. ✓
- D. Prepare a single combined material list and estimate the total cost together.

Q53 Part B

An industrial PLC control panel requires compliance with electromagnetic compatibility (EMC) standards. Which design change best enhances EMC performance?

- A. Installing metallic cable glands and proper grounding for all entry cables ✓
- B. Increasing the insulation grade of all panel cables
- C. Minimizing the variation in cable insulation color
- D. Using plastic cable glands for all wiring entries



Q54 Part B

Which part of a twist drill removes chips from the hole during drilling?

- A. The shank
- B. The flutes
- C. The point
- D. The web

Q55 Part B

If an ELCB in a domestic installation trips occasionally without any apparent fault, what could be a probable reason?

- A. Increase in total load beyond ELCB rating
- B. Phase and neutral lines are reversed
- C. Sudden voltage surges from the supply
- D. Small leakage currents from cumulative appliance insulation deterioration

Q56 Part B

Which of the following methods is used to detect an oil leak in an underground oil filled cable joint without excavation?

- A. Monitor pressure drop in the oil system
- B. Use a thermal imaging camera
- C. Visually inspect the joint enclosure
- D. Listen for unusual cable sounds

Q57 Part B

Why is hazard communication critical in construction environments?

- A. It allows workers to perform tasks without protective equipment
- B. It helps workers understand hazards and safety precautions
- C. It focuses mainly on reporting workplace accidents and incidents
- D. It removes all potential hazards from the construction site

Q58 Part B

Which component in a wiring diagram is specifically used to protect against overcurrent?

- A. Pushbutton symbol
- B. Fuse symbol
- C. Lamp symbol
- D. Relay symbol

Q59 Part B

Why is the control circuit typically wired separately from the power circuit in electrical schematic drawings?

- A. To combine power and control circuits
- B. To increase the current carrying capacity
- C. To facilitate easy maintenance and identification
- D. To reduce the cost of conductors

Q60 Part B

When an electric vehicle is connected to a charging station, which process ensures that only authorized users can access charging services securely and efficiently?

- A. Collecting charging-related data through EVSE-CMS
- B. Managing billing information through EVSE-CMS
- C. Grid monitoring through EVSE-CMS
- D. User authorization through EVSE-CMS

Q61 Part B

During the open circuit test, transformer core loss depends on _____.

- A. Winding resistance only
- B. Secondary load current
- C. Leakage reactance
- D. Maximum core flux density

Q62 Part B

While planning lighting for a machine assembly area, an engineer calculates the required number of luminaires. If the area is 60 square meters and the recommended illumination level is 300 lux, what is the total luminous flux required for the area?

- A. 12000 lumens
- B. 21000 lumens
- C. 9000 lumens
- D. 18000 lumens

Q63 Part B

Select the relay type that compares currents at two points to detect faults within a protected zone.

- A. Distance relay
- B. Differential relay
- C. Instantaneous overcurrent relay
- D. Inverse time overcurrent relay



Q64 Part B

If a universal motor runs smoothly at low speed but emits a high-pitched noise at high speed, what is the probable cause?

- ☒ A. Incorrect brush angle
- ☐ B. Loose lamination stack
- ☐ C. Open field winding
- ☐ D. Faulty centrifugal switch

Q65 Part B

Choose the correct sequence for erecting an overhead transmission line.

1. Foundation work
2. Tower erection
3. Conductor stringing
4. Insulator installation

- ☐ A. Foundation work, Conductor stringing, Tower erection, Insulator installation
- ☒ B. Foundation work, Tower erection, Insulator installation, Conductor stringing
- ☐ C. Tower erection, Foundation work, Conductor stringing, Insulator installation
- ☐ D. Insulator installation, Foundation work, Tower erection, Conductor stringing

Q66 Part B

Which statement best describes an isolating switch?

- ☐ A. It is an automatic electronic switch
- ☐ B. It is a programmable digital switch
- ☒ C. It is a manually operated mechanical switch
- ☐ D. It is a remote-controlled hydraulic switch

Q67 Part B

Which property of a resistor determines how much it opposes the flow of electric current in a DC circuit?

- ☐ A. Color code
- ☒ B. Resistance value
- ☐ C. Physical size
- ☐ D. Power rating

Q68 Part B

Which of the following equipment provides surge protection in substations?

- ☐ A. Main busbar
- ☒ B. Lightning arrester
- ☐ C. Overcurrent relay
- ☐ D. Line isolator

Q69 Part B

Which of the following is NOT a characteristic of a block diagram?

- ☐ A. It highlights the functional relationships between the main system components
- ☐ B. It displays the overall system functions without showing complex connection paths
- ☒ C. It includes the detailed internal construction details of individual components
- ☐ D. It utilizes simple geometric blocks to represent individual critical subsystems

Q70 Part B

If copper wire is replaced with aluminum wire in a joint, which electrical property is most significantly affected?

- ☒ A. Electrical resistance of the joint
- ☐ B. Magnetic susceptibility of the joint
- ☐ C. Magnetic permeability of the wire
- ☐ D. Insulation strength of the conductor

Q71 Part B

What does it mean when the galvanometer in a Wheatstone bridge shows zero deflection?

- ☐ A. The power supply is disconnected completely
- ☐ B. The bridge contains a short-circuited path
- ☐ C. Exactly three out of four resistances are identical
- ☒ D. The bridge has reached a balanced condition

Q72 Part B

Which generator type is least suitable for constant voltage applications?

- ☒ A. Series DC Generator
- ☐ B. Separately Excited DC Generator
- ☐ C. Compound DC Generator
- ☐ D. Shunt DC Generator



Q73 Part B

Which component in a lead acid cell is specifically made by repeated charging and discharging?

- A. Container
- B. Separators
- C. Electrolyte
- D. Plante plates



Q74 Part B

For fitting operations on thin sheet metal, which cutting tool offers the best control and precision?

- A. Standard hacksaw
- B. Hand snips
- C. Cold chisel
- D. Flat hand file



Q75 Part B

If the current in a coil lags the voltage by 60° , what is the circuit's power factor?

- A. 0.5 leading
- B. $\frac{\sqrt{3}}{2}$ leading
- C. $\frac{\sqrt{3}}{2}$ lagging
- D. 0.5 lagging



Part B

75 Questions · Answer Key

Q1 Part B

Which part of a Vacuum Circuit Breaker (VCB) helps to maintain insulation and protects the breaker from external environmental influences?

- A. Vacuum interrupter unit
- B. Trip coil assembly
- C. Insulating casing ☒
- D. Drive rod assembly

Q2 Part B

A circuit contains three resistors connected in series with resistances of $2\ \Omega$, $3\ \Omega$, and $5\ \Omega$ across a $20\ \text{V}$ DC power supply. According to Kirchhoff's Voltage Law, what is the voltage drop across the $3\ \Omega$ resistor?

- A. $6\ \text{V}$ ☒
- B. $8\ \text{V}$
- C. $2\ \text{V}$
- D. $10\ \text{V}$

Q3 Part B

If 5 workers, working at the same rate, complete a job in 12 days, how many days will 10 workers take to complete the same job?

- A. 6 days ☒
- B. 5 days
- C. 12 days
- D. 10 days

Q4 Part B

Why is it necessary to monitor isolation resistance in fuel cell electric vehicles?

- A. To improve the acceleration performance
- B. To increase the driving range of the vehicle
- C. To reduce the emission levels of the vehicle
- D. To prevent potential electric shock to users and maintenance personnel ☒

Q5 Part B

What should a Process Hazard Analysis methodology be based on?

- A. The production schedule and operating time requirements
- B. The size of the workforce involved in the process
- C. The complexity of the process and associated hazards ☒
- D. A random selection of hazards and process conditions

Q6 Part B

A control circuit uses a timer relay to switch ON a load after a set delay. If the load energizes immediately when the circuit is powered, what is most likely wrong?

- A. The timer relay is bypassed or its contacts are shorted ☒
- B. The load is faulty and not responding
- C. The control transformer is incorrectly rated
- D. The timer setting is longer than required

Q7 Part B

Which part of a wattmeter connects in parallel with the load to measure voltage?

- A. Fixed coil
- B. Current coil
- C. Potential coil ☒
- D. Shunt capacitor

Q8 Part B

A transformer is designed to operate with maximum efficiency near full-load conditions and is installed in a grid substation. It is classified as a/an:

- A. Isolation transformer
- B. Instrument transformer
- C. Distribution transformer
- D. Power transformer ☒



Q9 Part B

What will happen if the secondary winding of a current transformer remains open while the transformer is energized?

- A. It will ensure accurate current measurement by reducing the current at the secondary
- B. It will induce high voltage at secondary winding and cause equipment damage ✓
- C. It will prevent overheating of the conductors of the supply lines
- D. It will protect the power system from the short circuited faults

Q10 Part B

Why a cumulative compound DC motor is considered for heavy-duty machines with varying loads, such as rolling mills?

- A. It offers the fastest speed changes
- B. It always runs at maximum efficiency
- C. It prevents any speed drop under load
- D. It combines good starting torque and stable speed ✓

Q11 Part B

If 5 identical components weigh 20 kg, what is the weight of one component?

- A. 2 kg
- B. 5 kg
- C. 10 kg
- D. 4 kg ✓

Q12 Part B

What is the function of dilute sulfuric acid electrolyte in a lead-acid battery?

- A. Serves as the active material of the negative electrode plate
- B. Acts as the separator and prevents direct contact between the electrodes
- C. Functions as an insulator and prevents electrical conduction between the electrodes
- D. Acts as the electrolyte and allows ionic conduction between the electrodes ✓

Q13 Part B

Which geometric shape is most commonly used for title blocks and object outlines in engineering drawings?

- A. Pentagon
- B. Hexagon
- C. Rectangle ✓
- D. Triangle

Q14 Part B

Which component in a solar DC domestic system prevents overcharging of the battery?

- A. Charge controller ✓
- B. Solar panel
- C. Inverter
- D. Battery

Q15 Part B

Which safety measure should be followed when replacing a CFL or LED lamp connected to a DC power supply?

- A. Wear gloves while replacing the lamp
- B. Replace the lamp as quickly as possible
- C. Use a wet cloth to hold the lamp
- D. Turn off the power supply before handling the lamp ✓

Q16 Part B

Which standard grading is typically used for cables in a domestic three-phase supply system?

- A. Extra-high voltage cable insulation
- B. Grade III insulation cable
- C. Bare conductor without insulation
- D. Grade I insulation cable ✓

Q17 Part B

When drawing a complex assembly with hidden details, which instrument is crucial for accurately representing hidden lines?

- A. Protractor
- B. Scale
- C. Mini-drafter ✓
- D. Eraser



Q18 Part B

What is the effect on the synchronous speed of a three-phase induction motor when the supply frequency is increased while keeping the number of poles constant?

- A. The synchronous speed remains unchanged
- B. The synchronous speed decreases
- C. The synchronous speed reverses direction
- D. The synchronous speed increases ✓

Q19 Part B

Which type of wire is recommended for heavy current carrying in main distribution boards?

- A. Single core wire ✓
- B. Twin flexible wire
- C. Flexible wire
- D. Multi-strand bell wire

Q20 Part B

Which of the following describes the purpose of portable earthing during electrical maintenance?

- A. It provides a temporary path for fault current to flow safely to ground. ✓
- B. It prevents earth leakage from electrical panels.
- C. It is used to test insulation resistance of conductors.
- D. It disconnects equipment from the supply for repairs.

Q21 Part B

During precision assembly, which caliper type is least likely to introduce parallax error?

- A. Spring caliper with pointed measuring legs
- B. Transfer caliper for internal measurements
- C. Steel rule used with inside calipers
- D. Vernier caliper with clear scale markings ✓

Q22 Part B

A distributed winding is being designed for a stator core with 48 slots and 8 poles for a three-phase system. What will be the slots per pole per phase?

- A. 6
- B. 2 ✓
- C. 4
- D. 3

Q23 Part B

A theater manager is selecting lamps for stage lighting, aiming to minimize both heat generation and maintenance costs. Considering lamp disadvantages, which type of lamp should NOT be used to achieve these goals?

- A. LED lamp
- B. Halogen lamp
- C. Incandescent lamp ✓
- D. Fluorescent lamp

Q24 Part B

What is the purpose of using earth connection in electrical appliances?

- A. To improve the overall performance of appliances
- B. To decrease the electrical energy consumed daily
- C. To enhance safety against electric shock hazards ✓
- D. To reduce the manufacturing cost of appliances

Q25 Part B

A mercury tilt switch is mainly operated by _____.

- A. Magnetic force
- B. Gravity action ✓
- C. Temperature change
- D. Air pressure

Q26 Part B

A motor stator requires six coils to be wound using concentric winding. If the smallest coil has 10 turns, and each subsequent layer increases by 2 turns, how many turns will the largest coil have?

- A. 20 turns ✓
- B. 14 turns
- C. 16 turns
- D. 22 turns

Q27 Part B

A fan circuit's regulator has multiple resistance steps. What happens electrically when the knob is turned to a higher setting?

- A. Circuit resistance increases, decreasing fan current
- B. Circuit resistance decreases, increasing voltage at fan ✓
- C. Fan motor receives less voltage, slowing speed
- D. Fan is disconnected from supply temporarily



Q28 Part B

An industrial plant in a region with frequent electrical storms wants to protect both its equipment and personnel from electrical faults. Which approach addresses safety and equipment protection based on the distinction between grounding and earthing?

- A. Connecting all equipment directly to ground without separate grounding for electronics
- B. Connecting equipment frames to the earth to divert fault currents and using a separate grounding system for sensitive electronics ✓
- C. Isolating equipment from both ground and earth to avoid surges
- D. Using only grounding to protect personnel without earth connection for equipment

Q29 Part B

Which safety device is designed to detect cable electrical leakage and disconnect the circuit?

- A. Earth leakage circuit breaker ✓
- B. Relay
- C. Fuse
- D. Miniature circuit breaker

Q30 Part B

Which of the following is NOT a purpose of using dividers in fitting operations?

- A. Transferring distances from a rule
- B. Measuring the thickness of plates ✓
- C. Marking circles on a surface
- D. Dividing a line into equal parts

Q31 Part B

What is the purpose of a pre-molded joint in underground cables?

- A. To terminate the cable at equipment
- B. To regulate the cable voltage
- C. To securely connect two or more cables ✓
- D. To insulate the cable ends

Q32 Part B

Which function is performed by turning the selector switch on a digital multimeter?

- A. Adjusting display brightness
- B. Choosing measurement type ✓
- C. Resetting the instrument
- D. Storing readings

Q33 Part B

How many terminals are available for connection in a single-pole, two-way switch?

- A. Three terminals ✓
- B. Four terminals
- C. Five terminals
- D. Two terminals

Q34 Part B

Which type of cell can be recharged by passing electric current in the reverse direction?

- A. Dry cell
- B. Secondary cell ✓
- C. Primary cell
- D. Fuel cell

Q35 Part B

Which of the following steps helps prevent void formation during epoxy resin casting in underground cable joints?

- A. Slowly pour resin while tapping the joint body ✓
- B. Mix resin near the joint after sealing
- C. Pour resin quickly to finish before hardening
- D. Seal the joint body before pouring resin

Q36 Part B

An electrical panel needs connections that resist corrosion in a coastal environment. Which wire type is best suited?

- A. Aluminum wire
- B. PVC insulated copper wire
- C. Bare copper wire
- D. Tinned copper wire ✓



Q37 Part B

A panel has wires labeled with cable markers like 1A, 1B, 2A, 2B. What does this labeling system most likely indicate?

- A. The labels show only the wire size and insulation type.
- B. Each wire is paired according to circuit numbers and phase identifiers. ✓
- C. It indicates the manufacturer and batch number of the wire.
- D. It is a color code for distinguishing between wire colors.

Q38 Part B

An industrial workshop requires 300 lux of uniform illumination on workbenches. The area to be illuminated is 120 square meters. If the utilization factor is 0.7 and the maintenance factor is 0.8, what should be the total luminous flux provided by the lighting installation?

- A. 54000 lumens
- B. 42800 lumens
- C. 37500 lumens
- D. 64286 lumens ✓

Q39 Part B

Which component in the wind power generating station ensures that the wind turbine faces the wind direction for maximum efficiency?

- A. Tower
- B. Yaw mechanism ✓
- C. Brake system
- D. Gearbox

Q40 Part B

Which parameter must be regulated by a charge controller to prevent battery overcharging in a solar plant?

- A. Voltage applied to battery terminals ✓
- B. Tilt angle of the solar panel
- C. Solar irradiance level
- D. AC output frequency of inverter

Q41 Part B

Four resistors of $5\ \Omega$ each are connected in series. What is the equivalent resistance of the circuit?

- A. $20\ \Omega$ ✓
- B. $10\ \Omega$
- C. $5\ \Omega$
- D. $15\ \Omega$

Q42 Part B

A technician receives a mild shock when touching a faulty machine but does not lose consciousness. What is the most likely effect of the electric current in this scenario?

- A. Immediate cardiac arrest leading to complete unconsciousness
- B. Sudden respiratory paralysis resulting in a prolonged coma
- C. Widespread internal tissue destruction and severe skin burns
- D. Involuntary muscle contraction and a sharp tingling sensation ✓

Q43 Part B

Which symbol is commonly used in wiring diagrams to represent a single-pole switch?

- A. A continuous zigzag layout featuring multiple sharp alternating bends
- B. A plain rectangle layout featuring two horizontal internal detail lines
- C. A small circle layout featuring a centered dot and no attached lines
- D. A straight line layout featuring a center break and a diagonal lever ✓

Q44 Part B

Which part of a die ensures the alignment of the die with the workpiece during threading?

- A. The central hole
- B. The adjusting screw
- C. The lead-in chamfer ✓
- D. The split slot



Q45 Part B

In a control panel, why is it necessary to select a contactor with a higher making capacity than the running current of the connected load?

- A. To reduce the overall cost of the control panel
- B. To ensure the contactor has a higher voltage rating
- C. To withstand inrush currents during circuit switching ✓
- D. To provide overload protection for the main circuit

Q46 Part B

What best describes a short circuit in an electrical system?

- A. A connection with unusually high resistance
- B. A connection where no current flows due to a break
- C. An unintended path with zero or very low resistance ✓
- D. An intended path with normal resistance

Q47 Part B

Which factors determine the synchronous speed of the rotating magnetic field in a three-phase induction motor?

- A. Rotor resistance and load torque
- B. Stator voltage and power factor
- C. Supply frequency and number of poles ✓
- D. Rotor current and motor slip

Q48 Part B

A raceway is used in electrical and control panel installations. What is the primary purpose of using a raceway in wiring systems?

- A. To convert AC supply into DC supply for control circuits
- B. To carry and organize wires neatly between components ✓
- C. To reduce the resistance of conductors during operation
- D. To increase the voltage capacity of electrical wires

Q49 Part B

A rod of length 2 m is cut into $\frac{1}{4}$ m pieces. How many pieces are obtained?

- A. 10
- B. 6
- C. 8 ✓
- D. 4

Q50 Part B

According to Indian Electricity (IE) safety practices, what is the first mandatory action before performing maintenance on a commercial electrical wiring installation?

- A. Increase the supply voltage to check load condition
- B. Connect all exposed conductors together before inspection
- C. Tighten all terminal connections in the distribution board
- D. Isolate and switch OFF the main electrical supply ✓

Q51 Part B

Which type of commercial wiring system uses low-resistance copper conductors of suitable current-carrying capacity to distribute electrical power to lighting circuits and socket outlets?

- A. Communication wiring
- B. Power wiring ✓
- C. Entertainment wiring
- D. Control wiring

Q52 Part B

What is a critical step before distributing PPE to workers in a new manufacturing plant?

- A. Schedule regular inspections and maintenance of all PPE
- B. Purchase sufficient quantities of PPE for all workers
- C. Assess workplace hazards and select appropriate PPE ✓
- D. Provide orientation on workplace rules and procedures

Q53 Part B

What will be the impact on solar panel performance if a high-latitude installation uses the same tilt angle as an equatorial installation?

- A. Solar panels capture less sunlight in winter months ✓
- B. Solar panels overheat throughout the year
- C. Solar panels degrade rapidly in high temperatures
- D. Solar panels experience frequent wiring faults



Q54 Part B

What is the effect of using a conductor with insufficient current-carrying capacity in a low-voltage (LV) distribution system?

- A. It improves system efficiency by reducing conductor resistance
- B. It increases the transmission capacity of the feeder
- C. It causes overheating, voltage drop, and increased power losses ✓
- D. It maintains stable voltage regardless of load conditions

Q55 Part B

An industrial panel uses a cartridge fuse rated at 250V, 32A. If a technician replaces it with a 16A fuse of the same voltage rating, what is the likely outcome during normal operation at 28A?

- A. The fuse will blow even during normal load conditions. ✓
- B. The fuse will allow equipment to run at a higher current safely.
- C. The fuse will offer improved protection from overloads without any drawback.
- D. The fuse voltage rating will cause insulation breakdown in the circuit.

Q56 Part B

Which type of MCB tripping curve is most appropriate for protecting standard domestic lighting circuits?

- A. Type A MCB
- B. Type B MCB ✓
- C. Type D MCB
- D. Type C MCB

Q57 Part B

A technician is using the Murray loop test to locate a ground fault in a two-core cable. Which essential component must be connected to complete the test setup?

- A. A known resistance bridge circuit ✓
- B. A digital voltmeter
- C. A clamp meter or tong tester
- D. An earth leakage relay

Q58 Part B

A drawing specifies a hole with 12.00 +0.02/-0.00 mm. What is the minimum permissible diameter of the hole?

- A. 12.01 mm
- B. 12.00 mm ✓
- C. 12.02 mm
- D. 12.20 mm

Q59 Part B

Which factor is important when selecting a location for a distribution board in domestic wiring?

- A. Proximity to the load centre. ✓
- B. Brand of the distribution board.
- C. Type of wiring used.
- D. Number of rooms in the building.

Q60 Part B

If a lightly loaded DC shunt generator experiences a continuous increase in its external load, how will its efficiency behave?

- A. Efficiency will increase at a constant rate with load.
- B. Efficiency will remain constant at all load levels.
- C. Efficiency will decrease steadily as load increases.
- D. Efficiency will initially increase then decrease after a certain point. ✓

Q61 Part B

A house has a three-phase supply, but only single-phase loads are connected. How should the distribution board be configured?

- A. Install a single-phase distribution board
- B. Use only one phase for all circuits
- C. Connect all loads to a single phase busbar
- D. Distribute single-phase loads evenly across all three phases ✓

Q62 Part B

When testing a three-phase motor feeder, the insulation resistance readings between phase conductors are as follows: L1-L2: 60 MΩ, L2-L3: 58 MΩ, L1-L3: 61 MΩ. What does this indicate about the wiring?

- A. The feeder has an open circuit in one of the phases
- B. There is an inter-turn short circuit in the motor windings
- C. Immediate replacement of the cable is required
- D. The insulation between phase conductors is satisfactory ✓



Q63 Part B

During the short circuit test of a single-phase transformer, the wattmeter reading indicates which type of loss in a transformer?

A. Copper loss at rated-current operating condition ✓

B. Dielectric loss inside transformer insulation oil

C. Hysteresis loss under no-load operating condition

D. Core eddy current loss at rated magnetic flux

Q64 Part B

Which of the following best describes the primary function of control wiring in appliance circuits?

A. To provide direct power supply to appliances

B. To ground the electrical system for safety

C. To connect only protective devices

D. To transmit commands between control devices and lighting ✓

Q65 Part B

What is the power factor of a purely resistive AC circuit?

A. It is less than 1

B. It is equal to 0

C. It is greater than 1

D. It is equal to 1 ✓

Q66 Part B

A project manager is preparing a cost estimate for a new wiring installation. The estimate accounts for materials, labor, overhead, and profit. Which method best ensures the project stays financially secure if unexpected price increases or additional work occur?

A. Including an appropriate contingency allowance in the estimate ✓

B. Excluding the contingency from the estimate

C. Relying solely on historical cost data

D. Ignoring potential risks in the estimate

Q67 Part B

If a differential compound generator is used in variable load applications, what will be the effect on terminal voltage?

A. Terminal voltage remains unchanged with increasing load

B. Terminal voltage decreases with increase in load current ✓

C. Terminal voltage fluctuates randomly

D. Terminal voltage increases with increasing load

Q68 Part B

Which device is commonly used to measure voltage in a circuit with a digital display?

A. Digital voltmeter ✓

B. Digital ohmmeter

C. Digital ammeter

D. Digital wattmeter

Q69 Part B

In an electric vehicle, which approach ensures both physical and visual safety when accessing high voltage components during maintenance?

A. Marking high voltage areas with non-standard symbols

B. Using enclosures without any color coding

C. Applying only color coding without physical barriers

D. Using enclosures with electrical protection barriers and standardized high voltage color coding ✓

Q70 Part B

Which part of an electric iron controls the temperature by switching the current on or off?

A. Heating coil

B. Soleplate

C. Thermostat ✓

D. Indicator lamp

Q71 Part B

A technician needs to maximize the lifespan of a lead-acid battery used in a solar backup system. Which charging and discharging practice should they strictly avoid to prevent weakening of the battery's plate structure?

A. Charging the battery at a moderate rate over long periods

B. Discharging the battery under light loads

C. Maintaining the battery at constant voltage during use

D. Charging and discharging the battery rapidly ✓



Q72 Part B

Which of the following statements describes a difference between incandescent lamps and fluorescent lamps used in illumination?

- A. Incandescent lamps are mainly used for decorative lighting, while fluorescent lamps are only for commercial use.
- B. Incandescent lamps are always tube-shaped, while fluorescent lamps are always round-shaped.
- C. Incandescent lamps produce light by heating a filament, while fluorescent lamps use a gas discharge process. ✓
- D. Incandescent lamps are found only in table lamps, while fluorescent lamps are used only in ceiling fixtures.

Q73 Part B

Which action causes the failure of voltage buildup in a self-excited DC generator?

- A. Maintaining proper residual magnetism
- B. Connecting the load after voltage builds up
- C. Running the generator at rated speed
- D. Increasing the field resistance beyond the critical resistance ✓

Q74 Part B

Which of the following is an example of equipment that uses mercury cells?

- A. Kitchen ovens
- B. Televisions
- C. Ceiling fans
- D. Calculators ✓

Q75 Part B

For a pure sinusoidal AC voltage, the RMS value is obtained by multiplying the peak value by _____.

- A. 1
- B. $\sqrt{2}$
- C. $\frac{1}{\sqrt{2}}$ ✓
- D. $\frac{1}{2}$



Part B

75 Questions • Answer Key

Q1 Part B

For a sensor used to measure signals over a wide frequency range, which dynamic characteristic is most important for maintaining measurement accuracy?

- A. High output sensitivity over a narrow operating bandwidth
- B. Nearly uniform amplitude response across the required frequency range ✓
- C. Gradual attenuation near the upper frequency limit of operation
- D. Linear phase variation throughout the operating frequency range

Q2 Part B

When testing a differentiating module, what steady-state output is expected if a constant DC voltage is applied at the input?

- A. The output will oscillate rapidly
- B. There will be little to no output signal ✓
- C. It will produce a sinewave output signal
- D. It will amplify the input significantly

Q3 Part B

While preparing a fabrication drawing, a fitter needs to indicate a hidden edge on a 80 mm thick plate. According to BIS SP 46-2003, which line type should the fitter use to represent the hidden edge?

- A. Thick chain lines with alternately long and short dashes
- B. Continuous thick lines for visible outlines
- C. Short, evenly spaced dashed lines with equal-length dashes ✓
- D. Thin chain lines with longer dashes and dots

Q4 Part B

What feature within an electronic circuit simulation environment provides rapid access to standard resistors, capacitors, and transistors for schematic assembly?

- A. Output waveform analysis
- B. Library components ✓
- C. Custom schematic drawing
- D. Simulation speed

Q5 Part B

Which color is commonly used for 'Danger' safety signs in workplaces?

- A. Yellow
- B. Blue
- C. Red ✓
- D. Green

Q6 Part B

What steps need to be followed to correctly install a Direct to Home (DTH) system at a customer's residence?

- A. Only connect the set-top box to the TV
- B. Place the dish indoors and connect with any cable
- C. Mount the dish securely, align it towards the satellite, connect with cable and connect the set-top box to the TV ✓
- D. Install the dish at any angle without alignment

Q7 Part B

What happens to the output voltage amplitude of an LVDT when the core moves farther from the null position?

- A. It increases proportionally ✓
- B. It decreases gradually
- C. It changes randomly
- D. It remains constant

Q8 Part B

In circuit simulation software, after placing a 10 kΩ resistor from the component library, how can its value be changed to 15 kΩ?

- A. The resistor value is locked and a new unique custom library file must be written from scratch.
- B. The software automatically calculates and overwrites the library value based on mouse positioning.
- C. The technician must manually stitch multiple 10k-ohm models together in a complex network series.
- D. The properties menu of the placed library component can be opened to edit its nominal electrical value directly. ✓

Q9 Part B

In an RS latch built using NOR gates, what will be the output Q when S = 1 and R = 0?

- A. Q will always toggle
- B. Q will always remain unchanged
- C. Q = 1
- D. Q = 0

Q10 Part B

The circuit used for demodulating a standard AM signal at the receiver end is a/an _____

- A. Phase Discriminator
- B. Armstrong circuit
- C. Ratio detector
- D. Envelope detector

Q11 Part B

In an area prone to frequent power fluctuations, a technician should select a DTH set-top box featuring a built-in _____ to protect internal components against severe _____.

- A. Advanced remote control, configuration delays
- B. Antenna alignment tool, signal errors
- C. Power stabilizer, voltage fluctuations
- D. High-capacity hard drive, storage limits

Q12 Part B

During testing of a multiplexer module, the output occasionally remains in its previous logic state instead of following the newly selected input. Which test is most appropriate for locating the fault?

- A. Apply input pulses to all channels and observe output synchronization
- B. Check static output states for each selection input
- C. Inspect the module for visible signs of corrosion
- D. Increase the supply voltage and observe output

Q13 Part B

In the context of IF coils, what does the term 'Q factor' refer to?

- A. It indicates the maximum power rating of the coil
- B. It is the physical size of the coil
- C. It refers to the maximum current the coil can handle
- D. It indicates the selectivity and sharpness of resonance

Q14 Part B

Which meter is used to measure both active and reactive power for power factor billing applications?

- A. Dynamometer power factor meter
- B. Single-phase energy meter
- C. Induction wattmeter
- D. Trivector meter

Q15 Part B

A technician needs to design an op-amp based inverting amplifier with a gain of -10. If the input resistor is 2 k Ω , what value should the feedback resistor have?

- A. 2 k Ω
- B. 10 k Ω
- C. 20 k Ω
- D. 5 k Ω

Q16 Part B

Which unit is used to measure the electrical resistance?

- A. Ohm
- B. Ampere
- C. Volt
- D. Watt

Q17 Part B

What is the cladding in an optical fiber responsible for?

- A. It amplifies optical signals
- B. It prevents overheating
- C. It transmits electrical signals
- D. It confines light within the core

Q18 Part B

If a ramp input is applied to a differentiator op-amp, the output will be:

- A. Triangular wave
- B. Zero
- C. Square wave
- D. Constant



Q19 Part B

What is the phase difference between the input and output signals of a non-inverting op-amp configuration?

A. 0°



B. 90°

C. 45°

D. 180°

Q20 Part B

A fitter needs to remove excess metal from a workpiece after marking but before filing. Which tool is most suitable for this operation?

A. Screwdriver

B. File

C. Spanner

D. Chisel

**Q21 Part B**

If a voltage cut-off system fails in an SMPS, what is the most likely consequence for the connected load?

A. The load may be exposed to damaging overvoltage conditions



B. The system will automatically stabilize the output voltage

C. The load will operate at a constant voltage regardless of supply changes

D. The load efficiency will significantly increase

Q22 Part B

Why is the soldering iron tip filed before tinning?

A. To remove oxide scales from the surface



B. To increase the heat retention of the tip

C. To remove old solder from the tip

D. To shape the tip for fine work

Q23 Part B

Why is a DIAC unsuitable for use as a standard rectifier in a power supply circuit?

A. It has more than two terminals, complicating connections

B. It is designed for DC, not AC, applications

C. It is larger and more expensive than standard diodes

D. It conducts only after a specific breakover voltage is reached, not at all input voltages

**Q24 Part B**

If you want to verify the correct operation of a half adder circuit using a truth table, how many unique input combinations of A and B must you test to complete the table?

A. Eight input combinations

B. Three input combinations

C. Two input combinations

D. Four input combinations

**Q25 Part B**

Which DVR rear-panel interface is used to connect analog CCTV camera video cables for recording and playback?

A. BNC Input Ports



B. RJ-45 LAN Sockets

C. HDMI Output Ports

D. USB 3.0 Ports

Q26 Part B

Which connector type is threaded and crimped onto the coaxial cable for connection to the LNB and set-top box?

A. RS-232 connector

B. RJ-45 connector

C. F-type connector



D. RCA connector

Q27 Part B

When testing a power supply in an LED TV, why is it important to discharge capacitors before handling the board?

A. To confirm the cooling fan is operating

B. To verify all board traces are continuous

C. To reset static charge on the board

D. To prevent shock from stored voltage

**Q28 Part B**

Which effect is minimized by spacing the turns of an RF coil farther apart?

A. Skin effect

B. Parasitic capacitance



C. Coil resistance

D. Core losses



Q29 Part B

In an op-amp differentiator, what will be the output if a constant (DC) voltage is applied at the input?

- A. The output will oscillate
- B. The output will decrease linearly
- C. The output will increase linearly
- D. A short-duration impulse signal followed by zero output ✓

Q30 Part B

Which factor should be considered when selecting a soldering iron tip for a joint?

- A. The area of the tip face should be approximately equal to the area of the joint ✓
- B. The tip should be much larger than the joint area
- C. The tip should always be very sharp for all joints
- D. The tip should be flat for every joint

Q31 Part B

What is the primary function of an RGB connector when used with LCD or LED-backlit LCD TVs?

- A. To transmit separate red, green, and blue signals ✓
- B. To transmit digital audio signals
- C. To supply power to the TV
- D. To transmit combined analog video signals

Q32 Part B

According to a trigonometric table, what is the value of $\cos 60^\circ$?

- A. 1.000
- B. 0.707
- C. 0.500 ✓
- D. 0.866

Q33 Part B

In a stabilizer, which feature of a relay guarantees that it activates only when required?

- A. Physical size of the relay
- B. Set activation voltage level ✓
- C. Coil resistance value
- D. Contact material quality

Q34 Part B

In a simple envelope detector used for AM demodulation, what is the main role of the capacitor?

- A. To convert frequency to voltage
- B. To smooth out the rectified signal ✓
- C. To generate oscillations
- D. To amplify the signal

Q35 Part B

A worker in an ITI workshop notices an electrical fire starting from a faulty power tool. Which extinguisher should be used, and why?

- A. Use a carbon dioxide extinguisher because it is non-conductive and residue-free. ✓
- B. Use a water extinguisher because it cools burning materials safely.
- C. Use a foam extinguisher because it covers the burning surface.
- D. Use a wet chemical extinguisher because it suppresses cooking-oil fires.

Q36 Part B

In FM transmission, the Guard Band is used to

- A. Prevent interference between adjacent stations ✓
- B. Increase the signal strength
- C. Protect the antenna from lightning
- D. Cool the transmitter

Q37 Part B

Which block in the IC-555 diagram is responsible for changing the state of the output when the trigger or threshold voltage is crossed?

- A. SR flip-flop ✓
- B. Output buffer
- C. Discharge transistor
- D. Voltage divider



Q38 Part B

A classroom demonstration aims to show how an LED TV's IR receiver interprets remote-control commands. Which method best illustrates this function?

- A. Replace the remote batteries and note signal strength
- B. Move the remote closer and note stronger reception
- C. Send different IR command codes and note TV responses ☒
- D. Send identical IR commands and note repeated responses

Q39 Part B

While drilling through a thin metal sheet, the technician wants to reduce burr formation at the exit side. Which method is most effective?

- A. Support the sheet with a backing material ☒
- B. Stop drilling before breakthrough
- C. Use maximum feed pressure
- D. Increase drilling speed significantly

Q40 Part B

A student wants to minimize losses in the IF transformer circuit. Which design change should be avoided to ensure low losses?

- A. Minimizing stray capacitance between windings
- B. Shielding the transformer from external fields
- C. Using a ferrite core for the transformer
- D. Using thin wire for the coil windings ☒

Q41 Part B

In a DC circuit, to measure the _____, a multimeter (in DC mode) is connected in _____ with the load.

- A. current; parallel
- B. current; series ☒
- C. power factor; parallel
- D. voltage; series

Q42 Part B

During a layout job in the carpentry trade, an ITI student must set six equal points on a 150 mm line to prepare a drawing in the instrument box. Which instrument should be used?

- A. Inking pen used with the T-square for equal point marking
- B. Lengthening bar fitted to the large-size compass for stepping off the line
- C. Large-size divider adjusted step by step along the line ☒
- D. Small bow compass adjusted to the required spacing

Q43 Part B

In an optical fiber, total internal reflection occurs when the angle of incidence at the core-cladding interface is _____.

- A. Triple the critical angle
- B. Less than the critical angle
- C. Greater than the critical angle ☒
- D. Equal to the critical angle

Q44 Part B

What is the role of the infrared transmitter in a TV remote control?

- A. To display images on the screen
- B. To receive signals from the TV
- C. To convert light into electrical signals
- D. To send coded control signals to the TV ☒

Q45 Part B

Which combination of sensors is best suited for monitoring both the position of a robotic arm and detecting the presence of metallic objects on an assembly line?

- A. Ultrasonic sensor and thermocouple
- B. LVDT and capacitive sensor
- C. Potentiometer and inductive proximity sensor ☒
- D. Thermistor and photoelectric sensor



Q46 Part B

A 150-metre underground coaxial cable run carrying an HD-TVI video signal has completely failed. The technician needs to pinpoint the exact structural location of a clean break or crushing damage inside the conduit without digging up the run. Which tool is optimized for this task?

- A. Cable Continuity Beeper
- B. Analog Tone Generator and Probe
- C. Visual Fault Locator (VFL)
- D. Time Domain Reflectometer (TDR)**

Q47 Part B

A technician builds a circuit for $Y = A \cdot B$, but accidentally connects inputs A and B to an OR gate instead of an AND gate. What will happen?

- A. Output remains LOW at all times
- B. Output remains the same as intended
- C. Output becomes HIGH only when both inputs are LOW
- D. Output becomes HIGH when any one input becomes HIGH**

Q48 Part B

Rods of length 1.25 m and 0.875 m are available in a workshop. Which combination will give a total length of 3.375 m?

- A. Three rods of 1.25 m
- B. One rod each of 1.25 m and 0.875 m
- C. Four rods of 0.875 m
- D. Two rods of 1.25 m and one rod of 0.875 m**

Q49 Part B

Gas tubes are considered which type of electronic component?

- A. Active component
- B. Passive component**
- C. Insulating layer
- D. Electrolyte

Q50 Part B

Which of the following circuits is not a part of an AM receiver but is used in an FM receiver?

- A. Oscillator
- B. De-emphasis circuit**
- C. RF tuner
- D. Mixer

Q51 Part B

The input impedance of an ideal op-amp is _____ and the output impedance is _____.

- A. Zero, Infinite
- B. Infinite, Zero**
- C. Zero, Zero
- D. Infinite, Infinite

Q52 Part B

The output stage of a typical Op-amp is usually a:

- A. Common Emitter amplifier
- B. Class AB Push-pull amplifier**
- C. Differential amplifier
- D. Common Base amplifier

Q53 Part B

Which method correctly implements a two-input NAND gate using only NOR gates?

- A. Using cross-coupled NOR gates to form the required logic circuit
- B. Implementing an OR function using NOR gates and then inverting the output
- C. Implementing an AND function using NOR gates and then inverting the output**
- D. Applying a NOR operation directly to the input signals

Q54 Part B

What principle allows a 3D TV to create the perception of depth?

- A. Sending one image to both eyes
- B. Increasing screen brightness
- C. Displaying slightly different images to each eye**
- D. Reducing the display color range

Q55 Part B

What is the purpose of a voltage regulator module in an electronic circuit?

- A. To maintain a consistent output voltage despite input fluctuations**
- B. To supply a variable voltage to loads as needed during input variations
- C. To increase the current to a load automatically due to input variations
- D. To decrease resistance in the power supply line due to load variations

Q56 Part B

In a fabrication shop, a drawing instructor asks a trainee to draw a line parallel to a given inclined line through a point 20 mm away from it. Which of the following procedures should be used?

- A. Use only the T-square and draw a fresh inclined line
- B. Use a protractor to measure 20 mm from the line and mark the point
- C. Use a compass to transfer 20 mm and connect the points freely
- D. Use two set-squares, keep one fixed and slide the other to the required point ✓

Q57 Part B

What does UJT stand for in electronics?

- A. Universal Junction Transistor
- B. Unijunctional Transistor
- C. Unilateral Junction Transistor
- D. Unijunction Transistor ✓

Q58 Part B

Which of the following is a fundamental advantage of photoelectric proximity switches over inductive proximity switches?

- A. Higher resistance to dust and airborne contamination
- B. Ability to detect metallic as well as non-metallic objects ✓
- C. Immunity to optical interference and ambient light variations
- D. Ability to detect objects through electromagnetic induction

Q59 Part B

While checking connections on a digital trainer kit, a technician wants to prevent unwanted toggling at the output of a JK flip-flop. Which input combination should be avoided?

- A. $J = 0, K = 0$
- B. $J = 0, K = 1$
- C. $J = 1, K = 1$ ✓
- D. $J = 1, K = 0$

Q60 Part B

In an ITI workshop drawing test, a student must construct a circle divided into 12 equal parts without using set-squares. Which drawing instrument supports this work?

- A. Protractor used to mark equal angular divisions on the circle ✓
- B. T-square used to keep the circle center aligned with the board edge
- C. Divider used to transfer equal chord lengths around the circle
- D. Scale used to mark equal radii from the circle centre

Q61 Part B

While observing signals on a digital trainer kit, a technician notices that the output frequency becomes half of the clock frequency. Which flip-flop can perform this function?

- A. JK flip-flop ($J \neq K$ condition)
- B. JK flip-flop ($J = K = 0$)
- C. T flip-flop ✓
- D. SR flip-flop

Q62 Part B

An IR receiver in an LCD TV is malfunctioning and randomly triggers commands without a remote present. What is the cause?

- A. Loose speaker wires causing signal feedback
- B. Ambient infrared noise interfering with the IR receiver circuit ✓
- C. Faulty TV backlight inverter causing display flickering
- D. Damaged TV display panel affecting image output

Q63 Part B

A user wants to design a sequential circuit in which the output toggles on each clock pulse when both inputs are active. Which flip flop should be used?

- A. JK flip flop ✓
- B. RS flip flop using NAND gate
- C. RS flip flop using NOR gate
- D. D flip flop



Q64 Part B

Consider the following statements regarding inverter and UPS and select the correct option.

Statement 1: An inverter provides backup power during a power outage.

Statement 2: A UPS switches to battery power without any delay when main power fails.

- A. Both statements are correct
- B. Both statements are incorrect
- C. Only statement 1 is correct ✓
- D. Only statement 2 is correct

Q65 Part B

When securing an ATM kiosk, which camera placement helps identify potential fraudsters while protecting customers' PIN-entry privacy?

- A. A camera placed low on the floor pointing upward to capture the shoes of the person using the machine.
- B. A hidden pinhole camera embedded inside the ATM fascia at eye-level or a CCTV angled directly at the user's face. ✓
- C. A wide-angle camera mounted directly overhead to monitor the user's keystrokes on the PIN pad.
- D. A long-range camera positioned across the street to capture the license plates of all arriving customers.

Q66 Part B

When the temperature of an intrinsic semiconductor increases, what happens to its resistance?

- A. It remains constant
- B. It increases sharply
- C. It becomes infinite
- D. It decreases ✓

Q67 Part B

An optical fiber link has attenuation of 0.2 dB/km. What is the total loss over a 5 km fiber length?

- A. 2 dB
- B. 5 dB
- C. 1 dB ✓
- D. 7 dB

Q68 Part B

In a right-angled triangle, the Pythagoras theorem is mainly used to determine:

- A. The perimeter of the triangle
- B. The length of the third side ✓
- C. The area of the triangle
- D. The measure of an angle

Q69 Part B

In a moving coil instrument, the coil is wound on a lightweight aluminum bobbin to provide _____ damping, while a permanent magnet with a central cylindrical _____ produces a uniform radial magnetic field.

- A. eddy current; permanent magnet
- B. eddy current; soft iron core ✓
- C. fluid friction; copper core
- D. pneumatic; air core

Q70 Part B

An industrial facility requires continuous power for critical machines. If the main supply fails, the system must instantly switch to backup without any interruption. Which configuration is most suitable for this scenario?

- A. Standard inverter
- B. Off line UPS
- C. Line interactive UPS
- D. On line UPS ✓

Q71 Part B

Which of the following sets contains a property that is undesirable for insulating materials?

- A. High dielectric strength, flexibility, mechanical strength
- B. Mechanical strength, flexibility, hygroscopic nature ✓
- C. High dielectric strength, non-hygroscopic nature, mechanical strength
- D. Non-hygroscopic nature, high dielectric strength, flexibility



Q72 Part B

If a liquid spill is discovered on the workshop floor, what is the best immediate action to prevent injury?

A. Clean the spill and place a warning sign



B. Cover the spill with paper towels only

C. Leave the spill for cleaning staff

D. Ignore the spill and continue working

Q73 Part B

Which terminal in a phototube is responsible for emitting electrons when exposed to light?

A. Grid

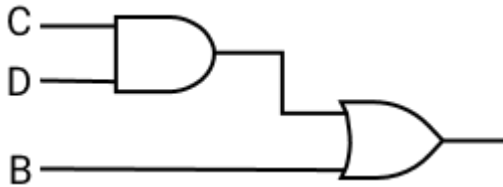
B. Anode

C. Filament

D. Cathode

**Q74** Part B

The output expression of the given logic circuit is _____.



A. $B(C + D)$

B. $B + C + D$

C. BCD

D. $B + CD$

**Q75** Part B

Suppose you are tasked with implementing the Boolean equation $Y = \overline{(A.B)}$ in a workshop. Which combination of basic logic gates would you use to construct this equation?

A. AND gate followed by NOT gate



B. OR gate only

C. OR gate followed by NOT gate

D. NOT gate only



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Part B

75 Questions • Answer Key

Q1 Part B

A technician wants to build an OR gate function using only NAND gates during a lab exercise. Which arrangement should be used to achieve this?

- A. Cascade three NAND gates in series without inverting the inputs
- B. Feed both inputs directly to a single NAND gate
- C. Connect two NAND gates to form inverters on each input, then connect their outputs to a third NAND gate ✓
- D. Arrange the NAND gates in a ring without using inverters

Q2 Part B

In an AM receiver, which block selects the desired station or desired radio frequency?

- A. Tuner ✓
- B. Power Supply
- C. Audio Amplifier
- D. Speaker

Q3 Part B

In a semiconductor material, the valence electrons are _____ compared to in an insulator.

- A. freely moving
- B. less tightly bound ✓
- C. not present
- D. tightly bound

Q4 Part B

Which of the following is NOT a stage in an op-amp?

- A. Power transformer ✓
- B. Level shifter
- C. Differential amplifier
- D. Output stage

Q5 Part B

Before running a circuit simulation, which component must be added to establish the 0 V reference node for nodal analysis?

- A. Operational Amplifier Terminal
- B. Ideal Ground Symbol (GND) ✓
- C. AC Voltage Source
- D. Virtual Multimeter Probe

Q6 Part B

A NOT gate is connected between a door sensor and a buzzer. The buzzer sounds when the door is closed instead of when it is open. What is the reason?

- A. NOT gate inverted sensor output logic ✓
- B. Supply voltage increased
- C. Sensor polarity reversed
- D. Buzzer resistance changed

Q7 Part B

How many minimum 2-input NAND gates are required to implement a 2-input OR gate?

- A. Two NAND gates
- B. Five NAND gates
- C. Four NAND gates
- D. Three NAND gates ✓

Q8 Part B

Why is a flux required in the process of soldering copper conductors?

- A. To increase the strength of the alloy
- B. To reduce the melting point of the solder
- C. To prevent mechanical failure of the joint
- D. To protect against de-oxidisation during soldering ✓



Q9 Part B

A trainee connects multiple JK flip-flops in cascade, with each flip-flop configured in toggle mode ($J = K = 1$). Only the first flip-flop gets the clock signal. Other flip-flop clock inputs are driven by previous flip-flop Q outputs. What practical function does this arrangement perform in the circuit?

- A. It increases the amplitude of the input clock signal at each stage
- B. It stabilizes the supply voltage across the circuit components
- C. It counts the number of clock pulses by acting as a ripple counter ✓
- D. It removes noise from the input clock signal to produce a clean waveform

Q10 Part B

In a packaging line, which situation best illustrates the use of an inductive proximity switch?

- A. Measuring package weight during conveyor movement
- B. Detecting the position of plastic bottle caps on a filling line
- C. Detecting the presence of metal seals before bottle capping ✓
- D. Reading printed barcode labels during packaging operations

Q11 Part B

Which specific microwave frequency band, operating between 2 to 4 GHz, is internationally allocated for airport surveillance radar, weather monitoring, and mobile satellite services due to its balance of moderate bandwidth and low weather attenuation?

- A. Q-band
- B. Ka-band
- C. X-band
- D. S-band ✓

Q12 Part B

What function does the grid perform in a triode vacuum tube?

- A. It provides electrical insulation
- B. It collects electrons for output
- C. It controls the flow of electrons between cathode and anode ✓
- D. It emits electrons for conduction

Q13 Part B

Which electronic component is used in digital circuits to store a single bit of data?

- A. Multiplexer
- B. Flip-flop ✓
- C. De-Multiplexer
- D. Decoder

Q14 Part B

While drawing an irregular machine profile in engineering drawing, which instrument is most suitable for joining multiple non-circular points smoothly?

- A. French curve ✓
- B. Compass
- C. Divider
- D. Protractor

Q15 Part B

Which property of liquid crystals allows them to control light passage in an LCD display?

- A. They absorb all incoming light
- B. They emit light when current passes through
- C. They generate static electricity under pressure
- D. Their molecules can change orientation when an electric field is applied ✓

Q16 Part B

Why is argon commonly used as the gas in gas-filled tubes intended for triggering and switching?

- A. It has a low ionization potential and provides stable operation ✓
- B. Its atomic weight enhances amplification
- C. Its high thermal conductivity helps dissipate heat
- D. It glows brightly under all conditions

Q17 Part B

An AND gate has two inputs, A and B, and one output Y. If $A = 1$, and B is given the input signal which continuously alternates between 0 and 1. How will Y behave?

- A. Y will always remain 1.
- B. Y will always follow signal connected at B. ✓
- C. Y will always remain undefined.
- D. Y will always remain 0.



Q18 Part B

Which statement correctly describes the output DC voltage polarity of an LVDT during core movement?

- A. DC voltage becomes positive in one direction from the center and negative in the opposite direction.** ✓
- B. DC voltage polarity remains unchanged for movement in either direction from the center.
- C. DC voltage remains negative for movement in both directions from the center.
- D. DC voltage remains positive for movement in both directions from the center.

Q19 Part B

The dissipation factor (DF) of a ceramic capacitor is a measure of its:

- A. Breakdown voltage only
- B. Maximum voltage rating
- C. Energy loss in the dielectric** ✓
- D. Physical dimensions

Q20 Part B

Which of the following materials is used to manufacture the core of an optical fiber?

- A. Bakelite resin
- B. Silica glass** ✓
- C. Mild steel
- D. Aluminum alloy

Q21 Part B

A technical drawing specifies a point labeled as the 'intersection of two perpendicular bisectors' in a triangle. What is this point called in geometrical nomenclature?

- A. Orthocenter
- B. Circumcenter** ✓
- C. Centroid
- D. Incenter

Q22 Part B

A zero crossing detector using an operational amplifier is basically a/an:

- A. Oscillator
- B. Differentiator
- C. Comparator** ✓
- D. Integrator

Q23 Part B

What is the characteristic equation for NOR based SR flip flop in terms of its current state (Q), Set input (S), and Reset input (R)?

- A. $Q(\text{next}) = S + Q(\text{current})R$** ✓
- B. $Q(\text{next}) = Q(\text{current}) + S + R$
- C. $Q(\text{next}) = S + RQ(\text{current})$
- D. $Q(\text{next}) = S + R$

Q24 Part B

If 6 meters of wire cost ₹180, what will be the cost of 9 meters of wire at the same rate?

- A. 120 rupees
- B. 270 rupees** ✓
- C. 150 rupees
- D. 210 rupees

Q25 Part B

A room heater is rated at 1500 W and operates for 2 hours. How much electrical energy does it consume (in kWh)?

- A. 0.75 kWh
- B. 3 kWh** ✓
- C. 3000 kWh
- D. 1.5 kWh

Q26 Part B

Which feature distinguishes a smart TV from a non-smart LED-backlit LCD TV?

- A. A non-smart TV always has better picture quality
- B. A smart TV has no built-in apps ever
- C. A smart TV can connect to the internet for streaming** ✓
- D. A smart TV never uses LED technology

Q27 Part B

Why does an installer typically create a downward drip loop in the coaxial cable just before it enters the hole in the building's outer wall during a DTH system installation?

- A. To leave spare cable for future TV relocation.
- B. To reduce RF resistance and signal impedance.
- C. To filter interference from nearby cellular towers.
- D. To prevent rainwater from entering through the cable path.** ✓



Q28 Part B

What primary role does positive feedback play in an oscillator module's operation?

- A. It ensures sustained oscillations by reinforcing the signal** ✓
- B. It increases the gain linearly
- C. It reduces noise in the circuit
- D. It stabilizes current flow

Q29 Part B

Which method involves dipping multiple components at once into a bath of molten solder for efficient production?

- A. Trigger-operated soldering gun
- B. Resistance soldering unit
- C. Dip soldering machine** ✓
- D. Pencil-type soldering iron

Q30 Part B

An engineer seeking to measure both AC and DC using a moving iron instrument would generally prefer the _____ moving iron meter over the _____ because of its better operating characteristics and wider practical use.

- A. repulsion type, attraction type** ✓
- B. attraction type, repulsion type
- C. attraction type, PMMC type
- D. repulsion type, hot-wire type

Q31 Part B

If a constant DC voltage is given to the input of an integrator using OP-AMP, the output will be a:

- A. Sine wave
- B. Ramp wave** ✓
- C. Pulse wave
- D. Square wave

Q32 Part B

In a full-wave rectifier circuit, what happens to the output waveform if one rectifier diode becomes open-circuited?

- A. Output remains constant DC
- B. Output frequency doubles
- C. Output becomes similar to half-wave rectification** ✓
- D. Output changes to pure AC

Q33 Part B

How is Direct-to-Home (DTH) satellite communication better than traditional cable television systems?

- A. No receiving equipment required
- B. Operates without antenna transponders
- C. Lower picture quality than cable
- D. Access in remote areas without cable infrastructure** ✓

Q34 Part B

To safely measure the resistance of a component using a multimeter, a technician must first _____ the circuit's power supply and then connect the meter probes in _____ across the component.

- A. turn off; parallel** ✓
- B. turn on; parallel
- C. turn on; series
- D. turn off; series

Q35 Part B

During a presentation, the projected image is out of focus and appears blurry. Which front panel control allows the user to resolve this issue most directly?

- A. Keystone correction button
- B. Focus ring** ✓
- C. Power button
- D. Zoom lever

Q36 Part B

A fitter has cut a metal workpiece oversize and needs to remove excess material quickly before final finishing. Which type of file should be selected first?

- A. Single cut file
- B. Rasp cut file
- C. Bastard cut file** ✓
- D. Smooth cut file

Q37 Part B

What should be worn to minimize the risk of electric shock while handling electrical wires?

- A. Leather gloves
- B. Insulated gloves** ✓
- C. Cotton gloves
- D. Safety goggles



Q38 Part B

In circuit simulation software, under which component library category are devices such as bipolar junction transistors and operational amplifiers typically found?

- A. Passive Devices / Linear Elements
- B. Power Distribution Grids / Ground Rails
- C. Active Components / Semiconductor Group ✓
- D. Connector Hardware / Enclosures

Q39 Part B

In a classroom demonstration, students observe that removing their 3D glasses makes the TV image appear blurry or doubled. Based on your understanding of 3D TV operation, what is the primary reason for this visual effect?

- A. Each eye receives overlapping images intended for 3D separation ✓
- B. The screen's backlight technology is incompatible with 2D viewing
- C. The TV refreshes images too quickly for the naked eye
- D. The TV displays a lower resolution image without glasses

Q40 Part B

Why should optical fiber waste be disposed of in a separate, marked container?

- A. To improve signal quality
- B. To prevent injuries from sharp glass pieces ✓
- C. To speed up fiber installation
- D. To reduce installation costs

Q41 Part B

While drawing a production sketch, a student needs to set a 60-degree line and also keep the straightedge direction unchanged during sliding. Which of the following drafting machine features provides both conditions simultaneously?

- A. Fixed blade holder with bevelled working edge
- B. Removable scale strip with centre mark
- C. Adjustable protractor head with parallel blades ✓
- D. Parallel arm bar with board margin line

Q42 Part B

Identify the number that is not a perfect square.

- A. 36
- B. 25
- C. 16
- D. 20 ✓

Q43 Part B

What is the correct sequence for operating a portable fire extinguisher in case of a small fire?

- A. Pull → Squeeze → Sweep → Aim
- B. Squeeze → Aim → Pull → Sweep
- C. Aim → Pull → Sweep → Squeeze
- D. Pull → Aim → Squeeze → Sweep ✓

Q44 Part B

A thermocouple is used in a process where rapid temperature fluctuations occur. Which approach gives the most accurate readings under these conditions?

- A. Reduce junction thermal mass and use thin thermocouple wires ✓
- B. Add thermal insulation around the junction for stable output
- C. Use a high thermal capacity reference junction for smooth readings
- D. Increase junction mass and use thicker wires for stable operation

Q45 Part B

Which optical fiber property best maintains signal strength and data integrity for high-speed, extended-reach networks?

- A. Low attenuation ✓
- B. High scattering loss
- C. Large core diameter
- D. Lightweight

Q46 Part B

During UPS installation, why is it necessary to isolate critical and non-critical loads on separate output circuits?

- A. To extend the overall battery life during routine operation
- B. To prioritize backup power for essential equipment during an outage ✓
- C. To reduce total installation time for the UPS system
- D. To increase the speed of battery charging under high load

Q47 Part B

Why are coupling capacitors used in amplifier modules?

- A. To increase bandwidth
- B. To reduce circuit noise
- C. To amplify the input signal
- D. To block DC and allow AC signals to pass ✓



Q48 Part B

Which phenomenon causes a thermocouple to generate voltage when two different metals are kept at different temperatures?

- A. Hall effect
- B. Peltier effect
- C. Seebeck effect ✓
- D. Thomson effect

Q49 Part B

What does LED stand for in electronic devices?

- A. Light Emitting Diode ✓
- B. Light Electronic Display
- C. Laser Emitting Device
- D. Low Energy Display

Q50 Part B

You are modifying a standard TV remote to add keypad backlighting. Which part would most likely need electrical modification?

- A. Battery compartment to fit more cells
- B. IR LED to increase transmission brightness
- C. Main PCB to add LED drive circuitry ✓
- D. Rubber keypad to increase thickness

Q51 Part B

A workshop employs skilled and unskilled workers in the ratio of 5 : 2. If the total workforce is 49, how many skilled workers are employed?

- A. 14
- B. 21
- C. 28
- D. 35 ✓

Q52 Part B

A biomedical device uses an inverting amplifier to process ECG signals. Which issue can arise if the op-amp's slew rate is too low?

- A. Greater power consumption
- B. Distorted output during rapid signal changes ✓
- C. Higher amplifier gain
- D. Increased input noise

Q53 Part B

A designer needs a capacitor for coupling AC signals between the amplifier stages while blocking DC. Why might an electrolytic capacitor be a poor choice if the circuit sometimes reverses polarity?

- A. Electrolytic capacitors are more expensive than alternatives
- B. Electrolytic capacitors have high leakage current
- C. Electrolytic capacitors are too large for most circuits
- D. Electrolytic capacitors are damaged by reversed polarity ✓

Q54 Part B

During testing of a 2-input logic gate built only with 2-input NAND gates, a technician observes that the output is HIGH only when both inputs are LOW. Which gate has been successfully implemented?

- A. 2-input OR gate
- B. 2-input AND gate
- C. 2-input NOR gate ✓
- D. 2-input EX-OR gate

Q55 Part B

Which of the following is used to perform logical negation in digital electronics?

- A. NOT gate ✓
- B. EX-OR gate
- C. OR gate
- D. AND gate

Q56 Part B

Where is the input signal applied in a non-inverting op-amp configuration?

- A. To the ground terminal
- B. To the non-inverting (+) terminal ✓
- C. To the inverting (-) terminal
- D. To both terminals (non-inverting terminal (+) and inverting terminal (-)) simultaneously



Q57 Part B

In a 555 astable multivibrator, if $R_1 = R_2 = R$ and $C = C$, the time period is:

Symbols:

T = Time period of output waveform

R = Common resistance value

R_1 = Resistor between V_{CC} and discharge pin

R_2 = Resistor between discharge pin and capacitor

C = Timing capacitor

A. 0.693 RC

B. 2.079 RC

C. RC

D. 1.386 RC

Q58 Part B

How can you ensure the clearest speech in a large, noisy hall?

A. Use of a speaker with maximum bass volume

B. Use of speakers placed outside the hall

C. Use of many ceiling speakers placed uniformly

D. Use of only one giant, loud speaker placed in the corner

Q59 Part B

When does an offline UPS supply power to connected equipment?

A. At all times

B. Only during normal voltage supply

C. Only during peak hours

D. Only during main supply failure

Q60 Part B

An engineer is installing a hybrid DVR and needs to connect a legacy analog camera, a 4K monitor, and a network router. Which combination of rear-panel connectors is required to connect these devices?

A. RJ-45 socket, HDMI port, and BNC connectors

B. USB port, DisplayPort, and F-type connectors

C. SATA interface, DVI port, and S-Video sockets

D. RS-485 terminal, VGA port, and RCA sockets

Q61 Part B

In a Switched Mode Power Supply (SMPS), what is the main advantage over a manual voltage stabilizer?

A. Higher efficiency and compact size

B. Lower output current ripple always

C. Handles extreme overvoltage better

D. Always less expensive

Q62 Part B

If a resistor has a green, blue, and orange color code, what is its resistance value?

A. 5,600 ohms

B. 560 ohms

C. 56,000 ohms

D. 560,000 ohms

Q63 Part B

What does LED stand for in LED TV?

A. Liquid Emitting Display

B. Light Emitting Diode

C. Linear Emission Device

D. Light Enhanced Display

Q64 Part B

Which of the following is the most suitable location for installing a CCTV camera to provide the best security coverage in a building?

A. In the garbage storage area for the building

B. Only in the parking lots

C. Only on the terrace

D. At the main entrance of the building

Q65 Part B

A fitter needs to cut a thin metal strip using a hacksaw. Which blade should be selected to prevent the teeth from snagging or breaking during cutting?

A. Blade with alternate-set teeth only

B. Blade with widely spaced teeth

C. Blade with fine teeth

D. Blade with coarse teeth



Q66 Part B

What is the primary purpose of testing a voltage regulator module in electronic circuits?

- A. To verify that the output voltage remains stable under varying loads ☒
- B. To measure the input voltage to the module under no load
- C. To determine the heat generated by the module during operation
- D. To check the physical size of the module for enclosure fitting

Q67 Part B

A trainee preparing a workshop drawing writes the sizes of a drilled hole on the view, while the supervisor asks for the line definition used for this purpose. Which option gives the correct definition?

- A. A line that shows axes, centres, and symmetry of the object
- B. A line that shows hidden edges and internal surfaces of the object
- C. A line that shows visible edges and surface boundaries of the object
- D. A line that shows measurements, limits, and size values of the object ☒

Q68 Part B

In a Cathode Ray Tube (CRT), the component responsible for generating and accelerating the electron beam is the _____, while the component that deflects the beam to produce patterns on the screen is the _____.

- A. deflection plates, phosphor screen
- B. deflection plates, electron gun
- C. electron gun, deflection plates ☒
- D. phosphor screen, deflection plates

Q69 Part B

Which of the following is NOT a correct feature of a Hybrid DVR (HVR)?

- A. It serves as a transitional system when upgrading an older CCTV setup.
- B. It allows users to view both analog and IP camera feeds on a single screen.
- C. It automatically converts legacy analog cameras into wireless IP cameras. ☒
- D. It can accept video feeds from both coaxial and Ethernet cables.

Q70 Part B

What is the role of polarized glasses in passive 3D TV viewing?

- A. They increase overall brightness of the display
- B. They synchronize the TV's frame rate with human eyes
- C. They filter images so each eye sees only its intended image ☒
- D. They enhance the color saturation of images

Q71 Part B

A school plans to protect its new SMPS-powered lab from voltage instability using a manual voltage stabilizer. What operational challenge may arise during non-working hours?

- A. Manual stabilizer automatically switches to automatic mode after hours
- B. Manual stabilizer only draws power during night hours
- C. No one will be available to adjust voltage if supply fluctuates ☒
- D. Manual stabilizer efficiency improves during non-working periods

Q72 Part B

Two identical machines are used in a workshop. Machine A receives regular inspection and servicing, while Machine B is repaired only after a fault occurs. After one year, Machine A experiences fewer breakdowns and lower repair costs. Which statement best explains this difference?

- A. Machine B reduced servicing costs through breakdown maintenance
- B. Machine A followed a preventive maintenance approach ☒
- C. Machine A required more emergency repairs
- D. Machine B received more effective maintenance

Q73 Part B

The Amplitude control on the front panel of a signal generator adjusts the _____.

- A. Peak-to-peak voltage of the output signal ☒
- B. Number of cycles per second
- C. Output impedance
- D. Type of waveform



Q74 Part B

A manufacturer receives complaints about uneven brightness in their LCD screens when viewed from different angles. Which design factor should be addressed to correct this problem?

- A. Select enhanced driver ICs
- B. Employ thicker glass substrates
- C. Increase pixel refresh rate
- D. Use advanced alignment layers for liquid crystals ✓

Q75 Part B

Why is it important to keep RF coils away from ferromagnetic materials during assembly?

- A. Ferromagnetic materials reduce resistance
- B. Ferromagnetic materials shield the coil from noise
- C. Ferromagnetic materials help cool the coil
- D. Ferromagnetic materials can distort the magnetic field and change coil performance ✓



Part B

75 Questions • Answer Key

Q1 Part B

During nameplate installation after the Impregnation, Balancing, and Final Assembly stage of an electrical machine, which sequence follows the correct standard industrial installation procedure?

- A. Position the nameplate, secure fasteners, clean the mounting surface, mark drilling locations, and drill mounting holes
- B. Drill mounting holes, mark drilling locations, clean the mounting surface, position the nameplate, and secure the nameplate using fasteners
- C. Clean the mounting surface, position the nameplate, mark drilling locations, drill mounting holes, and secure the nameplate using fasteners ✓
- D. Mark drilling locations, position the nameplate, clean the mounting surface, drill mounting holes, and secure the nameplate using fasteners

Q2 Part B

Direct material cost is ₹22,000 and direct labor cost is ₹8000. If factory overhead is charged at 25% of direct labor cost, find the factory cost.

- A. ₹30,000
- B. ₹32,000 ✓
- C. ₹31,000
- D. ₹33,000

Q3 Part B

Which process step is performed first during the vacuum pressure impregnation process of electrical machine windings?

- A. Creating a vacuum inside the impregnation chamber containing the windings ✓
- B. Baking the impregnated winding assembly for curing
- C. Filling the impregnation chamber with insulating resin
- D. Applying positive pressure inside the impregnation chamber

Q4 Part B

During the winding design calculation of a 3-phase AC motor, how many stator coil groups are required for a motor having 6 poles?

- A. 18 ✓
- B. 6
- C. 3
- D. 9

Q5 Part B

What is the mathematical term for equality between two ratios?

- A. Fraction
- B. Expression
- C. Proportion ✓
- D. Percentage

Q6 Part B

A DC machine has 8 poles and 128 conductors. If the winding is short-pitched by 2 conductors, what is the coil span?

- A. 14 Conductors ✓
- B. 18 Conductors
- C. 20 Conductors
- D. 16 Conductors

Q7 Part B

What is the primary objective of conducting an on-load operational test during the Impregnation, Balancing, and Final Assembly process of a rotating electrical machine?

- A. Measure insulation resistance of winding insulation before equipment energization
- B. Evaluate equipment performance under rated electrical and mechanical operating conditions ✓
- C. Verify dimensional alignment and fastening of assembled mechanical components
- D. Confirm removal of surface contaminants from assembled equipment



Q8 Part B

Why should the face of a claw hammer be kept smooth and clean?

- ☒ A. To prevent damage during regular use
- ☐ B. To reduce weight during regular use
- ☐ C. To secure the handle more firmly
- ☐ D. To improve grip during regular use

Q9 Part B

A parallel circuit has two branches containing 10 Ω and 20 Ω resistors. If the total current supplied is 3 A, determine the current flowing through the 10 Ω resistor.

- ☐ A. 1.5 A
- ☐ B. 1 A
- ☐ C. 0.5 A
- ☒ D. 2 A

Q10 Part B

What happens to the insulation resistance of an insulating material when the temperature increases?

- ☐ A. It remains constant
- ☐ B. It increases rapidly
- ☒ C. It decreases
- ☐ D. It becomes infinite

Q11 Part B

In a motor sketch, what is the most effective way to represent the winding terminals?

- ☐ A. By sketching freehand outlines of terminals
- ☐ B. By omitting important terminal connection details
- ☒ C. By using standardized symbols and clear labels
- ☐ D. By assigning random letters to the terminals

Q12 Part B

To achieve controlled step-by-step rotation in a stepper motor, which of the following input signals is applied?

- ☐ A. High-frequency audio signal
- ☒ B. Controlled digital pulse signal
- ☐ C. Continuous sinusoidal signal
- ☐ D. Random analog pulse signal

Q13 Part B

During the post-winding polarity verification test of a rewound multi-pole single-phase fan motor, what is the most likely effect if the polarity of one or more stator coils is incorrectly reversed?

- ☐ A. The motor develops a uniform reverse rotating magnetic field causing normal reverse rotation
- ☒ B. The motor develops an unbalanced magnetic field causing reduced torque and excessive heating
- ☐ C. The motor produces an immediate phase-to-phase short circuit during energization
- ☐ D. The motor maintains normal magnetic field distribution and operates at rated performance

Q14 Part B

The no-load voltage of an alternator is 525 V and the full-load voltage is 500 V. What is the voltage regulation?

- ☐ A. 3%
- ☒ B. 5%
- ☐ C. 6%
- ☐ D. 4%

Q15 Part B

Why is retrogressive winding rarely used in practice in DC machines?

- ☒ A. It does not follow the natural direction of rotation
- ☐ B. It increases generated EMF
- ☐ C. It reduces number of conductors
- ☐ D. It causes mechanical imbalance

Q16 Part B

Which of the following types of voltmeters is suitable for measuring the voltage across a component in a high resistance circuit?

- ☐ A. Voltmeter having low input impedance
- ☐ B. Voltmeter having high frequency response
- ☐ C. Voltmeter having high current rating
- ☒ D. Voltmeter having high input impedance



Q17 Part B

Which application specifically requires a motor that must not run at no-load condition due to risk of over speeding?

- A. Centrifugal pump
- B. Electric traction ✓
- C. Printing press
- D. Conveyor belt

Q18 Part B

During the Impregnation, Balancing, and Final Assembly process of a three-phase star-connected induction motor, what is the most likely consequence if one phase winding is incorrectly connected to the common neutral junction?

- A. The motor will develop unbalanced phase currents resulting in abnormal vibration and uneven operation ✓
- B. The motor will develop a direct short circuit simultaneously between all three phase windings
- C. The motor will experience reduced and equal phase voltage across all three stator windings
- D. The motor will operate at a rotational speed higher than the rated synchronous speed

Q19 Part B

In practical transformer design, which winding type is preferred for reducing leakage reactance in power transformers?

- A. Spiral winding
- B. Lap winding
- C. Sandwich winding ✓
- D. Concentric winding

Q20 Part B

During transformer oil preparation in the Impregnation, Balancing, and Final Assembly process, what corrective action is recommended if the transformer oil breakdown voltage remains below 30 KV RMS as specified in IS 335:1983 during dielectric strength testing?

- A. Increase the applied dielectric test voltage beyond the specified test limit
- B. Perform transformer oil filtration to remove moisture and suspended contaminants ✓
- C. Replace the dielectric test electrodes without treating the transformer oil condition
- D. Repeat the dielectric strength test without changing the transformer oil condition

Q21 Part B

If an energy meter disc rotates in the reverse direction under leading power factor loads, which corrective measure should be taken?

- A. Adjust current coil tap
- B. Reverse the polarity of the pressure coil ✓
- C. Increase brake magnet strength
- D. Change disc material

Q22 Part B

Which symbol usually indicates a coil in a starter circuit diagram?

- A. A triangle with a pointed shape
- B. A zigzag line with angled bend
- C. A rectangle with a text label
- D. A circle with a center marking ✓

Q23 Part B

When observing the chemical storage area, what is the most critical factor to check for immediate health and environmental safety?

- A. Proper segregation of incompatible chemical materials ✓
- B. Availability of protective equipment near storage area
- C. Accessibility of emergency spill response equipment
- D. Presence of clearly visible emergency contact signage

Q24 Part B

In a three-phase star-connected (Y-connected) system, what is the relationship between line current and phase current?

- A. Line current is double the phase current
- B. Line current is half the phase current
- C. Line current is zero
- D. Line current equals phase current ✓

Q25 Part B

If two AC waveforms are said to be 'in phase', what does this indicate?

- A. Their amplitudes are identical
- B. Their peaks and troughs occur at the same time ✓
- C. Their directions are opposite
- D. They have the same frequency but different timing



Q26 Part B

What is the reason for movement of the pointer of an analog multimeter in the opposite direction during measurement of DC voltage?

- A. Low internal battery
- B. Probe polarity connection ✓
- C. Blown fuse
- D. Incorrect scale selected

Q27 Part B

A shaft measurement is recorded as 24.98 mm, while the standard size is 25 mm. This indicates:

- A. severe shaft bending
- B. incorrect supply voltage
- C. excessive insulation failure
- D. minor dimensional deviation ✓

Q28 Part B

In a DC generator, the brushes are placed along the magnetic neutral axis (MNA). What is the reason for this placement?

- A. To increase armature current
- B. To increase generated EMF
- C. To ensure sparkless commutation ✓
- D. To reduce brush wear

Q29 Part B

A uniform material has mass 200 kg and volume 5 m³. Find its density.

- A. 30 kg/m³
- B. 40 kg/m³ ✓
- C. 20 kg/m³
- D. 50 kg/m³

Q30 Part B

An elevator driven by a DC motor fails to lift load but motor runs. What is the most probable cause?

- A. High speed
- B. Open armature
- C. Weak field flux ✓
- D. Low supply voltage

Q31 Part B

What is the primary goal of the 5S methodology in industrial workplaces?

- A. To ensure compliance with industrial safety regulations only
- B. To promote teamwork activities among factory workers only
- C. To improve workplace organization and operational efficiency ✓
- D. To clean production equipment and machinery every day

Q32 Part B

In a DC generator, what is the consequence if the cooling fan fails during continuous operation at rated load?

- A. Commutator voltage becomes zero
- B. Generated EMF increases
- C. Temperature rise leads to insulation deterioration ✓
- D. Armature resistance decreases

Q33 Part B

A house has a total load of 2500 watts and operates at 250 volts. What is the required current rating for the main earthing conductor?

- A. 20 amperes
- B. 10 amperes ✓
- C. 5 amperes
- D. 15 amperes

Q34 Part B

In the rewinding of a three-phase squirrel-cage induction motor stator, which winding arrangement is commonly used to achieve symmetrical phase distribution and balanced rotating magnetic field production?

- A. Double-layer distributed stator winding ✓
- B. Wave winding
- C. Lap winding
- D. Single-phase concentrated field winding



Q35 Part B

A DC generator is specified with 20 commutator segments and uses a simplex lap winding. How many armature coils does it have?

A. 10

B. 15

C. 20



D. 40

Q36 Part B

Which device is mainly used for automatically opening or closing an electrical circuit in wiring systems?

A. Relay



B. Switch

C. Fuse

D. MCB

Q37 Part B

Which of the following is a recommended use for Tinman's shears?

A. Making straight sheet cuts



B. Making electrical connections

C. Producing threaded fasteners

D. Cutting small internal holes

Q38 Part B

Which sequence correctly describes the standard procedure for dynamic balancing of a rotating electrical machine armature?

A. Mount armature on balancing machine, rotate at specified speed, detect unbalance, apply corrective weight



B. Mount armature on balancing machine, rotate at specified speed, apply corrective weight, detect unbalance

C. Mount armature on balancing machine, apply corrective weight, detect unbalance, rotate at specified speed

D. Rotate at specified speed, mount armature on balancing machine, detect unbalance, apply corrective weight

Q39 Part B

How is a digital multimeter connected for measuring the circuit current?

A. Both series and parallel connections are correct

B. Across the power supply terminals

C. In parallel with the circuit

D. In series with the circuit

**Q40 Part B**

If the number of parallel paths in a DC machine using wave winding is doubled, what type of winding is being used?

A. A lap winding is being used.

B. A simplex wave winding is being used.

C. A progressive winding is being used.

D. A duplex wave winding is being used.

**Q41 Part B**

Which parts are responsible for connecting the winding to the external circuit in conductors in case of domestic wiring?

A. Bus bars

B. Commutators

C. Slip rings

D. End connection leads

**Q42 Part B**

What causes EMF generation in the armature winding of an alternator?

A. Continuous heating of rotor conductors

B. Chemical action inside stator insulation

C. Relative motion between flux and conductors



D. Friction between shaft and bearings

Q43 Part B

Suppose a DC armature is wound with a lap winding and the number of parallel paths is increased beyond the number of poles. What operational problem is most likely to occur?

A. The machine will produce more torque per path

B. All armature coils will carry equal current regardless

C. Current in each path will decrease, causing uneven load sharing



D. Back EMF will be higher in each path, increasing speed



Q44 Part B

What function does the traverse mechanism perform in a coil winding machine used for DC machines?

- A. To insulate the conductor.
- B. To guide the wire uniformly across the winding space. ✓
- C. To supply electrical current to the winding.
- D. To rotate the armature core.

Q45 Part B

Which of the following is used for supplying power at medium voltages in electrical installations?

- A. Flexible wire
- B. Twin core wire
- C. Armored cable ✓
- D. Telephone wire

Q46 Part B

A DC machine has 6 poles and 72 conductors. Calculate the pole pitch in terms of number of conductors.

- A. 60 conductors
- B. 12 conductors ✓
- C. 72 conductors
- D. 18 conductors

Q47 Part B

Which action would violate the principles of 5S?

- A. Cleaning workplace stations on a regular basis
- B. Storing excess inventory within factory walkways ✓
- C. Organizing tools according to their specific function
- D. Labeling shelves for storage for material placement

Q48 Part B

During transformer core assembly in the Impregnation, Balancing, and Final Assembly process, which core lamination material is used to minimize magnetizing current requirement and hysteresis power loss under alternating magnetic flux conditions?

- A. Aluminum
- B. Copper
- C. Ferrite
- D. Silicon steel ✓

Q49 Part B

Which of the following statements describes the materials classified under Class Y insulation in terms of their properties and limitations?

- A. They are untreated organic materials with a limiting temperature of 90°C. ✓
- B. They are synthetic materials with a limiting temperature of 130°C.
- C. They are impregnated fibers with a limiting temperature of 90°C.
- D. They are untreated organic materials with a limiting temperature of 180°C.

Q50 Part B

Which statement correctly differentiates between Progressive and Retrogressive winding?

- A. Retrogressive is used only in AC machines.
- B. Progressive advances, retrogressive goes backward. ✓
- C. Both have identical commutator connections.
- D. Progressive has $Y_c = -1$, retrogressive has $Y_c = +1$.

Q51 Part B

During the rewinding process of a three-phase AC induction motor, which instrument is specifically used to measure winding insulation resistance between the stator winding and motor frame?

- A. Megger ✓
- B. Wattmeter
- C. Voltmeter
- D. Ammeter

Q52 Part B

During magnetic core loss testing of ferromagnetic cores used in electromechanical assemblies, which two loss components constitute the total core loss?

- A. Leakage loss and copper loss
- B. Dielectric loss and leakage loss
- C. Hysteresis loss and eddy current loss ✓
- D. Copper loss and dielectric loss



Q53 Part B

A technician is tasked with installing an Earth Leakage Circuit Breaker (ELCB) in a facility where sensitive electronic equipment is used. Which installation method will ensure that the ELCB correctly detects and isolates earth faults without causing unnecessary interruptions?

- A. Connect the ELCB so that all circuit conductors, including the neutral, pass through the ELCB's sensing coil** ✓
- B. Connect the ELCB only to the phase wire before the load
- C. Install the ELCB on the earth wire between equipment and ground rod
- D. Wire the ELCB to the load side conductors, but not the return path

Q54 Part B

If an electrical drawing includes a symbol of two parallel lines with a gap between them, what component does this depict?

- A. Capacitor** ✓
- B. Single wire
- C. Battery
- D. Resistor

Q55 Part B

What distinguishes an on-load performance test from a no-load test during the Impregnation, Balancing, and Final Assembly process of an electrical machine?

- A. It verifies dimensional alignment of assembled mechanical components without energization
- B. It evaluates machine performance while supplying or consuming rated output power** ✓
- C. It measures winding insulation resistance using a megohmmeter under de-energized conditions
- D. It evaluates machine performance with the shaft mechanically uncoupled from all loads

Q56 Part B

A three-phase alternator gives 440 V at no load and 400 V at full load. Calculate the percentage voltage regulation.

- A. 8%
- B. 10%** ✓
- C. 12%
- D. 15%

Q57 Part B

Which of the following is the primary purpose of applying impregnation treatment during the rewinding process of an AC motor?

- A. To modify electromagnetic flux distribution within the rotating magnetic field system
- B. To mechanically secure winding conductors and improve insulation protection against moisture and contaminants** ✓
- C. To reduce magnetic hysteresis and eddy current losses within the laminated stator core
- D. To increase dimensional uniformity of the air gap between the stator and rotor assemblies

Q58 Part B

Which of the following must exist to generate EMF in a DC generator?

- A. Only resistance
- B. Only conductor
- C. Relative motion between conductor and magnetic field** ✓
- D. Only magnetic field

Q59 Part B

During the rewinding process of a three-phase AC motor stator, which procedure must be repeatedly performed for each pole group until completion of the main winding?

- A. Apply insulating varnish immediately after winding each individual pole group
- B. Repeat coil insertion, coil placement, and temporary slot wedging operations for each pole group** ✓
- C. Replace the stator winding conductor with a different wire gauge for each pole group
- D. Perform insulation resistance measurement after winding each individual pole group

Q60 Part B

Which of the following best explains the purpose of transformer oil filtration during the Impregnation, Balancing, and Final Assembly process?

- A. It applies lubricating properties to mechanical assembly contact surfaces
- B. It increases transformer oil temperature to reduce oil viscosity during circulation
- C. It removes moisture and suspended contaminants to improve dielectric insulation performance** ✓
- D. It modifies transformer oil chemical composition to alter dielectric characteristics



Q61 Part B

An electrical grid in a coastal region needs to select a conductor material that balances weight, cost, and resistance to corrosion. Given these considerations, which is the suitable choice?

- A. Steel conductors are preferred for their mechanical durability and low cost.
- B. Aluminium conductors are preferred due to their light weight, lower cost, and good corrosion resistance. ✓
- C. Copper conductors are preferred for their high conductivity and strength.
- D. Silver conductors are preferred for their excellent conductivity and reliability.

Q62 Part B

An organization aims to improve future job planning by collecting accurate failure history data for reliability analysis. Which documentation method will best support this goal?

- A. Recording detailed fault reports for every equipment failure event. ✓
- B. Maintaining yearly breakdown summaries for workshop equipment records
- C. Recording preventive maintenance schedules without equipment faults
- D. Depending mainly on operator observations for equipment fault history

Q63 Part B

What is the function of an autotransformer starter used with a three-phase induction motor?

- A. To increase the frequency of supply
- B. To increase the running speed of motor
- C. To reverse the direction of rotation
- D. To reduce the starting current drawn. ✓

Q64 Part B

Which equipment is primarily used to conduct the high-speed test in the Impregnation, Balancing, Final Assembly process?

- A. Megger insulation tester
- B. Dynamic balancing machine. ✓
- C. Digital voltmeter
- D. Torque wrench

Q65 Part B

Which combination of mechanical components is correctly associated with the assembly of a shaft coupling used to transmit rotational power between two rotating shafts?

- A. Fixed resistors and rolling bearings
- B. Washers and light-emitting diodes
- C. Inductors and electromagnetic relays
- D. Rotating shafts and mechanical couplings. ✓

Q66 Part B

A protection engineer is designing a protection and metering scheme for a three-phase transformer using Current Transformers (CTs) and Potential Transformers (PTs). What is the purpose of the PTs in this system?

- A. To isolate the transformer during fault conditions automatically
- B. To supply excitation power to CTs
- C. To measure line current for overload detection
- D. To provide proportional voltage signals for relays and meters. ✓

Q67 Part B

Which condition ensures that all armature conductors are included in a single closed wave winding?

- A. Number of commutator segments must be prime
- B. Number of poles must be even
- C. Armature resistance must be low
- D. Winding pitch must satisfy proper closure condition. ✓

Q68 Part B

According to the law of conservation of energy, energy can neither be:

- A. Stored nor transferred
- B. Converted nor utilized
- C. Measured nor calculated
- D. Created nor destroyed. ✓

Q69 Part B

What type of line is used to indicate hidden internal features in a motor sketch?

- A. Continuous line
- B. Thick line
- C. Dashed line. ✓
- D. Chain line



Q70 Part B

In electromechanical assembly operations, which statement correctly distinguishes a jig from a fixture?

- A. A fixture is exclusively used for welding operations, whereas a jig is used for machining operations
- B. A jig only clamps the workpiece, whereas a fixture only guides the cutting tool
- C. A jig and a fixture perform identical functions in all manufacturing operations
- D. A jig accurately locates the workpiece and guides the cutting tool, whereas a fixture only locates and secures the workpiece ✓

Q71 Part B

Where is the Buchholz relay typically installed in an oil-immersed transformer?

- A. At the external cooling fins
- B. Inside the transformer core
- C. On the primary winding
- D. Between the main tank and conservator ✓

Q72 Part B

What is a critical step before storing cutting tools after use in woodworking?

- A. Wiping tools dry and removing debris carefully ✓
- B. Leaving tools unattended on the workbench area
- C. Placing tools in closed boxes without cleaning
- D. Soaking tools in water before storage overnight

Q73 Part B

In a three-phase star (Y) connection, what is the relationship between line voltage (V_L) and phase voltage (V_{ph})?

A. $V_L = \sqrt{3} V_{ph}$ ✓

B. $V_L = \frac{V_{ph}}{\sqrt{3}}$

C. $V_L = V_{ph}$

D. $V_L = 3 V_{ph}$

Q74 Part B

Why is AC electrical power commonly transmitted at very high voltage over long distances?

A. To reduce current and minimize $I^2 R$ losses ✓

B. To increase current and improve heating effect

C. To convert AC power into DC power

D. To avoid the use of transformers

Q75 Part B

In a three-phase star-connected system, the phase voltage (V_{ph}) is 230 V. Determine the line voltage (V_L).

A. 230 V

B. 460 V

C. $230\sqrt{3}$ V ✓

D. $\frac{230}{\sqrt{3}}$ V



Part B

75 Questions • Answer Key

Q1 Part B

What is the most significant insulation property of leatheroid paper used in rewinding of AC motor windings?

- A. It provides low electrical insulation resistance for rapid heat dissipation in winding assemblies
- B. It provides improved ageing resistance and high dielectric strength for winding insulation applications ✓
- C. It provides high magnetic permeability for improved alternating current motor flux distribution
- D. It provides conductive bonding characteristics for direct electrical connection between winding layers

Q2 Part B

Which material is used as insulation on winding wires in conductors?

- A. Paper wrapping
- B. Rubber sheathing
- C. Cotton braiding
- D. Enamel coating ✓

Q3 Part B

A technician is tasked with installing earthing for a commercial building using the plate earthing method. Which sequence of steps ensures safety and long-term effectiveness during the installation process?

- A. Dig deep pit, place plate without connecting earth wire, fill with stones and soil
- B. Dig shallow trench, lay plate horizontally, connect earth wire, cover with sand only
- C. Excavate pit, place plate vertically, connect earth wire, fill with alternate charcoal and salt layers ✓
- D. Excavate pit, place plate diagonally, connect earth wire, fill with only soil

Q4 Part B

What is the technical purpose of preheating an electrical machine winding before varnish impregnation during final assembly?

- A. To remove absorbed moisture from insulation and winding layers before varnish impregnation ✓
- B. To permanently increase varnish fluidity after curing
- C. To thermally strengthen conductor insulation by direct heat treatment
- D. To increase the direct current resistance of the winding conductor

Q5 Part B

Which method is effective for improving earth resistance in an earthing system?

- A. Using a single deep electrode
- B. Connecting earth wire directly to neutral
- C. Adding multiple earth electrodes ✓
- D. Applying oil to the earth pit

Q6 Part B

In a DC shunt generator, the field winding is connected _____.

- A. In series with armature
- B. In series with load
- C. Independently from armature
- D. In parallel with armature ✓

Q7 Part B

During final testing of a fully assembled electrical machine after impregnation and balancing, what is the primary objective of conducting a temperature rise test under rated operating conditions?

- A. To verify dielectric insulation resistance characteristics between winding conductors and frame
- B. To verify that winding and machine temperatures remain within specified insulation-class thermal limits ✓
- C. To verify correct electrical phase relationship and stator winding terminal polarity
- D. To verify dynamic mechanical stability of the rotating assembly during continuous operation



Q8 Part B

What is the function of the no-voltage coil (NVC) in a DC motor starter?

- A. Increase torque
- B. Protect against overload
- C. Increase speed
- D. Protect against supply failure ✓

Q9 Part B

During the transformer transformation ratio test performed in the Impregnation, Balancing, and Final Assembly stage, how should the secondary winding be connected while the rated test voltage is applied to the primary winding?

- A. Kept open-circuited without any external electrical load connection ✓
- B. Connected to an external resistive load bank during voltage application
- C. Kept short-circuited through a low-resistance conductive path
- D. Connected to earth potential through one secondary terminal during measurement

Q10 Part B

During the Class E motor stator winding impregnation process, after varnish draining, the stator is heated to 120°C for two hours and then to 140°C for a minimum of ten hours. To satisfy the post-baking inspection requirement, the insulation resistance measured immediately after baking shall not be less than:

- A. 2 megaohms ✓
- B. 10 kilohms
- C. 100 megaohms
- D. 500 ohms

Q11 Part B

When two dimension lines must be close together, what is the best practice to avoid misinterpretation?

- A. Placing dimension figures together in straight alignment
- B. Reducing dimension figure size for closer placement
- C. Omitting one of the required dimension value figures
- D. Staggering dimension figures to improve reading clarity ✓

Q12 Part B

A DC shunt motor shows a sudden increase in speed during operation. What may be the probable cause?

- A. Increase in armature resistance
- B. Decrease in supply voltage
- C. Increase in load
- D. Field circuit open or weakened ✓

Q13 Part B

If: $\sin\theta = 5/13$ and θ is an acute angle, find the value of $\cos\theta$.

- A. 13/12
- B. 12/5
- C. 12/13 ✓
- D. 5/12

Q14 Part B

In the context of liquid insulation materials, what is the probable effect when solid impurities align themselves along the electric field?

- A. It increases the chances of insulation breakdown ✓
- B. It enhances the dielectric strength of the liquid
- C. It strengthens the insulation against breakdown
- D. It reduces the possibility of insulation failure

Q15 Part B

In a transformer tap changer, changing the tap position directly alters which transformer parameter?

- A. Effective turns ratio of the transformer ✓
- B. Frequency of operation
- C. Core material permeability
- D. Magnetic flux waveform shape

Q16 Part B

Which of the following is a type of riveted joint?

- A. Seam joint
- B. Groove joint
- C. Edge joint
- D. Lap joint ✓



Q17 Part B

A technician must choose the most suitable conductor for wiring in a high-temperature industrial environment. Considering mechanical strength, electrical conductivity, and resistance to corrosion, which material offers the best overall performance for long-term reliability?

- A. Aluminum wire
- B. Iron wire
- C. Copper wire ✓
- D. Steel wire

Q18 Part B

During pre-varnish thermal conditioning of electric motor windings in the impregnation and balancing process, what is the effect of excessive preheating duration?

- A. Complete elimination of winding moisture content
- B. Increase in mechanical rigidity of conductor insulation
- C. Thermal degradation of winding insulation material ✓
- D. Acceleration of varnish polymerization before impregnation

Q19 Part B

In a three-phase alternator, which winding type is commonly used to achieve a sinusoidal output voltage and reduce harmonics?

- A. Wave winding
- B. Full-pitch winding
- C. Short-pitch winding ✓
- D. Lap winding

Q20 Part B

What is the effect of rapid deterioration of air-drying varnishes during storage on their service performance?

- A. They lose their intended insulating and protective performance characteristics over time ✓
- B. They become completely transparent and free from volatile odor compounds
- C. They cure into a permanently hardened glass-like insulating layer
- D. They develop improved resistance to petroleum-based insulating oils

Q21 Part B

Which of the following methods is recommended for extending the range of a 5A ammeter to measure currents up to 100A?

- A. By connecting a resistance of suitable value in series with the ammeter
- B. By connecting a shunt resistance of suitable value in parallel with the ammeter ✓
- C. By connecting multiplier resistor in series with the ammeter
- D. By connecting current transformer in series with the ammeter

Q22 Part B

A single phasing preventer is installed for protecting:

- A. Universal motor operated appliances
- B. Three-phase induction motor circuits ✓
- C. Direct current shunt motor drives
- D. Single-phase induction motor systems

Q23 Part B

Which of the following is the advantage of wave winding condition?

- A. High voltage generation ✓
- B. Requires many brushes
- C. High current capacity
- D. Low voltage generation

Q24 Part B

Which statement correctly describes the thermal shrink fitting process used for permanent interference assembly of cylindrical electromechanical components?

- A. A cooled inner component is mechanically compressed and inserted into a heated outer component, producing a permanent clearance fit after assembly.
- B. Both mating components are cooled before assembly, producing a permanent interference fit after returning to ambient temperature.
- C. Both mating components are heated uniformly before assembly, producing a clearance fit after cooling to ambient temperature.
- D. A metallic outer component is heated to expand its internal diameter and assembled over a cooler mating component, producing an interference fit after cooling to ambient temperature. ✓



Q25 Part B

What is the role of communication during an industrial system failure?

- A. To assign responsibilities only to selected workers
- B. To withhold information from concerned external agencies
- C. To coordinate actions and keep everyone properly informed ✓
- D. To communicate details only with higher management staff

Q26 Part B

What type of tachometer uses changes in frequency to measure rotational speed?

- A. Mechanical tachometer
- B. Electronic tachometer ✓
- C. Analog tachometer
- D. Thermal tachometer

Q27 Part B

An electrical workshop uses 15 lamps of 100 W each for 5 hours daily. If the workshop operates 25 days in a month, what is the total energy consumed in kilowatt-hours (kWh) per month?

- A. 150.0
- B. 187.5 ✓
- C. 125.0
- D. 112.5

Q28 Part B

Which property of a resistor determines how much it resists the flow of electric current?

- A. Inductance
- B. Capacitance
- C. Resistance ✓
- D. Conductance

Q29 Part B

Why is HV testing performed after insulation resistance (IR) test?

- A. To measure current
- B. To reduce voltage
- C. To avoid damage due to weak insulation. ✓
- D. To increase efficiency

Q30 Part B

Which of the following numbers has a square root that is irrational?

- A. 25
- B. 16
- C. 20 ✓
- D. 36

Q31 Part B

Which of the following is a disadvantage of a single-phase system compared with a three-phase system?

- A. It is more stable under heavy load
- B. It has lower losses
- C. It is better for large motors
- D. It delivers less power for the same current rating ✓

Q32 Part B

A maintenance engineer must select a varnish for an emergency field rewinding repair of a three-phase AC motor at a remote site without access to baking equipment. Which varnish type is most suitable for rapid restoration of motor operation?

- A. Solventless epoxy impregnation varnish requiring specialized processing equipment for curing
- B. Air-drying shellac spirit varnish allowing rapid insulation drying under ambient conditions ✓
- C. Thermosetting baking varnish requiring controlled heat curing for insulation hardening
- D. Oleoresinous baking varnish requiring prolonged thermal curing for impregnation stability

Q33 Part B

A technician is making a former for diamond winding used in a transformer. Which step is essential for achieving the desired coil shape?

- A. Maintaining uniform winding tension throughout the coil
- B. Applying a protective coating to the former surface
- C. Forming precise angles and dimensions at the coil corners ✓
- D. Selecting thicker insulation material for the winding wire



Q34 Part B

Which statement correctly defines the function of a jig in electromechanical assembly and machining operations?

- A. Supporting rotating machine elements during machining operations
- B. Rigidly supporting the workpiece without guiding the cutting tool
- C. Temporarily applying holding force during assembly operations
- D. Securely holding the workpiece and accurately guiding the cutting tool ✓

Q35 Part B

Which of the following best describes the dual role of stakes in sheet metal work?

- A. They serve as heating and bending tools
- B. They serve as cutting and welding tools
- C. They serve as measuring and marking tools
- D. They serve as supporting and forming tools ✓

Q36 Part B

Which operating condition produces positive voltage regulation in an alternator?

- A. Leading power factor load condition
- B. Zero excitation operating condition
- C. Lagging power factor load condition ✓
- D. No load open circuit condition

Q37 Part B

A vertical tower standing on level ground casts a shadow 15 m long when the angle of elevation of the Sun from the ground is 45° . Find the height of the tower.

- A. 15 m ✓
- B. 12 m
- C. 10 m
- D. 18 m

Q38 Part B

Which equipment is used to maintain controlled and uniform tension on the insulated winding wire during the stator rewinding process of a three-phase alternating current motor?

- A. Soldering station with insulated terminal attachments
- B. Manual wire pulling arrangement without tension control
- C. Wire reel stand equipped with an adjustable tensioning mechanism ✓
- D. Digital voltmeter configured for continuity measurement

Q39 Part B

Which fundamental law states the conversion of mechanical energy into electrical energy with reference to a DC generator?

- A. Coulomb's Law
- B. Faraday's Law of Electromagnetic Induction ✓
- C. Thermal Conduction
- D. Mechanical Resonance

Q40 Part B

A workshop uses $\frac{3}{5}$ m of wire for each identical coil. Find the total wire required to make 15 coils.

- A. 8 m
- B. 7 m
- C. 9 m ✓
- D. 6 m

Q41 Part B

Complete the statement: The working principle of a DC generator is based on _____.

- A. Electrostatic induction
- B. Mutual induction
- C. Electromagnetic induction ✓
- D. Self-induction

Q42 Part B

What is the main function of a single-phase transformer in an AC electrical circuit?

- A. To store electrical energy magnetically
- B. To generate AC voltage at fixed frequency
- C. To change AC voltage at the same frequency ✓
- D. To convert AC voltage into DC voltage



Q43 Part B

Which of the following is a direct benefit of implementing safety standards at work?

- A. Increased employee working hours during production
- B. Higher financial taxes imposed on company employees
- C. Reduced duration of scheduled employee lunch breaks
- D. Reduced likelihood of workplace injuries and accidents ✓

Q44 Part B

A technician performs insulation resistance testing on a single-phase induction motor using a Megger. Which set of measurements is correctly recorded in the insulation resistance table?

- A. Phase to neutral, phase to phase, and neutral to earth
- B. Armature to commutator, brush to spring, and shaft to body
- C. Body to starting winding, body to running winding, and between windings ✓
- D. Starter to fuse, switch to relay, and cable to terminal

Q45 Part B

Which maintenance step ensures a draw spike remains effective for pattern withdrawal?

- A. Moistening the surface before each use
- B. Keeping it straight and checking for wear
- C. Applying oil to the surface regularly
- D. Sharpening the tip and polishing regularly ✓

Q46 Part B

A 3-phase AC machine winding is designed with a coil span of 150 degrees electrical instead of 180 degrees. Which statement best describes the outcome?

- A. The fundamental EMF is increased substantially
- B. The third harmonic EMF is minimized in the output voltage ✓
- C. The phase sequence of the machine is reversed
- D. The winding resistance is reduced significantly

Q47 Part B

Which single-phase motor is preferred for sewing machines requiring high-speed operation?

- A. Squirrel cage motor
- B. Reluctance motor
- C. Universal motor ✓
- D. Shaded pole motor

Q48 Part B

Consider a 4-pole DC generator with a lap winding. If each parallel path carries 20 A, what is the total armature current?

- A. 60 A
- B. 80 A ✓
- C. 20 A
- D. 40 A

Q49 Part B

In a workshop, a technician receives a written instruction containing job details, quantity, and delivery date before starting work. What is this document called?

- A. Material return slip
- B. Attendance register
- C. Job order ✓
- D. Inspection tag

Q50 Part B

What is the purpose of name plate fixing during the Impregnation, Balancing, and Final Assembly stage of an electrical machine?

- A. To provide additional mechanical reinforcement for rotating and stationary assembly components
- B. To provide standardized equipment identification and rated operating specifications for the assembled electrical machine ✓
- C. To provide dynamic balancing correction for the rotating assembly during high-speed operation
- D. To provide supplementary electrical insulation between energized conductive machine components



Q51 Part B

Why is alternating voltage commonly generated in large power stations?

- A. Because rotating alternators naturally produce sinusoidal alternating emf ☒
- B. Because batteries directly produce alternating voltage
- C. Because alternating voltage produces no heating loss
- D. Because DC voltage cannot be converted into AC voltage

Q52 Part B

During manual coil winding handling procedures for a split-phase induction motor stator, which sequence correctly follows standard winding practice?

- A. Remove conductor insulation, wind all stator coils, and terminate end connections
- B. Start with the outermost coil, insert slot wedges, and wind remaining stator coils
- C. Wind the innermost coil first, continue with progressively larger coils, and bring out end connections ☒
- D. Insert insulating guide paper, wind all stator coils simultaneously, and clamp winding ends

Q53 Part B

In a purely capacitive AC circuit, what is the power factor value?

- A. 0 ☒
- B. 1
- C. -1
- D. 0.5

Q54 Part B

Which sequence correctly describes the standard order of making end connections during rewinding of a three-phase AC motor stator winding?

- A. First coil-group connections, then terminal lead connections, and finally inter-coil connections
- B. First terminal lead connections, then coil-group connections, and finally inter-coil connections
- C. First terminal lead connections, then inter-coil connections, and finally coil-group connections
- D. First inter-coil connections, then coil-group connections, and finally terminal lead connections ☒

Q55 Part B

How is the correctness of a three-phase delta winding connection verified during the Final Assembly stage of rotating electrical machine manufacturing?

- A. By measuring winding resistance between each line terminal and a neutral connection point
- B. By confirming phase continuity and closed-loop electrical paths between all phase terminal pairs ☒
- C. By measuring phase voltage between line terminals and an electrical neutral point
- D. By measuring insulation resistance between winding conductors and grounded machine body

Q56 Part B

Which action ensures minimal power consumption by the pressure coil in a dynamometer wattmeter during high-voltage measurements?

- A. Using a high resistance in series with the pressure coil ☒
- B. Lowering the resistance of the coil
- C. Connecting a low resistance in parallel with the coil
- D. Reducing the number of turns in the coil

Q57 Part B

What does it indicate if an armature rotor, during static balancing, comes to rest at different angular positions after repeated free rolling?

- A. An additional balancing counterweight is required on the rotor
- B. The armature rotor is statically balanced ☒
- C. Further static balancing correction is required on the rotor assembly
- D. The armature winding resistance distribution is electrically nonuniform

Q58 Part B

A drafter must select between vertical and inclined lettering. According to engineering drawing standards, what is the recommended angle for inclined lettering?

- A. Inclined at 60 degrees to the horizontal
- B. Inclined at 90 degrees to the horizontal
- C. Inclined at 75 degrees to the horizontal ☒
- D. Inclined at 45 degrees to the horizontal



Q59 Part B

A Megger is an instrument which is used to measure _____.

A. Insulation resistance ✓

B. Current

C. Voltage

D. Capacitance

Q60 Part B

Why is Insulation Resistance test performed before DC HiPot (High Potential) test on a DC machine winding?

A. To calculate fixed losses

B. To increase the test voltage

C. To reduce testing time

D. To ensure insulation can withstand high voltage ✓

Q61 Part B

Which pre-rewinding test result most strongly indicates that the existing winding insulation of an AC motor has deteriorated to a condition requiring rewinding?

A. Presence of electrical continuity across all winding terminals during continuity verification testing

B. Stable conductor resistance value obtained during low-voltage resistance measurement testing

C. Minor imbalance in phase winding resistance measured under ambient temperature conditions

D. Significant reduction in insulation resistance value under specified direct voltage testing conditions ✓

Q62 Part B

Which statement describes chlorinated hydrocarbons as used in electrical insulation?

A. They are gaseous insulants commonly referred to as silicone oil.

B. They are synthetic liquid insulants commercially called Askarel. ✓

C. They are natural solid insulants used as mineral oil.

D. They are ceramic-based insulants known as mica.

Q63 Part B

Why is Aluminium less preferred than Copper for DC machine windings?

A. Higher melting point

B. Higher resistivity ✓

C. Lower density

D. Better conductivity

Q64 Part B

Complete the following statement with regards to DC machine.

Wave winding is used for _____.

A. high voltage, low current applications ✓

B. low voltage, high current applications

C. only high current applications

D. low speed machines

Q65 Part B

What does a symbol with a circle and a cross inside usually indicate in an electrical schematic?

A. Lamp ✓

B. Fuse

C. Resistor

D. Ground

Q66 Part B

An alternator has total losses of 8 kW when supplying an output of 192 kW. What is the efficiency of the alternator?

A. 94%

B. 96% ✓

C. 92%

D. 98%

Q67 Part B

Which condition defines a balanced load in a three-phase electrical system?

A. All phase currents have equal magnitude and are 120 degrees apart ✓

B. All phase currents are unequal and randomly phased

C. One phase has zero current while others have current

D. All phase currents are in phase with each other

Q68 Part B

Which of the following options defines a fractional horsepower (FHP) motor?

A. A motor rated below one Watt output power

B. A motor operating above 1000 r.p.m speed only

C. A motor rated below one horsepower output power ✓

D. A motor operating only with direct current supply



Q69 Part B

In wave winding, what is the consequence if the front and back pitches are not odd numbers?

A. Improper commutation



B. Increased voltage

C. Better efficiency

D. Reduced speed

Q70 Part B

What is the primary purpose of using an MCB (Miniature Circuit Breaker) in an electrical wiring system?

A. To provide backup power during outages

B. To control the current flow during normal operation

C. To increase the voltage supplied to devices

D. To automatically switch off electrical supply in case of overload or short circuit

**Q71 Part B**

A 24 V battery is connected in series with 3 Ω and 5 Ω resistors. Calculate the power dissipated by the 5 Ω resistor.

A. 72 watts

B. 24 watts

C. 60 watts

D. 45 watts

**Q72 Part B**

How does vacuum pressure impregnation of stator or rotor windings contribute to the long-term reliability of electrical machinery?

A. By actively controlling the operating temperature of the electrical machine

B. By increasing the physical cross-sectional area of the conductor windings

C. By reducing the manufacturing assembly time of the electrical machine

D. By preventing moisture ingress, improving insulation bonding, and reducing partial discharge within windings

**Q73 Part B**

During stator rewinding of a three-phase alternating current induction motor, what is the primary function of the guide paper inserted inside stator slots before coil placement?

A. To increase magnetic flux density within the stator core structure

B. To provide an electrically conductive path between adjacent stator slot surfaces

C. To prevent mechanical abrasion of winding conductors during coil insertion into stator slots



D. To provide a thermal cooling medium for stator winding heat dissipation

Q74 Part B

When treating a suspected fracture at work, which basic first aid action should be avoided?

A. Immobilize the injured limb with a splint

B. Call for professional medical help promptly

C. Support the area above and below the injury

D. Attempt to realign the bone manually at that moment

**Q75 Part B**

Which of the following best describes a regular hexagon as used in the engineering drawing of geometrical figures?

A. A six-sided polygon with only opposite sides equal

B. A six-sided polygon with equal sides but unequal angles

C. A six-sided polygon with equal sides and equal angles



D. A six-sided polygon with unequal sides



Part B

75 Questions • Answer Key

Q1 Part B HINDI

मापन में किस प्रकार की त्रुटि, पूरी प्रक्रिया के दौरान परिमाण और दिशा में एकसमान बनी रहती है?

- A. गंभीर त्रुटि (Gross error)
- B. यादृच्छिक त्रुटि (Random error)
- C. यंत्रीय त्रुटि (Instrumental error)
- D. क्रमबद्ध त्रुटि (Systematic error) ✓

Q2 Part B HINDI

एक वर्कशॉप प्रैक्टिकल में, एक प्रशिक्षार्थी को बताया जाता है कि एक लैंप को नियंत्रित करने वाले दो हस्तचालित स्विचों का उपयोग करके एक AND गेट को निरूपित किया जा सकता है। AND गेट लॉजिक उत्पन्न करने के लिए स्विचों को किस प्रकार संयोजित किया जाना चाहिए?

- A. एक दूसरे के समांतर क्रम में
- B. एक दूसरे के श्रेणी क्रम में ✓
- C. एक संधारित्र के समांतर क्रम में
- D. एक क्रॉस-ओवर मैट्रिक्स विन्यास में

Q3 Part B HINDI

निम्नलिखित में से कौन-सा एक ऑपरेटिंग सिस्टम है जिसका उपयोग कंप्यूटर प्रयोगशालाओं में हार्डवेयर के मैनेज करने और ऐप्लिकेशनों को रन करने के लिए किया जाता है?

- A. टैलीप्राइम (TallyPrime)
- B. माइक्रोसॉफ्ट एक्सेल (Microsoft Excel)
- C. माइक्रोसॉफ्ट विंडोज (Microsoft Windows) ✓
- D. एडोब फोटोशॉप (Adobe Photoshop)

Q4 Part B HINDI

चल लौह एमीटर (moving iron ammeter) का कार्य सिद्धांत क्या है?

- A. यह मापयंत्र प्रचालन के लिए पॉइंटर पर अनुप्रयुक्त यांत्रिक बल पर निर्भर करता है
- B. यह मापयंत्र विद्युत धारा के ऊष्मीय प्रभाव का उपयोग करके कार्य करता है
- C. यह मापयंत्र अपनी कुंडली में प्रवाहित धारा द्वारा उत्पन्न चुंबकीय प्रभाव के आधार पर प्रचालित होता है ✓
- D. यह मापयंत्र कुंडली के भीतर होने वाली रासायनिक अभिक्रिया पर निर्भर करता है

Q5 Part B HINDI

कौन-सा डिवाइस, डिजिटल डेटा को संगत एनालॉग वोल्टता या धारा में रूपांतरित करता है?

- A. दिष्टकारी (Rectifier)
- B. एनालॉग-टु-डिजिटल कनवर्टर (Analog to digital converter)
- C. दोलित्र (Oscillator)
- D. डिजिटल-टु-एनालॉग कनवर्टर (Digital to analog converter) ✓

Q6 Part B HINDI

एक बुनियादी द्रवीय परिपथ (hydraulic circuit) में कौन-सा घटक मुख्य रूप से तरल प्रवाह की दिशा को नियंत्रित करने के लिए उत्तरदायी है?

- A. दिशात्मक नियंत्रण वाल्व (Directional control valve) ✓
- B. द्रवीय पंप (Hydraulic pump)
- C. जलाशय (Reservoir)
- D. दाब विमोचन वाल्व (Pressure relief valve)

Q7 Part B HINDI

स्टोरेज ऑसिलोस्कोप (storage oscilloscopes) क्षणिक घटनाओं के अवलोकन में क्यों उपयोगी हैं?

- A. वे अध्ययन के लिए घटना को स्वचालित रूप से दोहराते हैं
- B. वे घटना की आवृत्ति बदलते हैं
- C. वे घटना समाप्त होने के बाद तरंगरूप को दृश्यमान रखते हैं ✓
- D. वे अवांछित सिग्नलों को मिटाते हैं

Q8 Part B HINDI

पुनरावृत्त मापन के दौरान यंत्र निष्पादन के निर्धारण में औसत विचलन क्यों उपयोगी है?

- A. यह प्रत्यक्ष रूप से मापन यथार्थता में सुधार करता है
- B. यह मापी गई राशि के वास्तविक मान की पहचान करने में सहायक होता है
- C. यह डेटा के विस्तार का परिमाण निर्धारित करता है, जो मापन संगति इंगित करता है ✓
- D. यह तात्कालिक रूप से दर्शाता है कि कौन से पाठ्यांक त्रुटिपूर्ण हैं



Q9 Part B HINDI

जब कोई तरल, स्थिर असंपीड्य प्रवाह स्थितियों के अंतर्गत वैन्दुरी नली के अभिसारी खंड से होकर थ्रोट (throat) की ओर प्रवाहित होता है, तो तरल के वेग और स्थैतिक दाब में निम्नलिखित में से कौन-सा परिवर्तन होता है?

- A. वेग और दाब दोनों में वृद्धि होती है
- B. वेग में कमी होती है और दाब में वृद्धि होती है
- C. वेग में वृद्धि होती है और दाब में कमी होती है
- D. वेग और दाब दोनों में कमी होती है

Q10 Part B HINDI

संक्षारक रासायनिक वातावरण के लिए यंत्रीकरण नलिका (instrumentation tubes) का चयन करते समय, सामग्री चयन में किस प्राथमिक कारक का मार्गदर्शन होना चाहिए?

- A. नलिका पदार्थ की रासायनिक सुसंगतता
- B. नलिका भित्ति की एकसमान फिनिश
- C. नलिका विनिर्माण की विशिष्ट विधि
- D. नलिका व्यास का यथार्थ चयन

Q11 Part B HINDI

पर्ज और बैलेंस सिस्टम में स्तर के अंतर को इंगित करने के लिए यू-ट्यूब मैनोमीटर को कौन-सा सिद्धांत सक्षम बनाता है?

- A. एक रासायनिक अभिक्रिया द्रव के रंग को परिवर्तित करती है
- B. एक विद्युत सिग्नल रीडिंग को बदलता है
- C. चुंबकीय आकर्षण द्रव को खींचता है
- D. दाब अंतर के कारण द्रव की गति

Q12 Part B HINDI

एक ITI प्रशिक्षु एक सिलिकन डायोड का परीक्षण कर रहा है, जो एक परिवर्ती DC पावर सप्लाय और 1 kΩ धारा सीमाकारी प्रतिरोधक के साथ श्रेणी परिपथ में संयोजित है। डायोड अग्र-अभिनत है। जब प्रशिक्षु सप्लाय वोल्टता को 2 V से बढ़ाकर 10 V कर देता है, तो चालक डायोड के सिरों पर प्रत्यक्ष रूप से मापे गए वोल्टता पात में क्या परिवर्तन होता है?

- A. यह घटकर ठीक 0 V हो जाता है।
- B. यह सप्लाय के साथ अनुपाती रूप से 0.7 V से 3.5 V तक बढ़ता है।
- C. यह 0.7 वोल्ट से बढ़कर 10 V हो जाता है।
- D. यह लगभग 0.7 V पर लगभग अपरिवर्ती रहता है।

Q13 Part B

A factory needs to measure the level of an acidic, non-conductive liquid. Which electrical level measurement device would be most suitable?

- A. Capacitive sensor
- B. Conductive probe
- C. Float switch
- D. Differential pressure gauge

Q14 Part B HINDI

एक 2-निवेश XOR गेट का उपयोग एक संकेतन परिपथ में किया जाता है। निवेश A एक वेरिएबल डेटा लाइन से जुड़ा है, और निवेश B स्थायी रूप से +5V (लॉजिक 1) से जुड़ा है। निवेश A के सापेक्ष गेट का निर्गम कैसा व्यवहार करता है?

- A. निर्गम बिना किसी परिवर्तन के यथार्थतः निवेश A का अनुसरण करता है
- B. निर्गम 1 MHz की आवृत्ति पर स्वतः ही दोलन करता है
- C. निवेश A की स्थिति चाहे जो भी हो, निर्गम स्थायी रूप से लॉजिक 0 पर लॉक रहता है
- D. निर्गम, निवेश A के एक व्युत्क्रमित रूप के रूप में कार्य करता है

Q15 Part B HINDI

उस घन का आयतन ज्ञात कीजिए जिसकी भुजा की लंबाई 6 cm है।

- A. 36 cm³
- B. 72 cm³
- C. 108 cm³
- D. 216 cm³

Q16 Part B HINDI

DCS परिवेश में HMI का मुख्य कार्य क्या है?

- A. यह ऑपरेटरों को केवल दूरस्थ स्थानों से, वायरलेस तरीके से सिस्टम तक अभिगम्यता की सुविधा देता है
- B. यह त्वरित निर्णय लेने हेतु जटिल प्रक्रम डेटा को यूजर-अनुकूल दृश्य प्रारूप में प्रस्तुत करता है
- C. यह मानवीय निरीक्षण के बिना सभी प्रक्रियाओं को स्वचालित रूप से नियंत्रित करता है
- D. यह ऑपरेटरों को सीधे इंटरफेस से ही हार्डवेयर अनुरक्षण करने में सक्षम बनाता है

Q17 Part B HINDI

ईथरनेट LAN (Ethernet LAN) कनेक्शन में किस केबल कनेक्टर का उपयोग किया जाता है?

- A. VGA कनेक्टर (VGA Connector)
- B. USB टाइप-C (USB Type-C)
- C. RJ-45
- D. BNC पावर प्लग (BNC Power Plug)

Q18 Part B HINDI

इंजीनियरिंग ड्राइंग के संदर्भ में, तकनीकी ड्राइंग पर यथार्थ 90-डिग्री का कोण बनाने के लिए कौन-सा यंत्र सर्वाधिक उपयुक्त है?

- A. सेट स्क्वायर (Set square)
- B. फ्रेंच कर्व (French curves)
- C. प्रोट्रेक्टर (Protractor)
- D. T स्क्वायर (T square)



Q19 Part B HINDI

कंप्यूटर का कौन-सा घटक मुख्य रूप से अंकगणितीय, लॉजिक और नियंत्रण (arithmetic, logic, and control) प्रचालनों को करने के साथ-साथ इनपुट और आउटपुट कार्यों के प्रबंधन के लिए उत्तरदायी है?

- A. मॉनिटर
- B. पावर सप्लाय यूनिट
- C. हार्ड डिस्क ड्राइव
- D. CPU

**Q20 Part B HINDI**

औद्योगिक परिवेश में, तापमान मापन के लिए अवरक्त उत्तापमापी (infrared pyrometers) के उपयोग का मुख्य लाभ क्या है?

- A. वे भौतिक संपर्क के बिना तापमान मापते हैं
- B. वे केवल आंतरिक तापमान पाठ्यांक प्रदान करते हैं
- C. उन्हें प्रक्रम धारा में प्रविष्ट किया जाना चाहिए
- D. कार्य करने के लिए उन्हें जल शीतलन की आवश्यकता होती है

**Q21 Part B HINDI**

औद्योगिक प्रक्रियाओं में यंत्रीकरण किस प्रकार उपयोगी है?

- A. यह प्रक्रम चरों की यथार्थ रूप से निगरानी और नियंत्रण में सहायता करता है
- B. यह उत्पादन के दौरान उपकरण की शून्य विफलता की गारंटी देता है
- C. यह प्रक्रम में होने वाले समस्त ऊर्जा ह्रास को समाप्त कर देता है
- D. यह अनुरक्षण की आवश्यकता को समाप्त कर देता है

**Q22 Part B**

Which component is used in a crystal oscillator circuit to stabilize its frequency during workshop testing?

- A. Quartz crystal
- B. Carbon resistor
- C. Ceramic capacitor
- D. Silicon diode

**Q23 Part B HINDI**

55° चूड़ी कोण और गोलित शिखरों तथा मूलों (rounded crests and roots) द्वारा अभिलक्षित किस प्रकार की V-चूड़ी होती है?

- A. यूनिफाइड चूड़ी (Unified thread)
- B. ISO मीटरी चूड़ी (ISO Metric thread)
- C. व्हिटवर्थ चूड़ी (Whitworth thread)
- D. एकमी चूड़ी (Acme thread)

**Q24 Part B HINDI**

यंत्र का कौन-सा अभिलक्षण, इनपुट संकेतों को बिना विरूपण के पुनरुत्पादित करने की क्षमता का वर्णन करता है?

- A. यथार्थता (Accuracy)
- B. विश्वसनीयता (Reliability)
- C. तद्रूपता (Fidelity)
- D. सुग्राहिता (Sensitivity)

**Q25 Part B HINDI**

औद्योगिक परिवेश में कार्य करते समय, एक कर्मचारी को दुर्घटनावश अग्रबाहु (forearm) पर गभीर कट लग जाता है। आगे की कार्रवाई पर विचार करने से पहले, प्रारंभिक प्राथमिक उपचार प्रदान करने के लिए पहला कदम क्या होना चाहिए?

- A. बाहु को तुरंत हृदय से ऊपर उठाना
- B. किसी भी अन्य कार्य से पहले क्षत को प्रवाही जल से धोना
- C. बाहु को तुरंत पट्टी (bandage) से कसकर बांधना
- D. साफ कपड़े से क्षत (wound) पर सीधे ही दाब डालना

**Q26 Part B**

In an industrial environment, what is the primary safety reason for keeping walkways clear of tools and materials during maintenance tasks?

- A. To facilitate quick movement around the machines
- B. To prevent workers from tripping and getting injured
- C. To reduce cleaning and housekeeping effort
- D. To improve workplace lighting conditions

**Q27 Part B HINDI**

एक चिकित्सा उपकरण के लिए ऐसे ताप सेंसर की आवश्यकता है जो संवेदनशील रोगी-निगरानी (sensitive patient monitoring) हेतु ताप बढ़ने पर अपने प्रतिरोध को तीव्रता से कम कर दे। इस अनुप्रयोग के लिए कौन-सा थर्मिस्टर सर्वाधिक उपयुक्त है?

- A. ऋणात्मक ताप गुणांक (NTC) थर्मिस्टर
- B. धनात्मक ताप गुणांक (PTC) थर्मिस्टर
- C. प्रकाश आश्रित प्रतिरोधक
- D. धातु ऑक्साइड वैरिस्टर



Q28 Part B HINDI

उच्च-आवृत्ति धाराओं को मापते समय, तापवैद्युत-युग्म ऐमीटर, विद्युत-चुंबकीय ऐमीटर की तुलना में विश्वसनीय पाठ्यांक क्यों प्रदान करते हैं?

- A. वे आंतरिक धारिता प्रभावों के साथ आवृत्ति परिवर्तनों की प्रतिपूर्ति करते हैं
- B. वे परिपथ प्रतिरोध परिवर्तनों के संसूचन द्वारा धारा को मापते हैं
- C. वे अपने चुंबकीय क्षेत्र को प्रत्यावर्ती सिग्नल आवृत्ति के साथ संरेखित करते हैं
- D. वे उपरिस्तर प्रभाव या आवृत्ति-निर्भर प्रेरकत्व से प्रभावित नहीं होते हैं ✓

Q29 Part B HINDI

ईथरनेट नेटवर्किंग में, OSI मॉडल की कौन-सी लेयर मुख्य रूप से MAC एड्रेसिंग के प्रबंधन और फिजिकल ट्रांसमिशन मीडियम तक एक्सेस को नियंत्रित करने के लिए उत्तरदायी है?

- A. फिजिकल लेयर (Physical Layer)
- B. एप्लिकेशन लेयर (Application Layer)
- C. सेशन लेयर (Session Layer)
- D. डेटा लिंक लेयर (Data Link Layer) ✓

Q30 Part B HINDI

HART ट्रांसमीटरों के संदर्भ में संक्षिप्त रूप HART का पूर्ण रूप क्या होता है?

- A. High Accuracy Recording Terminal (हाई एक्यूरेसी रिकॉर्डिंग टर्मिनल)
- B. Hybrid Analog Relay Transmitter (हाइब्रिड एनालॉग रिले ट्रांसमीटर)
- C. High Amplitude Response Tester (हाई एम्प्लीट्यूड रिस्पॉन्स टेस्टर)
- D. Highway Addressable Remote Transducer (हाईवे एड्रेसेबल रिमोट ट्रांसड्यूसर) ✓

Q31 Part B HINDI

जब धारा मापन के लिए समानांतर शंट युक्त परिपथ में गैल्वेनोमीटर का उपयोग किया जाता है, तो शंट का मान क्या निर्धारित करता है?

- A. गैल्वेनोमीटर को बायपास करने वाली धारा का अंश ✓
- B. गैल्वेनोमीटर कुंडली की सुग्राहिता
- C. पावर स्रोत पर वोल्टता पात
- D. संपूर्ण परिपथ का कुल प्रतिरोध

Q32 Part B HINDI

8085 इंस्ट्रक्शन अनुक्रम इस प्रकार दिया गया है:

MVI A, 20H

MVI B, 10H

CMP B

कौन-सा ऑपरेशन किया जाता है?

- A. A और B को क्लीयर (Clear) करना
- B. कैरी से एक्ज्युमुलेटर की तुलना करना
- C. A और B का पूरक (Compliment) करना
- D. रजिस्टर B से एक्ज्युमुलेटर की तुलना करना ✓

Q33 Part B HINDI

ऑप-एम्प समाकलक परिपथ के फीडबैक पथ में कौन-सा इलेक्ट्रॉनिक घटक जुड़ा होता है?

- A. डायोड
- B. फ्यूज
- C. संधारित्र ✓
- D. ट्रांसफार्मर

Q34 Part B HINDI

यदि किसी ज्या तरंग का RMS मान 10 V है और अर्धचक्र में इसका औसत मान 8 V है, तो तरंगरूप का रूप गुणक (form factor) कितना होगा?

- A. 18
- B. 80
- C. 0.8
- D. 1.25 ✓

Q35 Part B HINDI

यदि कोई वातिल तंत्र, ऊष्मा को बाहर निकाले बिना वायु को तेजी से संपीड़ित करता है, तो वायु के ताप और दाब दोनों पर क्या प्रभाव पड़ने की संभावना होती है?

- A. तापमान और दाब दोनों में कमी आएगी
- B. तापमान और दाब दोनों में वृद्धि होगी ✓
- C. केवल तापमान में वृद्धि होगी
- D. केवल दाब में वृद्धि होगी

Q36 Part B HINDI

एक ऐसी प्रक्रिया में जहाँ एक स्तर नियंत्रक, स्टोरेज टैंक में अंतर्गम प्रवाह को समायोजित करने के लिए नियंत्रण वाल्व को सिग्नल भेजता है, तो नियंत्रण वाल्व मुख्य रूप से कौन-सी भूमिका निभाता है?

- A. नियंत्रक
- B. प्राथमिक संवेदन अवयव
- C. अंतिम नियंत्रण अवयव ✓
- D. मापन ट्रांसमीटर



Q37 Part B HINDI

वैद्युत उपकरण में AC मोटर का प्राथमिक कार्य क्या है?

- A. सिग्नल का संचरण करना
- B. विद्युत ऊर्जा को यांत्रिक ऊर्जा में रूपांतरित करना ✓
- C. विद्युत ऊर्जा का संचयन करना
- D. यांत्रिक ऊर्जा को विद्युत ऊर्जा में रूपांतरित करना

Q38 Part B HINDI

तापमान में वृद्धि होने से प्रकाशिक उत्तापमापी द्वारा संसूचित विकिरण की तीव्रता पर क्या प्रभाव पड़ता है?

- A. तीव्रता में तीव्र वृद्धि होती है ✓
- B. तीव्रता में क्रमिक कमी होती है
- C. तीव्रता अपरिवर्ती रहती है
- D. तीव्रता में अनियमित परिवर्तन होता है

Q39 Part B

What is the main purpose of a recorder in industrial and research processes?

- A. To obtain a permanent record of process variables over time ✓
- B. To trigger alarms when values change suddenly
- C. To measure variables without storing the data
- D. To display data in real time without saving it

Q40 Part B

Which component automatically disconnects the auxiliary winding in a split phase induction motor after the motor gains sufficient speed?

- A. Centrifugal switch after motor accelerates ✓
- B. Thermal overload relay connected externally
- C. Electromagnetic contactor during full load
- D. Time delay relay after a preset duration

Q41 Part B HINDI

विद्युत प्रणाली के लिए ब्लॉक आरेख अभिकल्पित करते समय, कौन-सा अभिलक्षण यूनिटों के बीच संभ्रम या अतिव्यापन के बिना सूचना के सही प्रवाह को सुनिश्चित करता है?

- A. आरेख में ब्लॉकों को विकर्णतः व्यवस्थित करना
- B. विभिन्न आकृतियों के ब्लॉक आरेखित करना
- C. समान ब्लॉकों को एक साथ समूहित करना
- D. ब्लॉकों के बीच दिशात्मक तीरों का उपयोग करना ✓

Q42 Part B

Which feature best describes the purpose of using a block diagram in engineering drawing when representing a complex system?

- A. To specify manufacturing dimensions of components
- B. To show exact shapes of physical components
- C. To indicate material specifications of parts
- D. To represent major functional units of a system ✓

Q43 Part B HINDI

कोई कार्यशाला, श्रम सहित एक घटक की विनिर्माण लागत ₹1,200 प्राक्कलित करती है। यदि 25 घटकों का उत्पादन किया जाता है और ₹5,000 का अतिरिक्त नियत उपरिव्यय जोड़ा जाता है, तो प्राक्कलित कुल उत्पादन लागत ज्ञात कीजिए।

- A. ₹30,000
- B. ₹32,500
- C. ₹35,000 ✓
- D. ₹37,500

Q44 Part B HINDI

ठोस प्रबंधन प्रणालियों (solids handling systems) में आयतनमितीय प्रवाह मापी क्या मापता है?

- A. प्रति यूनिट समय में गुजरने वाले ठोसों का द्रव्यमान
- B. भंडारण टैंक में ठोसों का स्तर
- C. ठोस प्रवाह में तापमान परिवर्तन
- D. प्रति यूनिट समय में गुजरने वाले ठोसों का आयतन ✓

Q45 Part B

Which option shows digits only from the decimal system?

- A. A, 2, 3, 5
- B. 1, 2, B, 4
- C. F, 8, 6, 2
- D. 3, 7, 9, 0 ✓

Q46 Part B HINDI

निम्नलिखित में से कौन-सा, नियंत्रक (controller) में इनपुट मॉड्यूल के प्राथमिक कार्य का सटीक वर्णन करता है?

- A. यह नियंत्रक से प्रवर्तक को सिग्नल भेजता है।
- B. यह नियंत्रक के लिए प्रोग्राम इंस्ट्रक्शन संग्रहीत करता है।
- C. यह फील्ड डिवाइसों से सिग्नल प्राप्त करता है और उन्हें नियंत्रक को भेजता है। ✓
- D. यह स्वचालन के लिए नियंत्रण लॉजिक को संसाधित करता है।



Q47 Part B HINDI

एक सिंचाई नहर के लिए न्यूनतम शीर्ष हानि के साथ और जल प्रवाह में बिना किसी महत्वपूर्ण व्यवधान के सतत प्रवाह मापन की आवश्यकता होती है। कौन सी युक्ति सर्वाधिक उपयुक्त है?

A. पारशल अवनलिका (Parshall flume) ✓

B. V-नॉच वियर (V-notch weir)

C. आस्य मापी (Orifice meter)

D. आयत वियर (Rectangular weir)

Q48 Part B HINDI

जब एक PN जंक्शन पर DC वोल्टता अनुप्रयुक्त की जाती है, जिसका धनात्मक सिरा N-टाइप से और ऋणात्मक सिरा P-टाइप से जुड़ा होता है, तो अवक्षय क्षेत्र में क्या परिवर्तन होता है?

A. अवक्षय क्षेत्र पूरी तरह से लुप्त हो जाता है

B. अवक्षय क्षेत्र की चौड़ाई में वृद्धि हो जाती है ✓

C. जंक्शन, दृश्य प्रकाश उत्सर्जित करता है

D. अवक्षय क्षेत्र की चौड़ाई में कमी हो जाती है

Q49 Part B HINDI

2 μF और 3 μF के दो संधारित्र श्रेणी क्रम में जुड़े हुए हैं। उनकी तुल्य धारिता कितनी है?

A. 0.6 μF

B. 6 μF

C. 1.2 μF ✓

D. 5 μF

Q50 Part B HINDI

एक द्रवीय तंत्र डिजाइन करते समय, जिसमें बारंबार दूरस्थ प्रचालन की आवश्यकता होती है, किस प्रकार के दिशात्मक नियंत्रण वाल्व वर्गीकरण पर विचार करना सर्वाधिक महत्वपूर्ण हो जाता है?

A. माउंटिंग शैली वर्गीकरण

B. मार्ग-आधारित वर्गीकरण

C. प्रवर्तन (actuation) विधि वर्गीकरण ✓

D. आमाप (size) आधारित वर्गीकरण

Q51 Part B HINDI

निम्नलिखित में से कौन-सी विशेषता, वाल्व पोजीशन सेंसिंग के लिए उपयोग किए जाने वाले कैपेसिटिव प्रॉक्सिमिटी स्विच को अन्य वाल्व पोजीशन सेंसर से अलग करती है?

A. यह पोजीशन फीडबैक के लिए पूरी तरह से लीवर की भौतिक गति पर निर्भर करता है।

B. यह पोजीशन परिवर्तनों को सेंस करने के लिए मुख्य रूप से ऊष्मीय विस्तार पर निर्भर करता है।

C. यह पोजीशन का पता लगाने के लिए यांत्रिक या ऊष्मीय प्रभावों के बजाय धारिता में परिवर्तन का उपयोग करता है। ✓

D. यह वाल्व की गति का पता लगाने के लिए दाबांतर को सेंस करता है।

Q52 Part B HINDI

जब दाब प्रमापी में धौंकनी (bellows) का उपयोग किया जाता है, तो क्या होता है यदि बाह्य दाब बढ़ जाता है जबकि आंतरिक दाब स्थिर रहता है?

A. धौंकनी फैलती है

B. धौंकनी अपरिवर्तित रहती है

C. धौंकनी घूमती है

D. धौंकनी सिकुड़ती है ✓

Q53 Part B

Which function does a 3/2 pneumatic valve perform in a basic pneumatic circuit?

A. It reduces the pressure of the compressed air

B. It mixes air with lubricating oil

C. It controls the flow of air to and from an actuator ✓

D. It measures the airflow in the pipeline

Q54 Part B HINDI

मापन यंत्र में क्रमबद्ध त्रुटि (systematic error) की पहचान कैसे की जा सकती है?

A. मापन को कई बार दोहराकर

B. दिन के अलग-अलग समय पर मापन करके

C. मापे गए मानों का औसत करके

D. यंत्र के पाठ्यांकों की तुलना एक ज्ञात मानक मान से करके ✓

Q55 Part B

Which characteristic fundamentally differentiates an oscillating piston flow meter from a reciprocating piston flow meter?

A. Display mechanism used for indication

B. Motion of the piston within the measuring chamber ✓

C. Method of transmitting the output signal

D. Material of construction

Q56 Part B HINDI

किसी प्ररूपी pH मीटर का कौन-सा भाग, प्राथमिक रूप से विलयन में हाइड्रोजन आयन की सांद्रता का संसूचन करने के लिए उत्तरदायी होता है?

A. डिस्प्ले

B. निर्देश इलेक्ट्रोड

C. प्रवर्धक

D. कांच इलेक्ट्रोड ✓



Q57 Part B HINDI

उच्च प्रवर्तन बल-आघूर्ण की आवश्यकता वाले क्रेन और हॉयस्ट जैसे अनुप्रयोगों के लिए किस प्रकार की DC मोटर का उपयोग किया जाता है?

- A. अन्यतः उत्तेजित DC मोटर (Separately excited DC motor)
- B. शंट कुंडलित DC मोटर (Shunt wound DC motor)
- C. श्रेणी कुंडलित DC मोटर (Series wound DC motor) ✓
- D. संचयी यौगिक DC मोटर (Cumulative compound DC motor)

Q58 Part B HINDI

एक ITI विद्यार्थी ने दो लॉजिक स्विच को अर्ध योजक (half adder) से जोड़ा और पाया कि सम (SUM) आउटपुट, लॉजिक HIGH पर है, जबकि कैरी (CARRY) आउटपुट, लॉजिक LOW पर है। दोनों इनपुट की स्थिति क्या है?

- A. दोनों इनपुट लॉजिक HIGH पर हैं
- B. एक इनपुट लॉजिक HIGH पर है, दूसरा इनपुट लॉजिक LOW पर है ✓
- C. दोनों इनपुट लॉजिक LOW पर हैं
- D. दोनों इनपुट फ्लोटिंग हैं

Q59 Part B HINDI

निम्नलिखित में से किसे औद्योगिक नियंत्रण लूप में प्रक्रिया चर नहीं माना जाएगा?

- A. ऊष्मा विनिमयित्र में तापमान
- B. किसी पात्र के भीतर का दाब
- C. प्रवर्तक को भेजा गया विद्युत संकेत ✓
- D. पाइपलाइन में प्रवाह दर

Q60 Part B HINDI

यदि एक प्रशिक्षु एक मानक 2-इनपुट NAND गेट के दोनों इनपुट पिनो को एक साथ शॉर्ट करके एक एकल उभयनिष्ठ इनपुट टर्मिनल बनाता है, तो कौन-सा बेसिक लॉजिक गेट फंक्शन बनता है?

- A. NOT गेट ✓
- B. AND गेट
- C. OR गेट
- D. NOR गेट

Q61 Part B HINDI

AC पावर सिस्टम में आवृत्ति-मापी का उपयोग करना क्यों महत्वपूर्ण है?

- A. सही आवृत्ति पर सिस्टम के प्रचालन को सुनिश्चित करता है ✓
- B. यह केबल में रोधन प्रतिरोध की जाँच करता है
- C. यह वोल्टता स्तर की सटीक रूप से माप करता है
- D. यह तापमान में परिवर्तनों को मॉनिटर करता है

Q62 Part B HINDI

ऐसे परिदृश्य में जहां शीतलन जल तंत्र में प्रवाह को समायोजित करने के लिए बारंबार प्रचालन और त्वरित अनुक्रिया की आवश्यकता है, बटरफ्लाई वाल्व की कौन-सी विशेषता उन्हें अन्य नियंत्रण वाल्वों की तुलना में लाभ प्रदान करती है?

- A. धीरे-धीरे खुलने के लिए रैखिक गति
- B. क्षरण को कम करने के लिए डबल-सीट डिज़ाइन
- C. त्वरित खुलने और बंद होने के लिए क्वार्टर-टर्न (Quarter-turn) प्रचालन ✓
- D. क्रमिक नियंत्रण के लिए मल्टी-टर्न (Multi-turn) प्रवर्तन

Q63 Part B HINDI

एक चल-लौह आवृत्ति मापी (moving iron frequency meter) में, मापे गए सिग्नल की आवृत्ति में परिवर्तन होने पर क्या बदलता है?

- A. लौह टुकड़े का भार
- B. परिपथ घटकों की प्रतिबाधा ✓
- C. सूचक की लंबाई
- D. कुंडली में फेरों की संख्या

Q64 Part B HINDI

डिस्ट्रिब्यूटेड कंट्रोल सिस्टम (DCS) में, फील्ड उपकरणों को नियंत्रकों से कनेक्ट करने के लिए मुख्य रूप से किस संचार प्रोटोकॉल का उपयोग किया जाता है?

- A. BACnet
- B. HTTP
- C. SNMP
- D. FOUNDATION Fieldbus ✓

Q65 Part B HINDI

जब एक 8-बिट सक्सेसिव एप्रोक्सिमेशन रजिस्टर (SAR) ADC अपना पहला तुलना चक्र आरंभ करता है, तो प्रारंभ में रजिस्टर में कौन-सा बाइनरी कोड लोड किया जाता है?

- A. 00000001
- B. 01111111
- C. 11111111
- D. 10000000 ✓

Q66 Part B HINDI

द्रवों से संबंधित दाब मापन में विशिष्ट गुरुत्व का उपयोग किस प्रकार किया जाता है?

- A. विशिष्ट गुरुत्व, दो दाबों के बीच के अंतर की तुलना करता है
- B. विशिष्ट गुरुत्व, किसी दिए गए दाबांतर के लिए द्रव स्तंभ की ऊंचाई निर्धारित करने में सहायक होता है ✓
- C. विशिष्ट गुरुत्व, उपकरणों में प्रयुक्त दाब की यूनिट प्रदान करता है
- D. विशिष्ट गुरुत्व, प्रणाली में प्रत्यक्ष रूप से दाब को मापता है



Q67 Part B HINDI

एक वोल्टमीटर, मापे जाने वाली वास्तविक वोल्टता से अधिक वोल्टता मान दर्शाता है। इस प्रकार की मापन त्रुटि क्या कहलाती है?

- A. ऋणात्मक त्रुटि (Negative error)
- B. धनात्मक त्रुटि (Positive error) ✓
- C. यादृच्छिक त्रुटि (Random error)
- D. शून्यांक त्रुटि (Zero error)

Q68 Part B HINDI

किसी मध्य-टैपित पूर्ण तरंग दिष्टकारी (centre-tapped full wave rectifier) में, एक डायोड विवृत परिपथित हो जाता है। परिपथ के आउटपुट पर इसका क्या प्रभाव पड़ता है?

- A. आउटपुट, ऊर्मिका-मुक्त DC हो जाता है
- B. कोई आउटपुट वोल्टता उत्पन्न नहीं होती है
- C. परिपथ अर्ध-तरंग दिष्टकारी के रूप में प्रचालित होता है ✓
- D. आउटपुट विशुद्ध AC हो जाता है

Q69 Part B HINDI

किसी आदर्श संक्रियात्मक प्रवर्धक को निम्नलिखित में से किस गुणधर्म द्वारा अभिलक्षित किया जाता है?

- A. अपरिमित निवेश प्रतिरोध और अपरिमित निर्गम प्रतिरोध
- B. परिमित निवेश प्रतिरोध और शून्य निर्गम प्रतिरोध
- C. अनंत निवेश प्रतिरोध और शून्य निर्गम प्रतिरोध ✓
- D. शून्य निवेश प्रतिरोध और अनंत निर्गम प्रतिरोध

Q70 Part B HINDI

पारद वायुदाबमापी (mercury barometer) का कौन-सा अभिकल्पन अभिलक्षण, दाब मापन में केशिका क्रिया के कारण होने वाली त्रुटि को न्यूनीकृत करता है?

- A. संकीर्ण आंतरिक व्यास वाली नली का उपयोग करना
- B. सूक्ष्म अंशांकन वाला पैमाना जोड़ना
- C. पर्याप्त बड़े आंतरिक व्यास वाली नली का उपयोग करना ✓
- D. दृश्यता के लिए रंगीन पारद का उपयोग करना

Q71 Part B HINDI

एक कर्मकार ने सौंपे गए कुल 48 कार्यों में से 36 कार्य पूरे किए। पूरे किए गए कार्यों का प्रतिशत ज्ञात कीजिए।

- A. 80%
- B. 60%
- C. 75% ✓
- D. 70%

Q72 Part B HINDI

किस परिस्थिति में अग्रभरण नियंत्रण (feedforward control), पुनर्भरण नियंत्रण की तुलना में परफॉरमेंस के संबंध में महत्वपूर्ण लाभ प्रदान करेगा?

- A. जब प्रक्रिया संबंधी विक्षोभों को मापा नहीं जा सकता हो
- B. जब प्रक्रिया संबंधी विक्षोभों को तंत्र पर प्रभाव डालने से पहले ही मापा जा सकता हो ✓
- C. जब मापन के लिए केवल प्रक्रिया का आउटपुट ही उपलब्ध हो
- D. जब नियंत्रक ट्यूनिंग पैरामीटर अज्ञात हों

Q73 Part B HINDI

टरबाइन प्रवाहमापी में, जब तरल का वेग बढ़ता है तो विद्युत स्पंदनों की आवृत्ति पर क्या प्रभाव पड़ता है?

- A. तरल के वेग में वृद्धि के साथ स्पंद आवृत्ति में भी वृद्धि होती है ✓
- B. तरल के वेग में वृद्धि होने पर स्पंदन आवृत्ति में कमी होती है
- C. स्पंद आवृत्ति सदैव अपरिवर्ती रहती है
- D. स्पंद आवृत्ति का वेग से कोई संबंध नहीं होता है

Q74 Part B HINDI

दृष्टि कांच के शीर्ष पर दाब की स्थितियाँ पात्र में द्रव के शीर्ष के समान क्यों होनी चाहिए?

- A. दृष्टि कांच के भीतर द्रव को वाष्पित होने से रोकने के लिए
- B. टैंक और दृष्टि कांच में द्रव के स्तर समान होना सुनिश्चित करने के लिए ✓
- C. भराई के दौरान टैंक से वायु को बाहर निकलने देने के लिए
- D. अनुरक्षण के दौरान दृष्टि कांच को बंद रखने के लिए



Q75 Part B **HINDI**

1-फेज ट्रांसफार्मर के शार्ट सर्किट परीक्षण (short circuit test) से निम्नलिखित पाठ्यांक प्राप्त होते हैं:

$V_{sc} = 15 \text{ V}$, $I_{sc} = 5 \text{ A}$ और $W_{sc} = 40 \text{ W}$

ट्रांसफार्मर का तुल्यमान प्रतिघात (X_{eq}) ज्ञात कीजिए।

A. $X_{eq} = \sqrt{\left(\frac{40}{25}\right)^2 + \left(\frac{15}{5}\right)^2}$

B. $X_{eq} = \sqrt{\left(\frac{15}{5}\right)^2 - \left(\frac{40}{25}\right)^2}$ ✓

C. $X_{eq} = \left(\frac{15}{5}\right) + \left(\frac{40}{25}\right)$

D. $X_{eq} = \left(\frac{15}{5}\right) - \left(\frac{40}{25}\right)$



Part B

75 Questions • Answer Key

Q1 Part B BENGALI

অনুনাদের নীতি ব্যবহারকারী একটি ফ্রিকোয়েন্সি মিটারে, পরিমাপক যন্ত্রের স্বাভাবিক ফ্রিকোয়েন্সি যখন ইনপুট সিগন্যাল ফ্রিকোয়েন্সির সাথে মিলে যায় তখন কী ঘটে?

- A. তড়িৎ প্রবাহের অভিমুখ বিপরীত হয়ে যায়
- B. যন্ত্রটিতে তড়িৎ প্রবাহ শূন্য হয়ে যায়
- C. স্পন্দনের সর্বোচ্চ বিস্তার পরিলক্ষিত হয় ✓
- D. যন্ত্রটির সামগ্রিক ভোল্টেজ শূন্য হয়ে যায়

Q2 Part B BENGALI

ডিজিটাল কন্ট্রোল সিস্টেমে স্মার্ট ডিভাইস কেন ব্যবহার করা হয়?

- A. সামগ্রিক খরচ বৃদ্ধি করতে
- B. অটোমেশনের মাত্রা কমাতে
- C. কন্ট্রোলারের প্রয়োজনীয়তা দূর করতে
- D. দক্ষতা বৃদ্ধি করতে ও কার্যক্রমকে সর্বোত্তম করতে ✓

Q3 Part B BENGALI

শিল্পাঞ্চলে অবস্থিত একটি কারখানা, নিকটবর্তী কোনো জলাধারে অপরিশোধিত বর্জ্য পদার্থ নিষ্পত্তি করলে স্থানীয় জলজ বাস্তুতন্ত্রের ওপর সবচেয়ে সম্ভাব্য প্রভাব কী হতে পারে?

- A. এটি কারখানার পার্শ্ববর্তী অঞ্চলে বাতাসের আর্দ্রতা বাড়িয়ে দিতে পারে
- B. এটি জলে দ্রবীভূত অক্সিজেনের মাত্রা কমিয়ে দিতে পারে, যার ফলে মাছ এবং অন্যান্য জলজ প্রাণীরা ক্ষতিগ্রস্ত হয় ✓
- C. এটি শৈবালের অত্যধিক বৃদ্ধি ঘটাতে পারে, যার ফলে জলদূষণ ঘটে
- D. এটি জলের উপরিভাগে পৌঁছানো সূর্যালোকের পরিমাণ বাড়িয়ে দিতে পারে

Q4 Part B BENGALI

একটি প্রক্রিয়ার জন্য এমন একটি যন্ত্র প্রয়োজন যা উচ্চ কম্পাঙ্কের নয়েজ দ্বারা প্রভাবিত না হয়ে ক্ষুদ্র বিস্তারের সংকেত সঠিকভাবে পরিমাপ করতে পারে। যন্ত্রটির কোন বিস্তার প্রতিক্রিয়া বৈশিষ্ট্য (amplitude response property) থাকা উচিত?

- A. যন্ত্রটি উচ্চ-কম্পাঙ্কের উপাদানগুলিকে বিবর্ধিত করবে
- B. যন্ত্রটি নিম্ন-কম্পাঙ্কের উপাদানগুলিকে বিবর্ধিত করবে
- C. যন্ত্রটি উচ্চ-কম্পাঙ্কের উপাদানগুলিকে ক্ষীণ (attenuate) করবে ✓
- D. যন্ত্রটি সকল কম্পাঙ্কে অভিন্ন প্রতিক্রিয়া (flat response) বজায় রাখবে

Q5 Part B BENGALI

একটি AC জেনারেটরের শতকরা ভোল্টেজ রেগুলেশন (percentage voltage regulation) গণনা করার সঠিক গাণিতিক সূত্র কোনটি?

- A. $\frac{((\text{ফুল-লোড ভোল্টেজ} - \text{নো-লোড ভোল্টেজ}) / \text{নো-লোড ভোল্টেজ}) \times 100}{}$
- B. $\frac{((\text{ফুল-লোড ভোল্টেজ} - \text{নো-লোড ভোল্টেজ}) / \text{ফুল-লোড ভোল্টেজ}) \times 100}{}$
- C. $\frac{((\text{নো-লোড ভোল্টেজ} - \text{ফুল-লোড ভোল্টেজ}) / \text{নো-লোড ভোল্টেজ}) \times 100}{}$
- D. $\frac{((\text{নো-লোড ভোল্টেজ} - \text{ফুল-লোড ভোল্টেজ}) / \text{ফুল-লোড ভোল্টেজ}) \times 100}{}$ ✓

Q6 Part B BENGALI

লেভেল পরিমাপের ক্ষেত্রে 'প্রেশার হেড' (pressure head) যন্ত্রগুলোর মূল নীতি কী?

- A. এগুলো তরলের রঙ পরিমাপ করে
- B. এগুলো ট্যাক্সের আয়তন পরিমাপ করে
- C. এগুলো তরল-স্তরের উচ্চতার কারণে সৃষ্ট চাপ পরিমাপ করে ✓
- D. এগুলো তরলের তাপমাত্রা পরিমাপ করে

Q7 Part B BENGALI

একটি 2-ইনপুট লজিক গেট কেবল তখনই লজিক HIGH আউটপুট প্রদান করে যখন উভয় ইনপুট সমান লজিক লেভেলে থাকে। কোন গেটটি এই কাজটি করে?

- A. NOR গেট
- B. XNOR গেট ✓
- C. NAND গেট
- D. XOR গেট

Q8 Part B BENGALI

নতুন যন্ত্রপাতি চালু করার আগে সাপ্লাইয়ের তিনটি ফেজের মধ্যে একটি ফেজ সিকোয়েন্স ইন্ডিকেটর সংযুক্ত করা কীভাবে সহায়তা করে?

- A. এটি নিশ্চিত করে যে যন্ত্রটি কাঙ্ক্ষিত অভিমুখে কাজ করবে ✓
- B. এটি সাপ্লাই লাইনে আর্থ ফল্ট শনাক্ত করে
- C. এটি ফেজগুলোর মধ্যে লোডের ভারসাম্য বজায় রাখে
- D. এটি সাপ্লাই ভোল্টেজকে যন্ত্রপাতির রেটিংয়ের সাথে সামঞ্জস্যপূর্ণ করে তোলে



Q9 Part B BENGALI

একটি DCS আর্কিটেকচারে, অপারেটরকে একটি কেন্দ্রীয় অবস্থান থেকে সেটপয়েন্ট (setpoints) অ্যাডজাস্ট এবং অ্যালার্ম পর্যবেক্ষণ করতে হয়। কোন সাব-সিস্টেমটি এই সুবিধাগুলো প্রদান করে?

- A. রিমোট টার্মিনাল ইউনিট
- B. হিউম্যান-মেশিন ইন্টারফেস ☒
- C. কন্ট্রোলার
- D. হিস্টোরিয়ান

Q10 Part B BENGALI

একটি বিশুদ্ধ সাইনুসয়ডাল AC কারেন্টের (pure sinusoidal AC current) একটি পূর্ণ চক্রের (one complete cycle) গড় মান কত?

- A. শীর্ষ মান (Peak value)
- B. RMS মান (RMS value)
- C. বিস্তার এবং কম্পাঙ্কের গুণফল (Product of amplitude and frequency)
- D. শূন্য (Zero) ☒

Q11 Part B BENGALI

একটি র‍্যাম্প অ্যানালগ-টু-ডিজিটাল কনভার্টারে (ADC), কোন সার্কিটটি সরাসরি সেই মুহূর্তটি নির্ধারণ করে যখন রূপান্তর প্রক্রিয়াটি থেমে যায়?

- A. ভোল্টেজ রেগুলেটর (Voltage regulator)
- B. কম্পারেটর (Comparator) ☒
- C. ক্লক জেনারেটর (Clock generator)
- D. কাউন্টার (Counter)

Q12 Part B BENGALI

ইলেক্ট্রোপ্লেটিং বা তড়িৎলেপন প্রক্রিয়ায় বিদ্যুৎ সরবরাহের জন্য একটি DC জেনারেটর ব্যবহার করা হয়। এই কাজের জন্য নিচের কোন বৈশিষ্ট্যটি প্রয়োজন?

- A. স্থির কারেন্ট আউটপুট (Constant current output) ☒
- B. বিরতিমূলক সরবরাহ (Intermittent supply)
- C. কম দক্ষতা (Low efficiency)
- D. উচ্চ পরিমাণে ভোল্টেজ ওঠানামা (High voltage fluctuation)

Q13 Part B BENGALI

ডেটা বাস (data bus) এর প্রস্থের (width) ওপর ভিত্তি করে Intel 8085 মাইক্রোপ্রসেসরটি কোন শ্রেণীর অন্তর্ভুক্ত?

- A. 16 বিট মাইক্রোপ্রসেসর
- B. 32বিট মাইক্রোপ্রসেসর
- C. 8 বিট মাইক্রোপ্রসেসর ☒
- D. 4 বিট মাইক্রোপ্রসেসর

Q14 Part B BENGALI

একাধিক সমরূপ ছিদ্রযুক্ত (identical holes) একটি উপাদান তৈরি করার সময়, প্রতিটি চিহ্নিত স্থানে ড্রিলটি যাতে সঠিকভাবে শুরু হয় তা নিশ্চিত করার জন্য ড্রিলিং করার ঠিক আগে কোন হস্তচালিত সরঞ্জামটি (hand tool) ব্যবহার করা উচিত?

- A. পূর্বে চিহ্নিত ছিদ্রের কেন্দ্রগুলোকে আরও গভীর করতে একটি ডট পাঞ্চ (dot punch) ব্যবহার করা
- B. ছিদ্রের কেন্দ্রগুলোতে সূক্ষ্ম লেআউট মার্ক (fine layout marks) তৈরি করতে একটি প্রিক পাঞ্চ (prick punch) ব্যবহার করা
- C. ড্রিলিং করার আগে কেন্দ্রের দাগগুলোকে আরও মজবুত করতে একটি স্কাইবার (scriber) ব্যবহার করা
- D. প্রতিটি অবস্থানে স্টার্টার ইন্ডেন্টেশন (starter indentations) তৈরি করতে একটি সেন্টার পাঞ্চ (center punch) ব্যবহার করা ☒

Q15 Part B BENGALI

কোন নীতির সাহায্যে একটি থার্মোকপল অ্যামিটার সঠিকভাবে পরিবর্তী প্রবাহ (AC) পরিমাপ করতে পারে?

- A. এটি AC কে তাপে রূপান্তরিত করে এবং সমানুপাতিক ভোল্টেজ উৎপন্ন করে ☒
- B. এটি প্রবাহ শনাক্তকরণের জন্য আবেশের ওপর নির্ভর করে
- C. এটি একটি চৌম্বক ক্ষেত্র তৈরি করে যা কয়েলের মাধ্যমে পরিমাপ করা হয়
- D. এটি প্রবাহ শনাক্ত করতে রাসায়নিক বিক্রিয়া ব্যবহার করে

Q16 Part B BENGALI

সিগন্যাল বিবর্ধনের (signal amplification) জন্য একটি NPN BJT-কে তার 'সক্রিয় অঞ্চল' (active region)-এ কাজ করাতে হলে নিচের কোন বায়াস শর্তটি পূরণ করতে হবে?

- A. বেস-এমিটার এবং কালেক্টর-বেস উভয়ই বিপরীত-বায়াসে থাকবে
- B. বেস-এমিটার এবং কালেক্টর-বেস উভয়ই সম্মুখ-বায়াসে থাকবে
- C. বেস-এমিটার সম্মুখ-বায়াসে এবং কালেক্টর-বেস বিপরীত-বায়াসে থাকবে ☒
- D. বেস-এমিটার বিপরীত-বায়াসে এবং কালেক্টর-বেস সম্মুখ-বায়াসে থাকবে

Q17 Part B BENGALI

কোন WAN সুইচিং পদ্ধতিতে ডেটাকে ছোট ছোট প্যাকেটে ভাগ করা হয় এবং প্রতিটি প্যাকেট গন্তব্যে পৌঁছানোর জন্য ভিন্ন ভিন্ন পথ বেছে নিতে পারে?

- A. সার্কিট সুইচিং
- B. প্যাকেট সুইচিং ☒
- C. লাইন সুইচিং
- D. ফ্রিকোয়েন্সি সুইচিং



Q18 Part B BENGALI

গবেষণাগারে একটি নমুনার কোন বৈশিষ্ট্যটি পরিমাপ করার জন্য কন্ডাক্টিভিটি মিটার সবচেয়ে উপযুক্ত?

- A. দ্রবণের pH মান
- B. প্রলম্বিত কণার ঘনত্ব
- C. দ্রবণ দ্বারা শোষিত আলোর পরিমাণ
- D. আয়নের মাধ্যমে তড়িৎ প্রবাহ বহন করার ক্ষমতা ✓

Q19 Part B BENGALI

কোন যন্ত্রটি একটি আবদ্ধ পাইপলাইন সিস্টেমের (closed pipeline system) মধ্য দিয়ে প্রবাহিত কঠিন পদার্থের (solid flow) প্রবাহকে অবিরত বৈদ্যুতিক সিগন্যালের মাধ্যমে পরিমাপ করতে পারে?

- A. পোটেনশিওমিটার
- B. রিলে
- C. লিমিট সুইচ
- D. ইলেক্ট্রোস্ট্যাটিক ফ্লো-মিটার ✓

Q20 Part B BENGALI

একটি সিঙ্গেল-ফেজ ট্রান্সফরমারে (single phase transformer), ট্যাপ চেঞ্জার মেকানিজমটি কোন অংশের সঙ্গে সংযুক্ত থাকে?

- A. ল্যামিনেটেড সিলিকন স্টিল কোর সেকশন অ্যারেঞ্জমেন্ট (Laminated silicon steel core section arrangement)
- B. সিলিকা জেল ব্রিডার প্রোটেকশন ইউনিট অ্যাসেম্বলি (Silica gel breather protection unit assembly)
- C. ট্রান্সফর্মার অয়েল কনজারভেটর স্টোরেজ সেকশন (Transformer oil conservator storage section)
- D. হাই ভোল্টেজ প্রাইমারি ওয়াইন্ডিং ট্যাপিং সেকশন (High voltage primary winding tapping section) ✓

Q21 Part B BENGALI

কারখানার একটি সংরক্ষিত এলাকার প্রবেশপথে সাদা অনুভূমিক রেখা-সহ একটি লাল রঙের আয়তাকার সাইনবোর্ড বসানো হয়েছে। নিরাপত্তা সংক্রান্ত নির্দেশক চিহ্নের নিয়ম অনুযায়ী, এই চিহ্নটির সবচেয়ে উপযুক্ত ব্যাখ্যা কী?

- A. অননুমোদিত ব্যক্তিদের প্রবেশ কঠোরভাবে নিষিদ্ধ ✓
- B. যন্ত্রপাতি চালু থাকার সময় প্রবেশ সীমিত
- C. শুধুমাত্র সুপারভাইজারের লিখিত অনুমতি সাপেক্ষে প্রবেশের অনুমতি রয়েছে
- D. রক্ষণাবেক্ষণ চলাকালীন শুধুমাত্র সাফাই কর্মীদের প্রবেশের অনুমতি রয়েছে

Q22 Part B BENGALI

একটি DC মোটরের আর্মেচার রোধ $1\ \Omega$ এবং এটি $120\ V$ সাপ্লাই থেকে $5\ A$ আর্মেচার প্রবাহ গ্রহণ করে। এর পশ্চাৎবর্তী তড়িচ্চালক বল (back emf) নির্ণয় করুন।

- A. $110\ V$
- B. $115\ V$ ✓
- C. $120\ V$
- D. $100\ V$

Q23 Part B BENGALI

ওয়ার্কশপে একজন ট্রেনিকে শুধুমাত্র স্ট্যান্ডার্ড 2-ইনপুট NAND গেট ব্যবহার করে একটি 2-ইনপুট OR গেট এর সমতুল্য সার্কিট তৈরি করতে হবে। এর জন্য সর্বনিম্ন কতগুলি NAND গেটের প্রয়োজন?

- A. তিনটি গেট ✓
- B. চারটি গেট
- C. একটি গেট
- D. দুটি গেট

Q24 Part B BENGALI

নিম্নোক্ত কোনটি ফেজ-কন্ট্রোলড (phase-controlled) পাওয়ার ইলেকট্রনিক কন্ট্রোলারে, ফায়ারিং (কন্ট্রোল) অ্যাঙ্গেলের ভূমিকাকে সবচেয়ে ভালোভাবে বর্ণনা করে?

- A. এটি কন্ট্রোলারের সঙ্গে সংযুক্ত লোডের ধরন চয়ন করে
- B. এটি প্রতিটি চক্রের মধ্যে কন্ট্রোলার কখন কন্ডাকশন বা পরিবহন শুরু করবে তার সময় নির্ধারণ করে ✓
- C. এটি কন্ট্রোলারে AC ইনপুটের ফ্রিকোয়েন্সি নির্ধারণ করে
- D. এটি কন্ট্রোলারের ফিডব্যাক রেসপন্স সামঞ্জস্য করে

Q25 Part B BENGALI

সোল্ডারিং (Soldering) এর সময় যদি ফ্লাক্স (Flux) ব্যবহার করা না হয়, তবে কী ঘটতে পারে?

- A. ভোল্টেজ স্বয়ংক্রিয়ভাবে বৃদ্ধি পায়
- B. সোল্ডার ঘরের তাপমাত্রায় গলে যায়
- C. তারটি চৌম্বকীয় হয়ে ওঠে
- D. সোল্ডার জয়েন্টটি দুর্বল বা নির্ভরযোগ্যতাহীন হয়ে পড়তে পারে ✓

Q26 Part B BENGALI

একটি কম্প্রেসড এয়ার ট্রিটমেন্ট সিস্টেমে মূলত একটি প্রি-ফিল্টার, একটি এয়ার ড্রায়ার এবং একটি লুব্রিকেটর থাকে। পরবর্তী পর্যায়ের নিউম্যাটিক যন্ত্রপাতিতে পরিষ্কার, শুষ্ক এবং লুব্রিকেটেড বাতাস সরবরাহ করার জন্য এই উপাদানগুলোকে কোন ক্রমে ইনস্টল করতে হবে?

- A. লুব্রিকেটর, প্রি-ফিল্টার, এয়ার ড্রায়ার
- B. প্রি-ফিল্টার, লুব্রিকেটর, এয়ার ড্রায়ার
- C. এয়ার ড্রায়ার, প্রি-ফিল্টার, লুব্রিকেটর
- D. প্রি-ফিল্টার, এয়ার ড্রায়ার, লুব্রিকেটর ✓



Q27 Part B BENGALI

একটি কমন-ক্যাথোড সেভেন-সেগমেন্ট ডিসপ্লেতে, যদি 'd' সেগমেন্টটি স্থায়ীভাবে OFF থাকে, তবে নিচের কোন অঙ্কটি সঠিকভাবে প্রদর্শিত হবে না?

A. 7

B. 8

C. 4

D. 1

Q28 Part B BENGALI

স্ট্রেইন গেজ প্রেশার ট্রান্সডিউসারে (strain gauge pressure transducer) হুইটস্টোন ব্রিজের (Wheatstone bridge) কাজ কী?

A. চাপকে সরাসরি ভোল্টেজে রূপান্তর করা

B. বিদ্যুৎ প্রবাহের সাপ্লাই নিয়ন্ত্রণ করা

C. বৈদ্যুতিক সংকেতকে বিবর্ধিত করা

D. রোধের সামান্য পরিবর্তন শনাক্ত করা

Q29 Part B BENGALI

প্রসেস লুপে স্বয়ংক্রিয় ভালভ পরিচালনার ক্ষেত্রে সেন্সর থেকে প্রাপ্ত ফিডব্যাক কেন গুরুত্বপূর্ণ?

A. এটি কেবল সিস্টেম চালু করার সময় প্রয়োজন হয়

B. এটি সিস্টেম ম্যানুয়াল পরীক্ষা করার প্রয়োজনীয়তা সম্পূর্ণভাবে দূর করে

C. এটি রিয়েল-টাইম প্রসেস পরিবর্তনের ওপর ভিত্তি করে ভালভকে নিয়ন্ত্রণ করতে সহায়তা করে

D. এটি নিশ্চিত করে যে সিস্টেমে কখনোই কোনো ত্রুটি দেখা দেবে না

Q30 Part B BENGALI

উচ্চ-চাপ প্রয়োগের (High-pressure applications) জন্য ইনস্ট্রুমেন্টেশন টিউব নির্বাচন করার সময়, লিকেজ প্রতিরোধ এবং নিরাপত্তা নিশ্চিত করার জন্য কোন বৈশিষ্ট্যটি সবচেয়ে গুরুত্বপূর্ণ?

A. দ্রুত ইনস্টলেশনের জন্য হালকা নকশা (Lightweight design)

B. সহজে ম্যানুয়াল বেন্ডিং (Manual bending) এর উপযোগী নমনীয়তা

C. চাপের মধ্যে বিকৃতির বিরুদ্ধে উচ্চ প্রতিরোধ ক্ষমতা

D. সহজে পরিষ্কার করার জন্য মসৃণ বাহ্যিক ফিনিশ

Q31 Part B BENGALI

একটি কম্পিউটার সিস্টেমে, কোন নির্দিষ্ট ধরনের সফটওয়্যারটি মাদারবোর্ডের নন-ভোলাটাইল মেমোরিতে এম্বেড (Embedded) করা থাকে এবং সিস্টেমটি চালুর পর পরই, অপারেটিং সিস্টেমে নিয়ন্ত্রণ হস্তান্তর করার পূর্বে, হার্ডওয়্যার উপাদানগুলি ইনিশিয়ালাইজ করতে এবং বুট প্রসেস শুরু করার জন্য দায়ী থাকে?

A. অ্যাপ্লিকেশন সফটওয়্যার (Application Software)

B. ইউটিলিটি সফটওয়্যার (Utility Software)

C. ডিভাইস ড্রাইভার (Device Driver)

D. ফার্মওয়্যার (Firmware)

Q32 Part B BENGALI

একটি সেচ খালে জলপ্রবাহের পরিমাণ খুব কম এবং তা পরিবর্তনশীল। প্রবাহের এমন স্বল্পতার ক্ষেত্রে পরিমাপের সর্বোচ্চ সংবেদনশীলতা (sensitivity) এবং সঠিকতা (accuracy) পেতে কোন ধরনের উইয়ার (weir) ব্যবহার করা সবচেয়ে উপযুক্ত?

A. সাপ্রেসড আয়তক্ষেত্রাকার উইয়ার (Suppressed rectangular weir)

B. ত্রিভুজাকার (V-নচ) উইয়ার [Triangular (V-notch) weir]

C. ব্রড-ক্রেস্টেড উইয়ার (Broad-crested weir)

D. সিপোলেটি উইয়ার (Cipolletti weir)

Q33 Part B BENGALI

অ-ধাতব ভেসেল (পাত্র) ব্যবহারের সময় মাইক্রোওয়েভ লেভেল ডিটেক্টরগুলোর ইনস্টলেশন সংক্রান্ত কোন সুবিধাটি অনন্য?

A. এগুলোর জন্য পাত্রের দেয়ালে বড় আকারের ছিদ্রের (openings) প্রয়োজন হয়

B. এগুলোকে পদার্থের মধ্যে আংশিকভাবে ডুবিয়ে রাখতে (partially immersed) হয়

C. এগুলোকে পাত্রের ভেতরে থাকা পদার্থের সংস্পর্শ ছাড়াই পাত্রের বাইরে স্থাপন (mounted outside) করা যায়

D. সঠিক পরিমাপের জন্য এগুলোকে অবশ্যই পাত্রের ভেতরে স্থাপন (mounted inside) করতে হয়

Q34 Part B

In a differential pressure gauge, how does the diaphragm respond if the pressure on one side increases while the other remains constant?

A. It moves toward the side with lower pressure

B. It remains stationary

C. It moves in both directions simultaneously

D. It moves away from the side with lower pressure



Q35 Part B BENGALI

ক্যালিব্রেশনের সময়, এক ডেটা পয়েন্টের সেট ধারাবাহিকভাবে রেফারেন্স মানের চেয়ে সমপরিমাণ বেশি মান (higher than the reference value by the same amount) নির্দেশ করে চলেছে। নিচের কোন ধরনের ত্রুটি (error) এই পরিস্থিতিতে বর্ণনা করে?

- A. পরিমাপ করা ডেটায় অফসেট (offset) ত্রুটি রয়েছে ✓
- B. পরিমাপ করা ডেটায় ড্রিফট (drift) ত্রুটি রয়েছে
- C. পরিমাপ করা ডেটায় স্কেল (scale) ত্রুটি রয়েছে
- D. পরিমাপ করা ডেটায় নয়েজ (noise) ত্রুটি রয়েছে

Q36 Part B BENGALI

তরলের স্তর পরিমাপের ক্ষেত্রে ডিসপ্লেসমেন্ট গেজ (displacement gauge) এবং ফ্লোট-টাইপ সেন্সরের (float-type sensor) মধ্যে প্রধান কার্যগত পার্থক্য কী?

- A. ফ্লোট সেন্সর তরলের সংস্পর্শ ছাড়াই কাজ করে
- B. ডিসপ্লেসমেন্ট গেজ শুধুমাত্র গ্যাসের ক্ষেত্রেই উপযুক্ত
- C. ফ্লোট সেন্সর মাইক্রোওয়েভ সংকেত তৈরি করে
- D. ডিসপ্লেসমেন্ট গেজ প্লবতার পরিবর্তনের মাধ্যমে কাজ করে ✓

Q37 Part B BENGALI

একটি বস্তুর ঘর্ষণ বল 40 N এবং অভিলম্ব প্রতিক্রিয়া 200 N হলে, তলগুলির মধ্যবর্তী ঘর্ষণ গুণাঙ্ক নির্ণয় করুন।

- A. 0.4
- B. 0.1
- C. 0.3
- D. 0.2 ✓

Q38 Part B BENGALI

একটি ব্রেডবোর্ডে একজন প্রশিক্ষার্থী আউটপুটে LED (LEDs at the output) ব্যবহার করে একটি দুই-ইনপুট বিশিষ্ট AND গেট (two-input AND gate) পরীক্ষা করছে। কোন শর্তে আউটপুট LED-টি HIGH হয়ে জ্বলবে?

- A. যখন উভয় ইনপুট LOW হবে
- B. যখন উভয় ইনপুট HIGH হবে ✓
- C. যখন যেকোনো একটি ইনপুট HIGH হবে
- D. যখন শুধুমাত্র একটি ইনপুট LOW হবে

Q39 Part B BENGALI

কোন যন্ত্রটি সুবেদী বৈদ্যুতিন বর্তনীতে বা সেন্সিটিভ ইলেকট্রনিক সার্কিটে (sensitive electronic circuits) অত্যন্ত ক্ষীণ বিদ্যুৎ প্রবাহ শনাক্ত ও পরিমাপ করে?

- A. মেগার
- B. স্ট্রবোস্কোপ
- C. ওয়াটমিটার
- D. গ্যালভানোমিটার ✓

Q40 Part B BENGALI

একটি বেসিক বৈদ্যুতিক সার্কিটের ইঞ্জিনিয়ারিং ড্রয়িং-এ, রেজিস্টর, সুইচ এবং ল্যাম্পের মতো উপাদানগুলির জন্য প্রমিত প্রতীক ব্যবহারের প্রধান উদ্দেশ্য কী?

- A. সার্কিট ডায়াগ্রামের সামগ্রিক আকার এবং বাহ্যিক সৌন্দর্য বৃদ্ধি করা
- B. বিভিন্ন প্রযুক্তিবিদদের মধ্যে স্পষ্ট বোঝাপড়া নিশ্চিত করা ✓
- C. ডায়াগ্রামটিকে দৃশ্যত আরও পেশাদার করে তোলা
- D. সার্কিটে বৈদ্যুতিক উপাদানের সংখ্যা কমানো

Q41 Part B BENGALI

কোনো বস্তুর ওপর ক্রিয়াশীল অভিকর্ষজ ত্বরণ শূন্য হলে, তার ওজন কত হবে?

- A. অসীম
- B. দ্বিগুণ
- C. শূন্য ✓
- D. ভরের সমান

Q42 Part B BENGALI

একটি SCADA-নিয়ন্ত্রিত জল শোধন প্ল্যান্টে, নেটওয়ার্ক ব্যর্থতার সময় প্রক্রিয়ার স্থায়িত্ব নিশ্চিত করতে বিকেন্দ্রীভূত নিয়ন্ত্রণ স্টেশনগুলির (decentralized control stations) প্রাথমিক ভূমিকা কী?

- A. প্রক্রিয়া নিয়ন্ত্রণের দায়িত্ব গ্রহণের জন্য বিকেন্দ্রীভূত স্টেশনগুলো রিমোট ব্যাকআপের অপেক্ষায় থাকে
- B. কেন্দ্রীয় কমান্ড (central commands) পুনরায় চালু না হওয়া পর্যন্ত সমস্ত নিয়ন্ত্রণ স্টেশন কার্যক্রম বন্ধ করে দেয়
- C. যোগাযোগ ব্যবস্থা পুনরায় চালু না হওয়া পর্যন্ত প্রতিটি বিকেন্দ্রীভূত নিয়ন্ত্রণ স্টেশন স্বাধীনভাবে তাদের স্থানীয় প্রক্রিয়াগুলো পরিচালনা করতে থাকে ✓
- D. নেটওয়ার্ক মেরামতের সময় স্থানীয় প্রক্রিয়াগুলি (local processes) স্থগিত রাখা হয়

Q43 Part B BENGALI

অন/অফ (on/off) পরিষেবার জন্য এমন একটি কন্ট্রোল ভালভ চয়ন করতে হবে, যা খোলার পরে ন্যূনতম ভালভ ট্র্যাভেলের (minimal valve travel) সাথে উচ্চ প্রবাহ হার (high flow rate) সরবরাহ করা যায়। কোন ভালভ বৈশিষ্ট্যটি সবচেয়ে উপযুক্ত?

- A. দ্রুত খুলতে পারা যায় (Quick opening) ✓
- B. রৈখিক (Linear)
- C. সমান শতাংশ (Equal percentage)
- D. ধীর প্রতিক্রিয়া (Slow response)



Q44 Part B BENGALI

একজন টেকনিশিয়ানকে চুল্লির (furnace) দরজা না খুলেই এর ভেতরের তাপমাত্রা পরিমাপ করতে হবে। তড়িৎচৌম্বকীয় বিকিরণের কোন নীতিটি এই কাজের জন্য পাইরোমেট্রিকে (pyrometry) উপযুক্ত করে তোলে?

- A. বস্তুসমূহ চারপাশের সমস্ত আলোক শক্তি শোষণ করে
- B. বস্তুসমূহ তাদের তাপমাত্রার সমানুপাতিক হারে বিকিরণ নির্গত করে ☒
- C. বস্তুসমূহ বাতাসের মাধ্যমে তাপ পরিবহন করে
- D. বস্তুসমূহ কেবল দৃশ্যমান আলো প্রতিফলিত করে

Q45 Part B BENGALI

একটি বুলিয়ান (Boolean) তেরিয়েবল নিচের কোন মানগুলো ধারণ করতে পারে?

- A. 1 বা 0 ☒
- B. 0 বা 2
- C. 0.5 বা 1
- D. 1 বা -1

Q46 Part B BENGALI

ইঞ্জিনিয়ারিং ড্রয়িং-এর ক্ষেত্রে, উপাদানের জন্য টেকনিক্যাল স্কেচ তৈরি করার সময় কোনো যন্ত্রাংশের লুকানো প্রান্তগুলি দেখানোর জন্য কোন রীতি ব্যবহার করা হয়?

- A. সরু ড্যাশযুক্ত রেখা (Thin dashed line) ☒
- B. ফ্রিহ্যান্ড রেখা (Freehand line)
- C. মোটা অবিচ্ছিন্ন রেখা (Thick continuous line)
- D. সরু চেইন রেখা (Thin chain line)

Q47 Part B BENGALI

একজন রক্ষণাবেক্ষণ ইঞ্জিনিয়ার এমন একটি স্থানের জন্য তাপমাত্রা পরিমাপক যন্ত্র চয়ন করছেন যেখানে সরলতা, মজবুত গঠন এবং নির্ভরযোগ্যতা অপরিহার্য। অন্য যন্ত্রের পরিবর্তে ওই ইঞ্জিনিয়ার কেন 'ফিল্ড সিস্টেম' (filled system) যন্ত্রগুলো বেছে নিতে পারেন?

- A. এগুলো সব দিক থেকেই দ্বি-ধাতব উপাদানের চেয়ে উৎকৃষ্ট।
- B. এগুলোর গঠন মজবুত ও সরল এবং রক্ষণাবেক্ষণ করা সহজ। ☒
- C. এগুলো উচ্চ তাপমাত্রা পরিমাপের জন্য উপযুক্ত নয়।
- D. এগুলোর রক্ষণাবেক্ষণ প্রক্রিয়া জটিল।

Q48 Part B BENGALI

একটি স্ট্যান্ডার্ড ডিজিটাল মাল্টিমিটার ব্যবহার করে নিচের কোন পরিমাপের কাজটি করা যায় না?

- A. রোধ
- B. বৈদ্যুতিক শক্তি ☒
- C. তড়িৎ প্রবাহ
- D. সার্কিট কন্টিনিউটি টেস্ট

Q49 Part B BENGALI

নিউম্যাটিক রেকর্ডারের একটি প্রধান উপাদান কোনটি?

- A. রেজিস্টর
- B. থার্মোকাপল
- C. বোর্ডন টিউব ☒
- D. পুলি

Q50 Part B BENGALI

ইঞ্জিনিয়ারিং ড্রয়িংয়ে ব্যবহৃত ইলেকট্রনিক চিহ্নের ক্ষেত্রে, একটি স্কিম্যাটিক ডায়াগ্রামে 'তেরিয়েবল রেজিস্টর'-কে নির্দেশ করতে সাধারণত কোন চিহ্নটি ব্যবহার করা হয়—যার অনন্য গ্রাফিক্যাল বৈশিষ্ট্য এটিকে 'ফিক্সড রেজিস্টর' এর থেকে আলাদা করে?

- A. একটি আয়তক্ষেত্রে আড়াআড়িভাবে অতিক্রম করা একটি তীরচিহ্ন ☒
- B. ভিতরে ক্রস চিহ্নসহ একটি বৃত্ত
- C. সমান্তরাল রেখাসহ একটি আয়তক্ষেত্র
- D. দুটি বিন্দুসহ একটি জিগ-জ্যাগ রেখা

Q51 Part B BENGALI

একটি অপ-অ্যাম্প ডিফারেনশিয়াল অ্যামপ্লিফায়ারের ডিফারেনশিয়াল গেইন (A_d) হলো 100 এবং কমন-মোড গেইন (A_c) 0.01 হলে, ডেসিবেল (dB) এককে এর কমন-মোড রিজেকশন রেশিও (CMRR) কত?

- A. 80 dB ☒
- B. 60 dB
- C. 100 dB
- D. 40 dB

Q52 Part B BENGALI

একটি আয়তাকার ট্যাক্সের পরিমাপ হলো 2 মিটার দৈর্ঘ্য, 1 মিটার প্রস্থ এবং 0.5 মিটার উচ্চতা। এর আয়তন প্রকাশ করার জন্য কোন লব্ধ এককটি ব্যবহার করা উচিত?

- A. ঘন মিলিমিটার
- B. ঘন মিটার ☒
- C. ঘন গজ
- D. ঘন ফুট

Q53 Part B BENGALI

নিউম্যাটিক সার্কিটের কোন উপাদানটি সংকুচিত (compressed) বাতাসের প্রবাহ শুরু ও বন্ধ করার জন্য দায়ী?

- A. কম্প্রেসার
- B. ডাইরেকশনাল কন্ট্রোল ভালভ ☒
- C. ফিল্টার
- D. অ্যাকচুয়েটর



Q54 Part B BENGALI

একজন টেকনিশিয়ান একটি ফিল্ড এফেক্ট ট্রানজিস্টর (FET) এর সাথে একটি বাইপোলার জংশন ট্রানজিস্টর (BJT) এর তুলনা করে দেখতে পান যে, FET এর ইনপুট টার্মিনালে ইনপুট রেজিস্ট্যান্স অনেক বেশি। FET এর কোন বৈশিষ্ট্যের কারণে এই আচরণটি ঘটে?

- A. উচ্চ সোর্স কারেন্ট (source current)
- B. খুব কম গেট কারেন্ট (gate current) ✓
- C. খুব কম ড্রেন কারেন্ট (drain current)
- D. কম ড্রেন ভোল্টেজ (drain voltage)

Q55 Part B BENGALI

কোন বৈশিষ্ট্যটি একটি স্প্লিট-বডি বল ভালভকে (split-body ball valve) একটি ওয়ান-পিস বল ভালভ (one-piece ball valve) থেকে আলাদা করে?

- A. এটি শুধুমাত্র নিউম্যাটিক অ্যাকচুয়েটরের সাহায্যে কাজ করে।
- B. এটি প্রবাহ নিয়ন্ত্রণের জন্য একটি নমনীয় ডায়াফ্রাম ব্যবহার করে।
- C. এর বডি দুই বা ততোধিক পৃথক অংশ নিয়ে গঠিত যা বোল্ট দিয়ে একসাথে যুক্ত থাকে, ফলে এর রক্ষণাবেক্ষণ সহজ হয়। ✓
- D. এটি একটি স্লাইডিং গেট ব্যবহার করে প্রবাহ নিয়ন্ত্রণ করে।

Q56 Part B BENGALI

একজন রক্ষণাবেক্ষণ প্রকৌশলীকে একটি খাদ্য প্রক্রিয়াকরণ কারখানায় হাইড্রোলিক সিস্টেমের শক্তি-দক্ষতা (energy efficiency) বৃদ্ধির দায়িত্ব দেওয়া হয়েছে। এই লক্ষ্য অর্জনের জন্য হাইড্রোলিক ফ্লুইডের কোন বৈশিষ্ট্যটিকে সবচেয়ে গুরুত্বপূর্ণ হিসেবে বিবেচনা করা উচিত?

- A. কম অভ্যন্তরীণ ঘর্ষণ এবং উচ্চ সান্দ্রতা সূচক (viscosity index) ✓
- B. অত্যন্ত উচ্চ ঘনত্ব এবং কম সংনমনযোগ্যতা (compressibility)
- C. উচ্চ জলীয় উপাদান এবং দ্রুত পৃথকীকরণ (separation) ক্ষমতা
- D. দ্রুত সাইক্লিংয়ের জন্য প্রচুর বাতাস মিশে যাওয়ার (air entrainment) সুযোগ রাখা

Q57 Part B BENGALI

রিভার্স-বায়াসড PN জংশন ডায়োডের মধ্য দিয়ে কেন অত্যন্ত সামান্য পরিমাণ তড়িৎ প্রবাহিত হয়?

- A. মেজরিটি ক্যারিয়ারগুলো (majority carriers) জংশন থেকে দূরে সরে যায় ✓
- B. ডিপ্লেশন অঞ্চলটি (depletion region) সম্পূর্ণভাবে অদৃশ্য হয়ে যায়
- C. ডায়োডটি অতিরিক্ত হোল (hole) তৈরি করে
- D. ক্রিস্টালের ভেতরে ইলেকট্রন চলাচল বন্ধ হয়ে যায়

Q58 Part B BENGALI

বারংবার পরিমাপের (repeated measurements) ক্ষেত্রে যদৃচ্ছ ত্রুটির (random error) প্রভাব সম্পর্কে কোন বক্তব্যটি ঠিক?

- A. এটি ফলাফলকে সর্বদা প্রকৃত মানের নিচে নিয়ে যায়
- B. এর জন্য ফলাফলগুলোর মান, প্রকৃত মানের চারপাশে কম-বেশি সংখ্যাগত মান হিসেবে ছড়িয়ে ছিটিয়ে থাকে ✓
- C. এটি প্রতিটি পরিমাপকে একরূপ করে তোলে
- D. এটি ফলাফলকে সর্বদা প্রকৃত মানের উপরে নিয়ে যায়

Q59 Part B BENGALI

ইলেকট্রনিক ইনস্ট্রুমেন্টেশনের ক্ষেত্রে CRO এর পূর্ণরূপটি কী?

- A. ক্যাথোড রে অসিলোস্কোপ (Cathode Ray Oscilloscope) ✓
- B. ক্যাপাসিটর রেগুলেটর অসিলেটর (Capacitor Regulator Oscillator)
- C. সার্কিট রিলে আউটপুট (Circuit Relay Output)
- D. কারেন্ট রেঞ্জ অপারেটর (Current Range Operator)

Q60 Part B BENGALI

একটি সুস্বাদু উপাদানের ঘনত্ব 7800 kg/m^3 এবং আয়তন 0.02 m^3 হলে, এর ভর কত?

- A. 120 kg
- B. 180 kg
- C. 156 kg ✓
- D. 78 kg

Q61 Part B BENGALI

প্রোগ্রামেবল কন্ট্রোলারের একটি প্রধান বৈশিষ্ট্য কী?

- A. শুধুমাত্র ম্যানুয়াল নিয়ন্ত্রণ
- B. ফিক্সড লজিক
- C. অ্যানালগ-ডায়াল চালনা
- D. রিপ্রোগ্রামেবল লজিক ✓

Q62 Part B BENGALI

একটি কন্ট্রোল সিস্টেমে ফাইনাল কন্ট্রোল এলিমেন্ট (final control element) এর প্রাথমিক কাজ কোনটি?

- A. এটি কন্ট্রোলারের আউটপুটের ওপর ভিত্তি করে সরাসরি প্রক্রিয়ার অবস্থা পরিবর্তন করে ✓
- B. এটি ফিডব্যাকের জন্য প্রক্রিয়ার আউটপুট পর্যবেক্ষণ করে
- C. এটি ইনপুট ভেরিয়েবল শনাক্ত করে এবং কন্ট্রোলারকে তা জানায়
- D. এটি ম্যানুয়াল অ্যাডজাস্টমেন্টের মাধ্যমে পরোক্ষভাবে কন্ট্রোলারকে প্রভাবিত করে



Q63 Part B BENGALI

কম্পিউটার সিস্টেমে নিচের কোনটি ইনপুট ডিভাইস হিসেবে বিবেচিত হয়?

- A. মনিটর
- B. স্পিকার
- C. প্লটার
- D. কীই বোর্ড

**Q64 Part B BENGALI**

একটি স্ট্যান্ডার্ড থ্রি-স্টেজ RC ফেজ শিফট অসিলেটরে অসিলেশন কম্পাঙ্কে প্রতিটি RC সেকশন দ্বারা প্রদত্ত ফেজ শিফট কত?

- A. 90 ডিগ্রি
- B. 60 ডিগ্রি
- C. 30 ডিগ্রি
- D. 45 ডিগ্রি

**Q65 Part B BENGALI**

পরিমাপ ব্যবস্থার কোন অংশটি পরবর্তী প্রক্রিয়াকরণের জন্য একটি ভৌত রাশিকে অন্য একটি ভৌত রাশিতে পরিবর্তন করে?

- A. ইন্ডিকেটিং এলিমেন্ট (Indicating element)
- B. রেকর্ডিং এলিমেন্ট (Recording element)
- C. অক্সিলিয়ারি এলিমেন্ট (Auxiliary element)
- D. ভ্যারিয়েবল কনভার্সন এলিমেন্ট (Variable conversion element)

**Q66 Part B BENGALI**

উন্মুক্ত-চ্যানেল প্রবাহ পরিমাপে (open-channel flow measurement), ক্রেস্টের উপরের লিকুইড হেডকে নির্গমনের (discharge) সাথে সম্পর্কিত করে কোন পরামিতিটি (parameter) নির্ধারণ করতে একটি নচ (notch) প্রধানত ব্যবহৃত হয়?

- A. প্রবাহীর সান্দ্রতা
- B. প্রবাহের হার (নির্গমন)
- C. জলের গুণমান
- D. প্রবাহীর ঘনত্ব

**Q67 Part B BENGALI**

বদ্ধ পাত্রে থাকা তরল বা গ্যাসীয় পদার্থের মধ্য দিয়ে চাপ সঞ্চালনের বিষয়ে পাস্কালের সূত্র কী বলে?

- A. কোনো বিন্দুতে প্রযুক্ত চাপ সব দিকে সমানভাবে সঞ্চালিত হয়
- B. কোনো বিন্দুতে প্রযুক্ত চাপ কেবল ওপরের দিকে সঞ্চালিত হয়
- C. কোনো বিন্দুতে প্রযুক্ত চাপ কিছু নির্দিষ্ট দিকে হ্রাস পায়
- D. কোনো বিন্দুতে প্রযুক্ত চাপ কেবল বলের অভিমুখেই সঞ্চালিত হয়

**Q68 Part B BENGALI**

যদি একটি যন্ত্র কোনো দৈর্ঘ্যকে 1.2 কিলোমিটার হিসেবে পরিমাপ করে, তবে মেট্রিক পদ্ধতি অনুযায়ী মিটার এককে এই মানটি কত হবে?

- A. 1200 মিটার
- B. 120 মিটার
- C. 0.12 মিটার
- D. 12000 মিটার

**Q69 Part B BENGALI**

একটি খাদ্য প্রক্রিয়াকরণ কারখানায় ব্যবহৃত বাইমেটালিক তাপমাত্রা পরিমাপক যন্ত্রটি সবসময় প্রকৃত তাপমাত্রার চেয়ে কম তাপমাত্রা নির্দেশ করে। কোন পরিবর্তনের মাধ্যমে এটির যথার্থতা (accuracy) উন্নত করা যেতে পারে?

- A. আরও ভালো দৃশ্যমানতার জন্য ডায়ালের আকার বৃদ্ধি করা
- B. তাপীয় সম্প্রসারণ গুণাঙ্কের মধ্যে বৃহত্তর পার্থক্যযুক্ত ধাতু নির্বাচন করা
- C. পাতের উপর একটি মোটা সুরক্ষামূলক আবরণ প্রয়োগ করা
- D. বাইমেটালিক স্ট্রিপটির দৈর্ঘ্য সংক্ষিপ্ত করা

**Q70 Part B BENGALI**

LAN পরিবেশে, লোকাল নেটওয়ার্কের মধ্যে ডিভাইসগুলোর পারস্পরিক যোগাযোগের সুবিধার্থে MAC অ্যাড্রেস নির্ধারণ ও ব্যবহারের জন্য OSI এর কোন স্তরটি দায়ী?

- A. ডেটা লিঙ্ক লেয়ার (Data Link Layer)
- B. নেটওয়ার্ক লেয়ার (Network Layer)
- C. ফিজিক্যাল লেয়ার (Physical Layer)
- D. ট্রান্সপোর্ট লেয়ার (Transport Layer)

**Q71 Part B BENGALI**

একজন টেকনিশিয়ান একটি স্ট্যান্ডার্ড 50 Hz AC মেইনস ইনপুট দ্বারা চালিত পাওয়ার সাপ্লাই ইউনিটের ব্রিজ রেকটিফায়ার স্টেজের আউটপুটের সাথে একটি অসিলোস্কোপ সংযুক্ত করেন। স্ক্রিনে দৃশ্যমান পালসেটিং DC রিপল সিগন্যালটির সঠিক কম্পাঙ্ক কত?

- A. 100 Hz
- B. 50 Hz
- C. 200 Hz
- D. 25 Hz

**Q72 Part B BENGALI**

ব্যবহৃত এনার্জি মিটারগুলো পর্যায়ক্রমে পরীক্ষা ও ক্যালিব্রেট করা গুরুত্বপূর্ণ কেন?

- A. মিটারের আয়ুষ্কাল বৃদ্ধি করতে
- B. ভড়িং শক্তি ব্যবহারের সঠিক পরিমাপ নিশ্চিত করতে
- C. বাহ্যিক নয়েজের প্রভাব কমাতে
- D. ব্যবহৃত কয়েলের ধরন পরিবর্তন করতে



Q73 Part B **BENGALI**

স্থির অবস্থায় চালিত একটি রোটামিটারে প্রবাহের হার বৃদ্ধি পেলে, ফ্লোটটি (float) কোন অবস্থা অর্জিত না হওয়া পর্যন্ত উপরের দিকে উঠতে থাকে?

- A. প্রবাহের বেগ শূন্য না হওয়া পর্যন্ত
- B. টিউবটি সর্বোচ্চ প্রস্থচ্ছেদের ক্ষেত্রফল লাভ না করা পর্যন্ত
- C. উর্ধ্বমুখী প্রবাহজনিত বল, ফ্লোটের ওজনের সমান না হওয়া পর্যন্ত ☒
- D. ইনলেটে চাপ শূন্য না হওয়া পর্যন্ত

Q74 Part B **BENGALI**

একটি তাপমাত্রা সেন্সর, অ্যানালগ ভোল্টেজ সিগন্যাল তৈরি করে। কোন যন্ত্রটি এই সিগন্যালকে মাইক্রোকন্ট্রোলারের জন্য ডিজিটাল ডেটায় রূপান্তর করে?

- A. রেকটিফায়ার
- B. ট্রান্সফরমার
- C. অ্যানালগ-টু-ডিজিটাল কনভার্টার ☒
- D. অসিলেটর

Q75 Part B **BENGALI**

কোন সূত্রটি একটি পাইপের মধ্য দিয়ে প্রবাহের হার [flow rate] (Q), প্রস্থচ্ছেদের ক্ষেত্রফল (A) এবং প্রবাহীর বেগ (V)-এর মধ্যকার সম্পর্ককে সঠিকভাবে প্রকাশ করে?

- A. $Q = A \times V$ ☒
- B. $Q = V/A$
- C. $Q = A/V$
- D. $Q = A + V$



Part B

75 Questions • Answer Key

Q1 Part B HINDI

स्ट्रेट बेवेल गियर (straight bevel gears) की तुलना में एक ऑफसेट के साथ 90° पर संचारित शक्ति हेतु एक हाइपॉइड गियर सेट के लिए मुख्य लाभ क्या है?

- A. उच्च चालों पर प्रतिच्छेदी अक्षों के साथ कार्य करने की क्षमता।
- B. स्ट्रेट बेवेल गियर की तुलना में सभी चालों पर शांत प्रचालन।
- C. उच्च बलाघूर्ण के साथ गैर-प्रतिच्छेदी अक्षों के बीच शक्ति संचारित करना। ✓
- D. तुल्य आकार और बलाघूर्ण निर्धारण के लिए निम्न प्रारंभिक लागत।

Q2 Part B

A maintenance team noticed an increase in machine breakdowns and wants to reduce unplanned stoppages. Which of the following actions supports total productive maintenance principles?

- A. Reducing operator involvement in upkeep
- B. Assigning repairs only after breakdown
- C. Scheduling routine checks for all machines ✓
- D. Allowing machines to run until failure

Q3 Part B HINDI

प्रोत्कर्ष स्थितियों के दौरान पंखा प्रणाली का कौन-सा भाग कंपन-जनित क्षति के प्रति सर्वाधिक सुग्राही होता है?

- A. विद्युत तार-स्थापन (Electrical wiring)
- B. ब्लेड समन्वयोजन (Blades assembly)
- C. वेशन (Housing)
- D. बेयरिंग और शाफ्ट समन्वयोजन (Bearings and shaft assembly) ✓

Q4 Part B

Which cutting tool material is most appropriate for high-speed CNC machining of hard metals?

- A. Tool steel
- B. High-speed steel
- C. Cemented carbide ✓
- D. Cast iron

Q5 Part B

What needs to be checked when a threaded pipe connection becomes loose after cutting?

- A. Amount of lubricant used
- B. Cutting speed applied
- C. Die adjustment setting ✓
- D. Type of tap used

Q6 Part B HINDI

बेयरिंग की स्थिति की मॉनिटरिंग के लिए विश्वसनीय कंपन पाठ्यांक प्राप्त करने हेतु मापन प्रोब (measuring probe) को कहाँ रखा जाना चाहिए?

- A. सामान्य मशीन प्रचालन परिस्थितियों के दौरान सीधे घूर्णी शैफ्ट पर
- B. घूर्णी मशीन असेंबली को कवर करने वाले सुरक्षात्मक गार्ड के विरुद्ध शीथिल रूप से
- C. सभी घूर्णी यांत्रिक घटकों से दूर मशीन फाउंडेशन पर
- D. मॉनिटर किए जाने वाले बेयरिंग के स्थान के समीप बेयरिंग हाउसिंग पर मजबूती से ✓

Q7 Part B

If the 6th division of the vernier scale coincides with a main scale division, the vernier reading is:
[Take least count = 0.1 mm]

- A. 0.06 mm
- B. 6 mm
- C. 0.6 mm ✓
- D. 0.006 mm

Q8 Part B HINDI

एक पर्यवेक्षक ने देखा कि कपास अवशेष (cotton waste) का निपटान नियमित कचरे के साथ किया जा रहा है। कार्यशाला सुरक्षा के संदर्भ में इस अनुचित कार्य का संभावित परिणाम क्या है?

- A. कार्यशाला में आग लगने की घटनाओं का बढ़ता जोखिम ✓
- B. पेयजल का रासायनिक संदूषण
- C. वायु गुणवत्ता में ध्यान देने योग्य कमी
- D. कार्यशाला की मशीनरी का तत्काल ब्रेकडाउन



Q9 Part B HINDI

औद्योगिक नियंत्रण पैनल में वरक स्विच (selector switch) का प्राथमिक कार्य क्या होता है?

- A. विद्युत धारा को मापना
- B. प्रदाय वोल्टता में वृद्धि करना
- C. विभिन्न ऑपरेटिंग मोड का चयन करना ✓
- D. विद्युत आवेश को संग्रहीत करना

Q10 Part B

An engineer suspects that wind is affecting plumb bob readings during outdoor equipment erection. Which approach best minimizes error due to wind?

- A. Shield the plumb bob from wind using a temporary screen ✓
- B. Wait for wind to stop before taking any measurement
- C. Use a heavier plumb bob to resist wind movement
- D. Take multiple readings and average the values

Q11 Part B

Which part of the belt conveyor supports and guides the belt along its path?

- A. Motor
- B. Gearbox
- C. Idler rollers ✓
- D. Drive pulley

Q12 Part B HINDI

एक अनुरक्षण आरेख, मशीन आधार प्रणाली की आधार प्लेट में एक टैप निर्मित चूड़ीदार छिद्र दर्शाता है। प्लान दृश्य में, चूड़ी के मुख्य व्यास को निरूपित करने के लिए डैशित रेखाओं का उपयोग किया जाता है। यह क्या इंगित करता है?

- A. चूड़ी आंतरिक है और आधार पट्ट के अंदर छिपी हुई है ✓
- B. चूड़ी एक सजावटी खांचा है जो बंधन से संबंधित नहीं है
- C. चूड़ी बाह्य है और बंधक शैफ्ट पर पूरी तरह दृश्य होती है
- D. चूड़ी एक आंशिक चूड़ी है जो फास्टर के केवल निचले आधे हिस्से पर कर्तित है

Q13 Part B

What is the main function of a flat key in mechanical fasteners?

- A. To act as a sealing device between components
- B. To align the shaft with the hub precisely
- C. To prevent axial movement of the shaft
- D. To transmit rotational force from the shaft to the hub ✓

Q14 Part B HINDI

ऊर्ध्वाधर भ्रमिकर्तन मशीन (milling machine) पर किस प्रकार का प्रचालन सबसे अधिक किया जाता है?

- A. समतल पृष्ठों का फलक भ्रमिकर्तन ✓
- B. भ्रंवरकली सिरे (swivelling head) के साथ कोणीय भ्रमिकर्तन
- C. संकीर्ण प्रोफाइलों का सिरा भ्रमिकर्तन
- D. पार्श्व कर्तक के साथ खांच भ्रमिकर्तन

Q15 Part B HINDI

कौन-सी मशीन, समतल पृष्ठों के निर्माण के लिए, रैखिक प्रत्यागामी कर्तन गति का उपयोग करती है?

- A. ड्रिलिंग मशीन
- B. शेपर मशीन ✓
- C. लेथ मशीन
- D. मिलिंग मशीन

Q16 Part B

In a fabrication sketch, which line correctly indicates the edge of a mounting bracket that is visible from the front view?

- A. Center line
- B. Dimension line
- C. Hidden line
- D. Object line ✓

Q17 Part B HINDI

विभिन्न प्रवर्तकों (actuator) के नियंत्रण हेतु कई 5/2 वाल्वों का उपयोग करने वाली प्रणालियों में मुख्य तुल्यकालन (synchronization) चुनौती क्या है?

- A. प्रदाय और रेचन वायु को मिश्रित होने से रोकना
- B. सभी वाल्वों के सही अनुक्रम में संचालन को सुनिश्चित करना ✓
- C. सुरक्षा हेतु सभी वाल्व चक्र काल का मिलान करना
- D. सभी वाल्वों में अत्यधिक दाब पात को रोकना

Q18 Part B HINDI

BIS संकेतन में, सहिष्णुता प्रतीक से पहले आने वाला संख्यात्मक मान क्या दर्शाता है?

- A. विनिर्माण प्रक्रिया के बाद प्राप्त वास्तविक आकार
- B. निरीक्षण प्रक्रिया के दौरान प्राप्त सहिष्णुता मान
- C. आकार की ऊर्ध्व और निम्न सीमाओं के बीच का अंतर
- D. ड्राइंग में निर्दिष्ट घटक का मूल आकार ✓



Q19 Part B

How does the thickness of the zinc coating on a GI pipe affect its performance?

A. Increases corrosion resistance



B. Reduces internal friction

C. Decreases pipe diameter

D. Makes pipe more flexible

Q20 Part B

When dimensioning in a crowded or narrow space on a drawing, which of the following arrowhead types is commonly used to avoid confusion with overlapping lines?

A. Open arrow head

B. Double dot terminator

C. Closed filled arrow head

D. Oblique stroke terminator

**Q21 Part B**

A maintenance mechanic is preparing to create a flat bearing surface at the mouth of a drilled hole on a mild steel workpiece. Which tool is specifically designed for this operation?

A. Counterbore tool

B. Countersink tool

C. Reamer

D. Spot facing tool

**Q22 Part B HINDI**

यदि 1 m के बराबर अंतरालन पर ऑफसेट 2 m, 4 m, 3 m और 5 m दिए गए हैं, तो समलंबी नियम का उपयोग करके अनियमित प्लॉट (irregular plot) का क्षेत्रफल ज्ञात कीजिए।

A. 12 m²

B. 9.5 m²

C. 10.5 m²



D. 7 m²

Q23 Part B

In a lever-operated compressor servicing tool (Class 1 lever), if the load arm length is decreased while the effort arm length is kept constant, what will be the effect on its mechanical advantage?

A. Mechanical advantage remains unchanged

B. Mechanical advantage becomes zero

C. Mechanical advantage increases



D. Mechanical advantage decreases

Q24 Part B HINDI

समान चौड़ाई वाले बट स्ट्रैप्स युक्त डबल-रिवेटेड बट जोड़ (butt joint) के ड्राइंग की व्याख्या करते समय, कौन-सी विशेषता ज़िग-ज़ैग रिवेटिंग विन्यास को इंगित करती है?

A. प्रत्येक प्लेट, जोड़ रेखा के अनुदिश एक सिंगल रिवेट पंक्ति दर्शाती है

B. दोनों बट स्ट्रैप्स, जोड़ सेक्शन के दोनों ओर समान रूप से विस्तारित होते हैं

C. क्रमिक पंक्तियों में रिवेट केंद्र रेखाएं पूरी तरह संरेखित रहती हैं

D. आसन्न पंक्तियों में रिवेट केंद्र आधे पिच से ऑफसेट होते हैं

**Q25 Part B HINDI**

मशीन के बार-बार खराब होने के कारण ओवरऑल इक्विपमेंट इफेक्टिवनेस (OEE) के किस घटक के अंतर्गत प्राथमिक रूप से व्यवरोध काल की हानि (loss of downtime) होती है?

A. उत्पादकता (Productivity)

B. निष्पादन (Performance)

C. गुणवत्ता (Quality)

D. उपलब्धता (Availability)

**Q26 Part B**

Which operation is NOT suitable for a single cut file?

A. Truing flat surfaces

B. Fine finishing

C. Heavy stock removal



D. Deburring edges

Q27 Part B

During routine inspection, an engineer notices a grooved nut applied on a shaft with a missing set screw. What is the most likely risk associated with this condition?

A. The nut may loosen due to vibration or movement



B. The nut will transmit more torque to the shaft

C. The threads will experience reduced wear

D. The nut may seize onto the shaft

Q28 Part B HINDI

एक मॉटेनेंस टीम को पता चलता है कि क्लाउड-आधारित डैशबोर्ड से मिलने वाले प्रेडिक्टिव मॉटेनेंस अलर्ट कई घंटों के विलंब के साथ प्राप्त हो रहे हैं। प्रोडक्शन लाइन के सभी स्मार्ट सेंसर और PLC दिखा रहे हैं कि प्रचालन सामान्य है और कोई डिवाइस त्रुटि नहीं है। कनेक्टिविटी से संबंधित निम्न में से कौन-सी समस्या इस विलंब का सबसे संभावित कारण है?

A. फैक्ट्री नेटवर्क और क्लाउड के बीच अस्थिर इंटरनेट कनेक्शन



B. सेंसर की विद्युत आपूर्ति में होने वाले उतार-चढ़ाव, जिससे सेंसर रीडिंग प्रभावित होती है

C. स्मार्ट सेंसर पर अप्रचलित फर्मवेयर, जिससे स्थानीय डेटा की हानि हो रही है

D. स्थानीय नियंत्रकों में गलत PLC एड्रेस कॉन्फिगरेशन



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Q29 Part B HINDI

एक नई कार्यशाला में खराद मशीन (lathe machine) अधिष्ठापित की जा रही है। मानक अनुरक्षण प्रक्रियाओं के अनुसार उचित अधिष्ठापन सुनिश्चित करने के लिए निम्नलिखित में से किसकी जाँच सर्वप्रथम की जानी चाहिए?

- A. अनुशसित स्नेहक से भराव
- B. फाउंडेशन लेवल और संरेखण ✓
- C. इलेक्ट्रिकल वायरिंग की जांच
- D. ट्रायल रनिंग और ऑब्जर्वेशन

Q30 Part B HINDI

किस प्रकार का अनुचित तरीका, कर्तन कार्यों के दौरान हैक्सॉ ब्लेड (hacksaw blade) की आयु को सबसे उल्लेखनीय रूप से कम करता है?

- A. कार्य के दौरान अनुचित ब्लेड तनाव बनाए रखना
- B. अनुशसित सीमा से अधिक अत्यधिक कर्तन दाब लगाना ✓
- C. वर्कपीस की मोटाई के लिए अनुपयुक्त दंत प्रति इंच वाले ब्लेड का उपयोग करना
- D. कर्तन के दौरान असंगत स्ट्रोक चाल पर प्रचालन करना

Q31 Part B

In limits and tolerances terminology, what is meant by deviation?

- A. The algebraic difference between a size and the corresponding basic size ✓
- B. The difference between the maximum size and minimum size limits
- C. The theoretical dimension used as reference in engineering drawing
- D. The measured dimension obtained after manufacturing process

Q32 Part B HINDI

एक यांत्रिक कार्यशाला में, अपघर्षण यंत्र का संचालन करते समय सुरक्षा चश्मा पहनने का मुख्य उद्देश्य क्या है?

- A. तेज आवाज वाले उपकरणों से श्रवण हानि को रोकने के लिए
- B. नेत्रों को उड़ते हुए मलबे और चिंगारियों से बचाने के लिए ✓
- C. धूल के कणों के अंतःश्वसन को कम करने के लिए
- D. दोषपूर्ण वायरिंग से होने वाले विद्युत आघात से बचने के लिए

Q33 Part B HINDI

किसी कार्यशाला में एक कंप्रेसर मोटर 2 ओम के कुल प्रतिरोध वाली वायरिंग प्रणाली के माध्यम से 240 V की आपूर्ति से जुड़ी है। यदि प्रचालन के दौरान मोटर 12 A की धारा कर्षित करती है, तो मोटर के टर्मिनलों पर मापी गई वोल्टता ज्ञात कीजिए।

- A. 228 V
- B. 192 V
- C. 240 V
- D. 216 V ✓

Q34 Part B HINDI

कौन-सा आशोधन, आपूर्ति दाब या स्ट्रोक की लंबाई को परिवर्तित किए बिना, वातिल प्रवर्तक के बल उत्पादन को कम करेगा?

- A. स्ट्रोक की लंबाई कम करना
- B. पिस्टन का व्यास कम करना ✓
- C. माउंटिंग स्टाइल को परिवर्तित करना
- D. लंबी पिस्टन रॉड का उपयोग करना

Q35 Part B

Which rigging safety strategy should be emphasized when lifting a delicate piece of machinery?

- A. Lift the machine quickly to reduce risk
- B. Place slings directly on machine edges
- C. Use a thicker sling for extra strength
- D. Use padding at sling contact points ✓

Q36 Part B HINDI

न्युमेटिक ड्राइंग (pneumatic drawings) में दाब स्रोत को इंगित करने के लिए किस प्रतीक का उपयोग किया जाता है?

- A. वृत्त ✓
- B. आयत
- C. वर्ग
- D. त्रिभुज

Q37 Part B HINDI

पेडस्टल ग्राइंडर (pedestal grinder) में ग्राइंडिंग व्हील के टूटने की स्थिति में ऑपरेटर को टुकड़ों (fragments) से बचाने के लिए कौन-सा सुरक्षा फीचर डिजाइन किया गया है?

- A. मोटर कवर (Motor cover)
- B. बेस (Base)
- C. टूल रेस्ट (Tool rest)
- D. व्हील गार्ड (Wheel guard) ✓



Q38 Part B HINDI

एक ITI अनुरक्षण मैकेनिक, ऊपरी क्रांतिक तापमान से अधिक तप्त किए गए इस्पात प्रतिदर्श का विश्लेषण कर रहा है। इस चरण में लौह-कार्बन आरेख में मुख्य रूप से कौन-सी प्रावस्था (Phase) उपस्थित है?

- A. पर्लाइट (Pearlite)
- B. फेराइट (Ferrite)
- C. ऑस्टेनाइट (Austenite) ✓
- D. सीमेंटाइट (Cementite)

Q39 Part B HINDI

V-बेल्ट को इसकी अनुप्रस्थ-काट विमाओं द्वारा निर्दिष्ट किया जाता है। कौन-सा युग्म इन विमाओं को सर्वोत्तम रूप से निरूपित करता है?

- A. चौड़ाई और गभीरता ✓
- B. केवल चौड़ाई
- C. लंबाई और चौड़ाई
- D. केवल मोटाई

Q40 Part B HINDI

पेंच चूड़ी का रूट (root), प्रायः उच्च-प्रतिबल वाले अनुप्रयोगों में गोल क्यों किया जाता है?

- A. धारण शक्ति बढ़ाने के लिए
- B. घर्षण कम करने के लिए
- C. चूड़ी की फिट को बेहतर बनाने के लिए
- D. प्रतिबल संकेंद्रण कम करने के लिए ✓

Q41 Part B

Which of the following tool materials is most commonly used in multi-point cutting tools like drills and milling cutters?

- A. Cast alloy steel
- B. High-speed steel (HSS) ✓
- C. Ceramic tool material
- D. Carbon tool steel

Q42 Part B HINDI

ऑटो मोड चक्र पूरा करने के बाद महत्वपूर्ण प्रचालक कार्रवाई क्या है?

- A. जांच किए बिना अगला प्रोग्राम शुरू करना
- B. परिष्कृत भाग की उपेक्षा करना और आगे कार्य करना
- C. गुणता आश्वासन के लिए परिष्कृत भाग का निरीक्षण करना ✓
- D. समान प्रोग्राम को तुरंत पुनः चालू करना

Q43 Part B HINDI

एक अनुरक्षण इंजीनियर यह अवलोकन करता है कि गियरबॉक्स में इनपुट और आउटपुट शैफ्ट न तो समानांतर हैं और न ही एक-दूसरे को प्रतिच्छेदित करते हैं, और उच्च लोड के अंतर्गत सुचारू और शांत प्रचालन की आवश्यकता है। इस संदर्भ में कौन-सी गियर व्यवस्था सबसे उपयुक्त है?

- A. हाइपोइड गियर (Hypoid gear) ✓
- B. वर्म गियर (Worm gear)
- C. सर्पिल बेवल गियर (Spiral bevel gear)
- D. हेलिकल गियर (Helical gear)

Q44 Part B HINDI

निम्नलिखित में से कौन-सा घटक PLC आर्किटेक्चर में कंट्रोल इंस्ट्रक्शंस (control instructions) को एग्जीक्यूट करने और लॉजिक ऑपरेशंस को प्रबंधित करने के लिए मुख्य रूप से उत्तरदायी है?

- A. सेंट्रल प्रोसेसिंग यूनिट (CPU) ✓
- B. आउटपुट मॉड्यूल
- C. इनपुट मॉड्यूल
- D. पावर सप्लाई

Q45 Part B

Which component of an industrial automation system directly converts physical parameters into electrical signals for processing?

- A. Actuator
- B. Sensor ✓
- C. Controller
- D. Human Machine Interface (HMI)

Q46 Part B HINDI

वायुचालित प्रवर्तक (pneumatic actuator) के अनियमित या झटके के साथ संचलन का सबसे संभावित कारण क्या हो सकता है?

- A. प्रवर्तक गियरों में ग्रीज की कमी
- B. फ्रेम पर त्रुटिपूर्ण आरोपण (mounting)
- C. वायु आपूर्ति में आद्रता या मलबा (debris) ✓
- D. विद्युत तार-स्थापन में लघु परिपथन

Q47 Part B HINDI

हस्तचालित रूप से टूल बदलने से पूर्व तर्कु (spindle) घूर्णन को रोकने और शीतलक प्रवाह को निष्क्रिय करने के लिए सामान्यतः M कोड का कौन-सा युग्म प्रोग्राम किया जाता है?

- A. M05 और M09 ✓
- B. M05 और M08
- C. M04 और M08
- D. M03 और M08



Q48 Part B HINDI

हस्त-मुक्त कार्यस्थल (hands-free workstation) में 3/2 वाल्व के लिए कौन-सी नियंत्रण विधि सबसे उपयुक्त होगी?

- A. स्वचालित काल नियामक (timer) नियंत्रण
- B. हाथ द्वारा पुश बटन संचालन
- C. वाल्व के लिए पाद-पदिक प्रवर्तन (Foot pedal actuation) ✓
- D. हाथ द्वारा लीवर संचालन

Q49 Part B HINDI

एक कार्यशाला में मशीन शीतलन तंत्र के लिए शीतलक सांद्र और जल को 3 : 2 के अनुपात में मिलाया जाता है। यदि आवश्यक कुल मिश्रण 25 लीटर है, तो कितने लीटर शीतलक सांद्र की आवश्यकता होगी?

- A. 17 लीटर
- B. 15 लीटर ✓
- C. 12.5 लीटर
- D. 10 लीटर

Q50 Part B HINDI

PLC STL में, अनुक्रम LD I2.0, AND I2.1, ORN I2.2, = Q2.0 का उपयोग किया जाता है। यदि I2.0, ON है, I2.1, ON है और I2.2, OFF है, तो Q2.0 की स्थिति क्या होगी?

- A. Q2.0, OFF हो जाएगा
- B. Q2.0, ON हो जाएगा ✓
- C. Q2.0, टॉगल करेगा
- D. Q2.0 का मान पूर्ववत रहेगा

Q51 Part B HINDI

यांत्रिक अभियांत्रिकी कार्यों में नींव निर्माण के दौरान भारी पत्थर के खंडों को उठाने के लिए सामान्यतः किस उपकरण का उपयोग किया जाता है?

- A. लूइस बोल्ट (Lewis bolt) ✓
- B. अक्षि बोल्ट (Eye bolt)
- C. प्रसारी बोल्ट (Expansion bolt)
- D. फन्नीदार बोल्ट (Wedge bolt)

Q52 Part B HINDI

एक इंजीनियर, विनिर्माण इकाई में बोल्ट के एक बैच का निरीक्षण कर रहा है। शीघ्रता से जांच करने के लिए कि क्या ये बोल्ट किसी विशिष्ट पिच और प्रोफाइल के अनुरूप हैं, इंजीनियर को किस मापयंत्र का उपयोग करना चाहिए?

- A. स्नैप गेज (Snap gauge)
- B. प्लग गेज (Plug gauge)
- C. थ्रेड गेज (Thread gauge) ✓
- D. रिंग गेज (Ring gauge)

Q53 Part B

What effect does improper feeder design have on the formation of bridges in hopper discharge systems?

- A. By creating uneven flow and restricting material discharge ✓
- B. By automatically crushing oversized materials
- C. By increasing the material flow uniformly
- D. By creating poor alignment between the feeder and hopper geometry

Q54 Part B HINDI

द्वि-आधारी संख्या (binary number) 101101 का दशमलव समतुल्य (decimal equivalent) क्या है?

- A. 49
- B. 43
- C. 47
- D. 45 ✓

Q55 Part B HINDI

शक्ति संचरण प्रणाली में पुली पर सपाट पट्टे (flat belt) के सही फिट होने के लिए कौन-सा विनिर्देश प्राचल सबसे महत्वपूर्ण है?

- A. पट्टे की पिच लंबाई
- B. पट्टे की मोटाई
- C. पट्टे की चौड़ाई ✓
- D. पट्टे में प्रयुक्त सामग्री

Q56 Part B

What is the relationship between axis limit switches and the machine zero point in a CNC machine?

- A. Limit switches help protect the machine zero location ✓
- B. Limit switches determine tool length offset
- C. Limit switches control spindle speed
- D. Limit switches set workpiece zero automatically

Q57 Part B

How does reducing the supply air pressure to a pneumatic actuator affect its performance if all other factors remain constant?

- A. Increases the actuator speed
- B. Actuator to move a greater distance
- C. Increases the stroke length
- D. Reduces the force output ✓



Q58 Part B

An operator selects a grinding wheel for finishing a hardened steel shaft. Which grit size is most suitable for achieving a smooth surface finish in this scenario?

- A. Coarse grit size
- B. Large grit size
- C. Medium grit size
- D. Fine grit size

**Q59 Part B HINDI**

ब्रिटिश मानक प्रणाली में, आरेखों में सहिष्णुता क्षेत्र को सामान्यतः किस प्रकार निरूपित किया जाता है?

- A. मशीनन छूट को निरूपित करने वाले संख्यात्मक मान के रूप में
- B. पुनरावृत्त विमीय पाठ्यांकों से प्राप्त औसत मान के रूप में
- C. कंपोनेंट की मापित विमा को निरूपित करने वाली एक क्षैतिज रेखा के रूप में
- D. मूल आकार को निरूपित करने वाली शून्य रेखा के सापेक्ष स्थित एक क्षेत्र के रूप में

**Q60 Part B HINDI**

किसी प्रतिरोधक में पीले, बैंगनी, भूरे और रजत रंग के बैंड हैं। इस रंग कोड द्वारा कौन-सा प्रतिरोध मान दर्शाया गया है?

- A. 47 ओम $\pm 10\%$
- B. 470 ओम $\pm 5\%$
- C. 470 ओम $\pm 10\%$
- D. 47 किलो ओम $\pm 20\%$

**Q61 Part B HINDI**

धात्विक चालक में विद्युत धारा _____ के प्रवाह के कारण उत्पन्न होती है।

- A. इलेक्ट्रॉन
- B. वोल्टता
- C. प्रतिरोध
- D. शक्ति

**Q62 Part B HINDI**

यदि PLC में एक प्रोफिबस-DP नेटवर्क, 12 Mbps पर केवल 100 मीटर प्रति खंड की अनुमति देता है, तो यदि पुनरावर्तक से तीन खंड जुड़े हों, तो अधिकतम कुल नेटवर्क लंबाई ज्ञात कीजिए।

- A. 1200 मीटर
- B. 200 मीटर
- C. 300 मीटर
- D. 400 मीटर

**Q63 Part B HINDI**

चेन पुली ब्लॉक वाली भारी मशीन के उत्थापन से पहले सुरक्षा सुनिश्चित करने के लिए सबसे पहले कौन-सी कार्रवाई की जानी चाहिए?

- A. उत्थापन के दौरान सभी श्रमिकों की स्थिति सीधे लोड के नीचे निर्धारित करना
- B. उत्थापन से पहले केवल रस्सियों का उपयोग करके लोड को कसकर बांधना
- C. सभी उत्थापक उपकरणों में किसी भी दृश्यमान दोष के लिए निरीक्षण करना
- D. उत्थापन से पहले मशीन पर उपयुक्त स्नेहक अनुप्रयुक्त करना

**Q64 Part B**

In a pair of meshing gears, what must be equal at the pitch circles?

- A. The diameters
- B. The number of teeth
- C. The tangential velocities
- D. The angular velocities

**Q65 Part B**

What is the basic mechanism behind the working of a centrifugal pump?

- A. Compression of air to increase liquid pressure
- B. Conversion of mechanical energy into hydraulic energy
- C. Direct displacement of liquid using pistons
- D. Expansion of gas inside a sealed chamber

**Q66 Part B HINDI**

उच्च बलाघूर्ण संचारित करने वाले दो शैफ्ट्स को जोड़ने के लिए, एक इंजीनियर परिशुद्ध संरेखण के साथ एक युग्मक का चयन करना चाहता है। इस अनुप्रयोग के लिए किस प्रकार का फ्लैज युग्मक सबसे उपयुक्त होता है?

- A. नम्य फ्लैज युग्मक (Flexible flange coupling)
- B. दृढ़ फ्लैज युग्मक (Rigid flange coupling)
- C. मफ युग्मक (Muff coupling)
- D. बुश पिन टाइप फ्लैज युग्मक (Bush pin type flange coupling)

**Q67 Part B HINDI**

इनेबल कंट्रोल सर्किट के रूप में उपयोग किए जाने वाले 2-इनपुट AND गेट में, स्पंद को गुजरने देने के लिए इनेबल इनपुट पर कौन-सा लॉजिक सिग्नल अनुप्रयुक्त किया जाना चाहिए?

- A. कॉस्टेंट लॉजिक HIGH (1) सिग्नल
- B. उच्च-प्रतिबाधा विवृत परिपथ कनेक्शन
- C. कॉस्टेंट लॉजिक LOW (0) सिग्नल
- D. स्पंद आवृत्ति से पूर्णतः सुमेलित प्रत्यावर्ती सिग्नल



Q68 Part B

In an oxy-acetylene cutting torch, which part is responsible for blending oxygen and acetylene before the gases reach the nozzle?

- A. Mixer chamber** ✓
- B. Welding tip
- C. Oxygen control valve
- D. Flashback arrestor

Q69 Part B

A universal coupling is primarily used to transmit rotary motion between shafts that are:

- A. In the same axis and coplanar
- B. Inclined to each other and not collinear** ✓
- C. Parallel and collinear
- D. Perpendicular but coplanar

Q70 Part B HINDI

अनुक्षण के बाद पंप शाफ्ट सील से तरल के रिसन का सामान्य कारण क्या होता है?

- A. पंप में वायु लॉक की उपस्थिति
- B. गलत-संरेखित युग्मन
- C. अत्यधिक निस्सरण दाब
- D. ग्लैंड पैकिंग का अनुचित इंस्टॉलेशन** ✓

Q71 Part B

In a case where a worker suffers a minor hand injury due to slipping tools, the investigation reveals missing guards on several machines. According to safety regulations, what is the most appropriate corrective measure?

- A. Install and regularly inspect machine guards** ✓
- B. Offer refresher safety training to workers
- C. Increase supervision during operations
- D. Rotate staff to different workstations

Q72 Part B HINDI

उच्च-चक्र (high-cycle) अनुप्रयोगों के लिए रोलर वाल्व को अपग्रेड करते समय कौन-सी डिज़ाइन विशेषता सबसे महत्वपूर्ण होती है?

- A. टिकाऊ, निघर्षण-प्रतिरोधी सामग्री** ✓
- B. उच्च प्रवर्तन बल की आवश्यकता
- C. तीव्र प्रवर्तन के लिए अपेक्षाकृत लघु व्यास
- D. वायु प्रवाह क्षमता में वृद्धि

Q73 Part B

A welder is preparing to perform arc welding on mild steel plates. Which parameter should be set initially to ensure a stable arc and proper penetration?

- A. Electrode angle
- B. Arc length
- C. Current setting** ✓
- D. Travel speed

Q74 Part B

A maintenance technician observes a cloudy or milky appearance in an oil sample taken from a hydraulic system. Which condition is most likely indicated by the lubricant analysis?

- A. Oxidation has degraded the hydraulic oil significantly
- B. Water contamination is present in the hydraulic oil** ✓
- C. Excessive viscosity loss has occurred in the oil
- D. Thermal degradation has increased oil acidity

Q75 Part B

Why is the point of a file important for finishing operations?

- A. It allows access to narrow spaces** ✓
- B. It provides a comfortable grip
- C. It increases tooth sharpness
- D. It absorbs vibrations



Part B

75 Questions • Answer Key

Q1 Part B

Which electrical switch configuration represents the working principle of a standard 2-input AND gate?

- A. A single-pole double-throw (SPDT) two-way staircase switch network.
- B. Two switches connected in a series configuration with the electrical load. ✓
- C. A normally closed limit switch wired in parallel with an emergency stop button.
- D. Two switches connected in a parallel configuration across the electrical load.

Q2 Part B

What is a key benefit of detailed process documentation in CNC planning?

- A. Increases the life of all cutting tools
- B. Guarantees lower machine purchase costs
- C. Maintain consistency in part quality ✓
- D. Improves operator chair comfort

Q3 Part B

While troubleshooting a machine, where can you find the recommended type of lubrication oil to use?

- A. Machine manual ✓
- B. List table for spare parts
- C. Previous entry in maintenance log
- D. Operator shift schedule page

Q4 Part B

A maintenance mechanic is drilling a 12 mm hole using a feed of 0.15 mm/rev and a spindle speed of 600 rpm. What is the total feed distance per minute?

- A. The total feed distance per minute is 180 mm
- B. The total feed distance per minute is 12 mm
- C. The total feed distance per minute is 90 mm ✓
- D. The total feed distance per minute is 72 mm

Q5 Part B

Which blower is commonly used in pneumatic conveying?

- A. Propeller blower
- B. Axial blower
- C. Roots blower ✓
- D. Exhaust blower

Q6 Part B

In screw threads, what does the term 'root' refer to?

- A. Bottom of the thread groove ✓
- B. Side of the thread profile
- C. Distance between threads
- D. Top of the thread ridge

Q7 Part B

In a workshop, a machine needs to transfer motion from a motor to a grinding wheel placed at a short distance, requiring smooth and quiet operation. Which method is most suitable for transmitting power?

- A. Using a gear drive for high torque transmission
- B. Using a rope drive for long-distance power transmission
- C. Using a belt drive between shafts ✓
- D. Using a chain drive for positive power transmission

Q8 Part B

How does the anatomy of a file enhance its effectiveness in metalworking?

- A. Specific parts perform distinct roles in filing ✓
- B. The tang is the only working part on the file
- C. All parts are used only for gripping
- D. The point is used for measuring the angles



Q9 Part B

Which dimensional value must lie within the upper and lower limits for acceptance of a manufactured component?

- A. Nominal dimension specified in engineering drawing sheet
- B. Actual measured size of the manufactured component after machining ✓
- C. Average dimension obtained from repeated measurement process
- D. Basic size used for tolerance specification during design stage

Q10 Part B

A maintenance manager compares conventional preventive maintenance with predictive maintenance for a high-speed turbine. Which scenario best demonstrates the advantage of predictive maintenance in optimizing production continuity and reducing spare-parts inventory?

- A. Replacing components during every scheduled shutdown, regardless of actual equipment condition.
- B. Performing routine component replacement at fixed calendar intervals without monitoring the condition.
- C. Maintaining a large spare-parts inventory continuously to handle unexpected equipment breakdowns.
- D. Using sensor data to schedule component replacement only when wear trends cross risk thresholds. ✓

Q11 Part B

What type of feedback might be used to monitor solenoid valve status in automation?

- A. Limit sensor detecting valve position ✓
- B. Manual inspection of the valve
- C. Checking the air temperature
- D. Using a larger solenoid coil

Q12 Part B

In the British Standard system of limits and fits, what is the main basis for specifying tolerances?

- A. Standard tolerance grades and fundamental deviations relative to basic size ✓
- B. Average manufacturing size obtained from inspection measurements
- C. Exact machining dimensions specified without tolerance variation
- D. Arbitrary dimensional variations chosen by machine operators

Q13 Part B

Which parameter must be adjusted to control the depth of weld penetration during manual arc welding?

- A. Electrode angle
- B. Arc voltage
- C. Travel speed
- D. Welding current ✓

Q14 Part B

Which type of valve is best suited to prevent overpressure in a pneumatic system?

- A. Non-return valve
- B. Flow control valve
- C. Directional control valve
- D. Pressure control valve ✓

Q15 Part B

Which of the following is a primary cause of electrical accidents in mechanical workshops?

- A. Wearing rubber-soled shoes
- B. Keeping tools dry while working
- C. Using insulated gloves when working
- D. Handling live wires without insulation ✓

Q16 Part B

In BIS notation, what does the tolerance grade primarily influence?

- A. The position of tolerance zone relative to zero line
- B. The measured dimension obtained during inspection
- C. The basic size specified in engineering drawing
- D. The magnitude or width of the tolerance zone ✓

Q17 Part B

In an industrial conveyor system where a speed sensor continuously monitors the belt speed and automatically adjusts the motor voltage to keep the speed constant, what type of control system is being used?

- A. Closed-loop system ✓
- B. Manual control system
- C. Non-feedback system
- D. Open-loop system



Q18 Part B

Which practice helps maintain the accuracy and effectiveness of measuring tools?

- A. Store them in protective cases** ✓
- B. Leave them in open toolboxes
- C. Use them as substitutes for other tools
- D. Clean them only when visibly dirty

Q19 Part B

In a machine workshop, workers frequently handle oils, chemicals, and metal particles during maintenance activities. Which occupational health practice is most effective in preventing skin-related diseases?

- A. Increasing machine speed during maintenance work
- B. Switching off fans during maintenance work
- C. Storing tools properly after maintenance work
- D. Wearing protective gloves during maintenance work** ✓

Q20 Part B

What feature enables a cutting torch to perform effective oxy-acetylene cutting operations?

- A. Use of a wooden handle to reduce operator fatigue
- B. Capability to produce electrical resistance heating
- C. Ability to supply a high-pressure oxygen jet** ✓
- D. Presence of a cooling fan inside the torch

Q21 Part B

What is the main function of the piston rings in a compressor piston assembly?

- A. Reduce the overall piston weight
- B. Enhance the piston surface finish
- C. Prevent air leakage past the piston** ✓
- D. Increase piston rotational speed

Q22 Part B

What key property of GI (Galvanized Iron) pipes justifies their use over plastic pipes in main municipal water supply systems during retrofitting?

- A. Greater flexibility for complex routes
- B. Lower cost than plastic pipes
- C. Higher mechanical strength** ✓
- D. Better resistance to all chemicals

Q23 Part B

An operator selects a grinding wheel for finishing a hardened steel shaft. Which structure type should be chosen to minimize the risk of workpiece overheating while ensuring efficient chip removal?

- A. Compact structure wheel
- B. Dense structure wheel
- C. Medium structure wheel
- D. Open structure wheel** ✓

Q24 Part B

In milling cutter nomenclature, which term refers to the angle provided behind the cutting edge to reduce friction during cutting?

- A. Rake angle
- B. Cutting angle
- C. Clearance angle** ✓
- D. Helix angle

Q25 Part B

Which property of a target object does not significantly affect an ultrasonic sensor?

- A. Shape and distance
- B. Surface position
- C. Colour of the object** ✓
- D. Sound reflection

Q26 Part B

While grinding, why is it unsafe to use the side surface of a pedestal grinding wheel for regular grinding work?

- A. The side surface increases material removal rate beyond safe limits
- B. The side surface is not designed to withstand regular grinding forces** ✓
- C. The side surface causes automatic imbalance in all grinding operations
- D. The side surface is more suitable only for polishing operations

Q27 Part B

Which device uses a chain and pulley arrangement to lift heavy loads in a workshop?

- A. Jib crane
- B. Chain block** ✓
- C. Pulley wheel
- D. Belt conveyor



Q28 Part B

Why should the outside micrometer not be dropped or handled roughly?

A. It may disturb calibration and alignment ✓

B. It changes thimble graduation

C. It increases the screw pitch

D. It increases measurement capacity

Q29 Part B

Which main component of a pipe cutter ensures the cutting wheel moves smoothly across the pipe surface?

A. Guide rollers ✓

B. Adjusting screw

C. Frame

D. Handle

Q30 Part B

An assembly layout in first angle projection uses auxiliary views for a slanted machine component. What is the main advantage of including these auxiliary views?

A. Auxiliary views are only required for symmetrical objects in first angle projection

B. Auxiliary views reveal true shape and size of inclined surfaces not shown in main views ✓

C. Auxiliary views primarily display hidden features behind solid surfaces

D. Auxiliary views replace all side and top views in first angle projection

Q31 Part B

Which part inside the shuttle valve moves to block one of the inlets?

A. Diaphragm

B. Spring

C. Piston

D. Ball element ✓

Q32 Part B

A maintenance dashboard shows Pump A has an MTTR of 2 hours and Pump B has an MTTR of 4 hours, both with similar failure rates. Which maintenance improvement action should be prioritized for Pump B?

A. Increase frequency of failure reporting for Pump B

B. Reduce the repair duration through better planning and training ✓

C. Ignore MTTR difference as it does not affect downtime

D. Schedule more breakdowns to gather additional data

Q33 Part B

Which procedure correctly confirms that a pipe wrench's jaws are adjusted properly to provide maximum grip and safe operation?

A. Set the jaws loosely

B. Apply grease to the jaws

C. Ensure the jaws fully contact ✓

D. Position the wrench at edges

Q34 Part B

A technician is assembling a gear train where the driver gear has 24 teeth and the driven gear has 72 teeth. What is the velocity ratio in this setup?

A. 1.5:1

B. 1:1.5

C. 2:1

D. 3:1 ✓

Q35 Part B

According to Faraday's law, induced EMF is produced when there is a change in:

A. Resistance

B. Temperature

C. Magnetic flux ✓

D. Power

Q36 Part B

What is the key advantage of performing periodic vibration analysis in a preventive maintenance schedule for multiple pumps?

A. Improves pump efficiency immediately

B. Increases pump flow rate

C. Detects signs of component deterioration ✓

D. Decreases pump power consumption



Q37 Part B

In a machine safety system, four emergency switches are connected through an OR gate. Under which condition will the output become HIGH?

A. Only when all switches are OFF

B. When at least one switch is ON



C. Only when all switches are ON

D. Only when two switches are ON

Q38 Part B

A ladder is placed against a workshop wall, making an angle of 60 degrees with the floor. If the ladder is 5 meters long, what is the vertical height from the floor to the top of the ladder?

A. 4.33 meters



B. 2.5 meters

C. 5 meters

D. 3.75 meters

Q39 Part B

In power system protection, which device detects fault current and sends a trip signal to the circuit breaker?

A. Ammeter

B. Capacitor

C. Fuse wire

D. Relay

**Q40 Part B**

An engineering drawing for a compressor frame shows a welding symbol with a fillet triangle placed below the reference line, with the dimension '6' placed to its left and '100' placed to its right. What does this indicate?

A. A 6 mm groove weld, 100 mm long, on arrow side

B. A 6 mm fillet weld, 100 mm long, on the arrow side



C. A 100 mm fillet weld, 6 mm long, on other side

D. A 6 mm fillet weld, 100 mm pitch, on both sides

Q41 Part B

A fitter is required to replace a large pulley on a shaft without disturbing the shaft alignment or its mounted components. Which type of pulley should be selected for this scenario?

A. Fast pulley

B. Loose pulley

C. Split pulley



D. Solid pulley

Q42 Part B

A shaft and hub assembly requires a parallel key with standard side clearance. Which factor ensures the proper fit of the key in the keyway?

A. The key should be longer than the shaft diameter

B. The height of the key should be larger than the keyway depth

C. The width of the key should be exactly equal to the keyway width

D. The width of the key should be slightly less than the keyway width

**Q43 Part B**

What is the consequence of using a relay with a coil voltage rating lower than the supply voltage?

A. Contact wear will be reduced

B. Improve relay performance

C. Coil may overheat and fail



D. Relay will operate at normal speed

Q44 Part B

A spur gear has 40 teeth and a pitch diameter of 80 mm. What is the diametral pitch of this gear?

A. 2 teeth per mm

B. 0.2 teeth per mm

C. 0.5 teeth per mm



D. 1 teeth per mm

Q45 Part B

A lifting machine raises a 500 N load to a height of 4 meters in 10 seconds. What is the mechanical power delivered by the machine?

A. 100 watts

B. 200 watts



C. 125 watts

D. 250 watts



Q46 Part B

A team is preparing for a shift change in a mechanical workshop. According to best practices in maintaining a clean work area, which action should be taken before leaving the workstation?

- A. Leave tools on the bench for the next working team
- B. Store waste under the worktables for later removal
- C. Sweep only the floors and leave items out
- D. Dispose waste and return tools to assigned places ✓

Q47 Part B

A shaper is used to machine a slot with a depth of 2 mm. If the recommended maximum depth of cut per pass for the tool and material is 1 mm, how many passes should the operator plan for?

- A. 2 passes ✓
- B. 4 passes
- C. 1 pass
- D. 3 passes

Q48 Part B

A conical tank has a base diameter of 1.2 m and a height of 2 m. What is its total capacity in cubic meters?

- A. 0.754 m³ ✓
- B. 1.507 m³
- C. 2.712 m³
- D. 0.377 m³

Q49 Part B

When interpreting a sheet-metal fabrication drawing with a third angle projection symbol, what is the correct location for the left side view relative to the front view?

- A. The left side view is placed above the top view
- B. The left side view is placed to the right of the front view
- C. The left side view is placed below the front view
- D. The left side view is placed to the left of the front view ✓

Q50 Part B

While erecting a foundation for a vertical pump, the fitter notices that the cotter bolt is not fitting properly in its slot, despite being of the correct nominal size. What is the most probable reason for this issue?

- A. The slot or hole has not been machined to the required tolerance ✓
- B. Excessive lubrication is preventing the cotter bolt from seating
- C. The thread pitch on the cotter bolt does not match the nut
- D. The cotter bolt is too short for the assembly

Q51 Part B

A machine requires the transmission of motion between two parallel shafts with uniform velocity ratio. Which type of gear is most suitable for this application?

- A. Helical gear
- B. Spur gear ✓
- C. Worm gear
- D. Bevel gear

Q52 Part B

Which property of a manila rope makes it suitable for lifting a medium-weight machine part in a workshop?

- A. Low cost and attractive surface appearance
- B. High resistance to acids and chemicals
- C. High flexibility and adequate tensile strength ✓
- D. Good electrical conductivity for industrial use

Q53 Part B

What is the primary risk of not verifying approach and retract movements in a CNC program?

- A. Coolant flow may not reach the tool
- B. Feed rate may be too aggressive
- C. Spindle speed may be set too low
- D. Tool may collide with the workpiece ✓

Q54 Part B

In which condition is a faceplate more suitable than a three-jaw chuck?

- A. Machining standard cylindrical shafts
- B. Quick clamping of small components
- C. Holding irregularly shaped workpieces ✓
- D. Automatic centering of round bars



Q55 Part B

What should be ensured for safety when different teams work on separate levels of the same scaffold structure?

- A. Lock access to one level during work
- B. Coordinate work to prevent dropping tools ✓
- C. Set strict time limits for each team
- D. Assign a supervisor to each level

Q56 Part B

A textile mill located in a humid coastal region requires a belt drive system for continuous operation. Which type of belt is most suitable for this environment based on weather conditions?

- A. Fabric belt
- B. Rubber belt ✓
- C. Leather belt
- D. Plastic belt

Q57 Part B

What happens to the total resistance when two equal resistors are connected in parallel?

- A. It becomes half of one resistor ✓
- B. It becomes zero
- C. It remains the same as one resistor
- D. It doubles compared to one resistor

Q58 Part B

Why is a reduced scale preferred over an enlarged scale for machine foundation layouts in fabrication workshops?

- A. Because measurement accuracy is improved with reduced scale
- B. Because enlarged scales are always used for large drawings
- C. Because foundations are large and must fit on standard drawing sheets ✓
- D. Because proportional representation is not required for foundations

Q59 Part B

An engineer observes that the belt on a flat pulley is tracking off-center during operation. Which adjustment related to crowning is most likely to correct this issue?

- A. Reduce the pulley diameter only
- B. Reduce the crowning at the pulley center
- C. Increase the crowning at the pulley center ✓
- D. Make the pulley face completely flat

Q60 Part B

Which operation benefits most from the use of a depth gauge in the fitting process?

- A. Assessing the pitch of a thread
- B. Measuring the thickness of a metal plate
- C. Determining the diameter of a washer
- D. Checking the depth of a keyway slot ✓

Q61 Part B

During normalizing, a steel component is heated above its upper critical temperature and then cooled in air. How does air cooling in normalizing affect the final microstructure compared to furnace cooling in annealing?

- A. It leads to coarse pearlite and large grains
- B. It results in the formation of martensite
- C. It produces finer pearlite and smaller grains ✓
- D. It creates a structure with mostly bainite

Q62 Part B

A rung in a ladder diagram of PLC has a counter (C1) incremented each time input I2 turns ON. If I2 is pulsed ON and OFF five times, what will be the value stored in C1?

- A. 5 ✓
- B. 1
- C. 0
- D. 10

Q63 Part B

An oil sample from a gearbox shows a high amount of iron (ferrous) particles, but the oil viscosity is normal, and there is no water. What should be done first?

- A. Inspect the gearbox for abnormal gear or bearing wear ✓
- B. Replace the lubricant immediately to prevent failure
- C. Increase oil sampling frequency only for trend monitoring
- D. Reduce gearbox operating temperature settings

Q64 Part B

A sequence valve in a pneumatic system is used to:

- A. Ensure operations occurs ✓
- B. Regulate flow rate
- C. Direct airflow
- D. Maintain system pressure



Q65 Part B

A mason cuts a dovetail-shaped hole in a stone block and inserts a lifting device that expands sideways when tension is applied, allowing the stone to be lifted. Which device is being used?

- A. Double hook
- B. Lewis bolt ✓
- C. Eye bolt
- D. Rivet

Q66 Part B

An AI-based inspection system continues improving defect classification accuracy after exposure to additional production images. Which capability is primarily being demonstrated?

- A. Static optimization through application of predefined operating limits
- B. Sequential processing through execution of fixed computational pathways
- C. Incremental learning through adaptation of internal decision parameters ✓
- D. Deterministic control through repetition of predefined execution routines

Q67 Part B

In a scenario where a newly installed conveyor system begins to vibrate excessively, but shows no clear external damage, what inspection strategy should the maintenance team adopt to diagnose the root cause?

- A. Tighten all external fasteners and check for immediate improvement
- B. Lubricate all moving parts and monitor vibration
- C. Perform a detailed inspection focusing on alignment, balance, and internal wear ✓
- D. Increase the frequency of visual inspections for surface defects

Q68 Part B

An engineering drawing specifies a surface finish symbol with a bar added below the basic symbol. What does this symbol indicate about the manufacturing process?

- A. No specific surface finish required
- B. Material removal by machining is required ✓
- C. Maximum roughness value is specified
- D. Surface must be left as cast

Q69 Part B

What is the shape of a Woodruff key used in machine assemblies?

- A. Wedge shape
- B. Rectangular bar
- C. Semicircular disc ✓
- D. Flat plate

Q70 Part B

Which geometric pattern results from the incremental coordinate sequence X0 Y10, X10 Y0, X0 Y-10, X-10 Y0?

- A. Circle
- B. Triangle
- C. Straight line
- D. Square ✓

Q71 Part B

In a smart factory, an intelligent conveyor system detects a jam and autonomously reroutes products using digital integration. Which Industry 4.0 feature does this scenario best illustrate?

- A. Batch processing of historical data for scheduled analysis
- B. Time-based scheduling for preventative maintenance cycles
- C. Centralized manual override via human-machine interfaces
- D. Real-time process adaptation through distributed control systems ✓

Q72 Part B

Why is closed loop control preferred over open loop control in high-precision CNC machining tasks?

- A. Speeds up machining by ignoring minor disturbances
- B. Reduces the need for operator supervision
- C. Checks for errors after the machining process
- D. Automatically corrects errors during machining ✓



Q73 Part B

A PLC program uses a retentive timer (RTO) set for 30 seconds. The timer is enabled for 10 seconds, then disabled for 5 seconds, and enabled again for 20 seconds. What is the final accumulated value of the timer?

A. 10

B. 20

C. 30



D. 0

Q74 Part B

Which of the following should be removed regularly from the bench vice to maintain smooth operation?

A. Guide rods

B. Jaw plates

C. Handle grip

D. Dust and metal chips

**Q75** Part B

Which component symbol is commonly used to perform the pneumatic AND function?

A. Pressure regulator

B. Shuttle valve

C. Quick exhaust valve

D. Two-pressure valve

