



RRB ALP 2024 CBT 2

Assistant Loco Pilot · CEN 01/2024 · CBT 2 · Electronics Mechanic Trade · Part B (Electronics Mechanic) · Question Paper

English

All 4 Shifts (Sets) · Part B (Electronics Mechanic) Section · Official Answer Key

About this Compilation

This booklet contains all 4 shift papers of the RRB ALP 2024 CBT 2 (Electronics Mechanic) examination in English (Part B (Electronics Mechanic) section only), with the correct option marked as per the official answer key.

✓ Correct option (highlighted green)

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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02 May 2025
9:30 AM - 12:00 PM

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Set 2

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Set 4

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Part B (Electronics Mechanic)

75 Questions • Answer Key

Q1 Part B (Electronics Mechanic)

In a velocity-time graph, the negative slope represents _____.

A. retardation



B. displacement

C. acceleration

D. distance

Q2 Part B (Electronics Mechanic)

How many parallel I/O ports are available in the 8051 microcontrollers?

A. Five

B. Three

C. Two

D. Four



Q3 Part B (Electronics Mechanic)

Which of the following organisations is responsible for enforcing workplace safety regulations in India?

A. World Health Organization (WHO)

B. Food and Drug Administration (FDA)

C. Directorate General of Factory Advice Service and Labour Institutes (DGFASLI)



D. Environmental Protection Agency (EPA)

Q4 Part B (Electronics Mechanic)

Which of the following parts of a file is the part fitted to the tang for holding the file?

A. Tip or Point

B. Handle



C. Edge

D. Tang

Q5 Part B (Electronics Mechanic)

What is a key advantage of using MOSFETs in electronic circuits compared to other types of transistors?

A. High frequency response

B. High input impedance and low power consumption



C. Ability to handle higher voltages and currents than BJTs

D. Ability to amplify both AC and DC signals

Q6 Part B (Electronics Mechanic)

A drawing instrument box is used to carry all _____ instruments.

A. drawing



B. screening

C. drilling

D. casting

Q7 Part B (Electronics Mechanic)

When selecting a sheet size for an original drawing, what should be the primary consideration?

A. The standard size of the drawing office.

B. The clarity and resolution required.



C. The orientation of the drawing (horizontal or vertical).

D. The size of the reproduction.

Q8 Part B (Electronics Mechanic)

When using a multimeter to measure current, which of the following is correct?

A. The multimeter is connected directly to the power source.

B. The multimeter is connected in series with the load.



C. The multimeter is connected only across resistive components.

D. The multimeter is connected in parallel with the load.



Q9 Part B (Electronics Mechanic)

In the IC 555 block diagram, which type of flip-flop is used?

- A. D flip-flop
- B. RS flip-flop** ✓
- C. T flip-flop
- D. JK flip-flop

Q10 Part B (Electronics Mechanic)

Which of the following is a switching error in electrical measuring instruments?

- A. Error due to wrong calculation of subdivisions
- B. Wrong connection of the meter** ✓
- C. Error due to heat
- D. Error due to vibration

Q11 Part B (Electronics Mechanic)

What is the role of the LC oscillator in an inductive proximity switch?

- A. It converts AC voltage to DC voltage.
- B. It measures temperature changes.
- C. It detects light intensity.
- D. It generates a high-frequency electromagnetic field.** ✓

Q12 Part B (Electronics Mechanic)

How can the range of an ammeter be extended?

- A. By using a step-up transformer
- B. By increasing the applied voltage
- C. By connecting a shunt resistor in parallel with the ammeter** ✓
- D. By connecting a resistor in series with the ammeter

Q13 Part B (Electronics Mechanic)

How can one avoid a parallax error while taking a reading from a moving iron type voltmeter?

- A. By seeing the needle at an angle of 90°
- B. By seeing the image of the pointer on the mirror
- C. By seeing straight on the needle** ✓
- D. By seeing the needle at an angle of 45°

Q14 Part B (Electronics Mechanic)

Why is a high-impedance input preferred in a frequency meter?

- A. To allow better voltage regulation
- B. To increase the power consumption of the meter
- C. To reduce display brightness fluctuations
- D. To prevent voltage drop across the circuit being measured** ✓

Q15 Part B (Electronics Mechanic)

Which of the following Boolean expressions represents the behaviour of a 3-input OR gate?

- A. $A + B + C$** ✓
- B. $(A + B) * C$
- C. $A * B * C$
- D. $(A * B) + C$

Q16 Part B (Electronics Mechanic)

What is the role of a capacitor in an op-amp integrator circuit?

- A. It blocks AC signals and passes DC signals.
- B. It stores charge and accumulates voltage over time.** ✓
- C. It amplifies the input signal.
- D. It acts as a voltage divider.

Q17 Part B (Electronics Mechanic)

Which of the following files is used for filing narrow grooves and angles above 10°?

- A. Knife-edge file** ✓
- B. Half round file
- C. Square file
- D. Triangular file

Q18 Part B (Electronics Mechanic)

In the 8051, how does the interrupt enable (IE) SFR and the interrupt priority (IP) SFR work together to manage interrupt handling?

- A. IE sets the global interrupt enable, while IP sets the address of the interrupt service routine.
- B. IE sets the priority levels, while IP enables or disables individual interrupts.
- C. IE enables or disables individual interrupts, while IP sets the global interrupt enable.
- D. IE enables or disables individual interrupts, while IP sets the priority level for each interrupt source.** ✓



Q19 Part B (Electronics Mechanic)

For what purpose are pins and clips used in engineering drawings?

- A. To transfer dimensions and dividing lines into a number of equal parts
- B. To draw horizontal lines, parallel lines and to guide/hold the set squares
- C. To fasten the drawing sheet on to the drawing board firmly so that it does not shake ✓
- D. To support the drawing paper/tracing paper for making drawings

Q20 Part B (Electronics Mechanic)

Gaskets, seals and spacers are made using:

- A. centre punch
- B. hollow punch ✓
- C. pin punch
- D. prick punch

Q21 Part B (Electronics Mechanic)

Which type of transformer is used in a full wave rectifier circuit with two diodes?

- A. Auto-transformer
- B. Center-tapped transformer ✓
- C. Step-up transformer
- D. Current transformer

Q22 Part B (Electronics Mechanic)

A/an ____ is connected in series with the voltmeter to increase the range of the voltmeter.

- A. inductor
- B. capacitor
- C. resistor ✓
- D. inductor and capacitor in series

Q23 Part B (Electronics Mechanic)

A circular hole of radius 3 cm is cut from a rectangular sheet of dimensions 12 cm × 10 cm. Find the remaining area.

(Take $\pi = 3.14$)

- A. 100 cm²
- B. 91.74 cm² ✓
- C. 95.86 cm²
- D. 75.74 cm²

Q24 Part B (Electronics Mechanic)

According to BIS SP 46-2003, which of the following applications is correctly represented by a chain-thin line in engineering drawings?

- A. Center lines ✓
- B. Hidden edges
- C. Dimension lines
- D. Visible edges

Q25 Part B (Electronics Mechanic)

What type of oscillator uses a capacitive voltage divider as the feedback network?

- A. Crystal oscillator
- B. Colpitts oscillator ✓
- C. RC oscillator
- D. Hartley oscillator

Q26 Part B (Electronics Mechanic)

In a non-inverting amplifier, what is the ideal input impedance?

- A. Zero
- B. Equal to R_f (Feedback Resistor)
- C. Infinite ✓
- D. Equal to R_{in} (Input Resistor)

Q27 Part B (Electronics Mechanic)

What is the Boolean expression for the carry-out (Cout) output of a Full Adder?

- A. $Cout = (A \cdot B) \oplus C_{in}$
- B. $Cout = A \oplus B \oplus C_{in}$
- C. $Cout = (A \cdot B) + (B \cdot C_{in}) + (C_{in} \cdot A)$ ✓
- D. $Cout = (A \cdot B) \cdot C_{in}$

Q28 Part B (Electronics Mechanic)

What is the advantage of using a transistor as a switch in a power electronic circuit?

- A. High current gain
- B. High power gain
- C. High voltage gain
- D. High switching frequency and low switching losses ✓



Q29 Part B (Electronics Mechanic)

When measuring the resistance of a resistor using an ohmmeter, what does a reading of zero resistance indicate?

- A. The resistor is functioning normally.
- B. The resistor is open-circuited.
- C. The resistor is short-circuited. ✓
- D. The ohmmeter is malfunctioning.

Q30 Part B (Electronics Mechanic)

What is the primary action that occurs in the base region of an NPN transistor when a small positive voltage is applied to the base with respect to the emitter?

- A. The collector current is reduced.
- B. Holes are created in the base region.
- C. Electrons from the emitter are attracted to the base region. ✓
- D. The base-emitter junction is reverse-biased.

Q31 Part B (Electronics Mechanic)

In an ideal op-amp, what would happen if there were no feedback in the circuit?

- A. The output would remain at zero.
- B. The output would saturate to supply limits. ✓
- C. The output would be unpredictable.
- D. The gain would become unity.

Q32 Part B (Electronics Mechanic)

Minimum gate required to implement XOR gate using NOR gate only are:

- A. 5 ✓
- B. 3
- C. 4
- D. 2

Q33 Part B (Electronics Mechanic)

Which of the following is NOT the correct truth table output for an OR gate?

- A. 1 if either input is 1
- B. 1 if both inputs are 1
- C. 0 if both inputs are 0
- D. 0 if either of input is 1 ✓

Q34 Part B (Electronics Mechanic)

The unit for specific gravity is ____.

- A. m/s^2
- B. g/cm^3
- C. kg/m^3
- D. no unit (dimensionless) ✓

Q35 Part B (Electronics Mechanic)

Which type of circuit is used to amplify low-level signals, such as those from sensors or microphones, to a level that is sufficient to drive a load?

- A. Power amplifier
- B. Voltage amplifier ✓
- C. Operations-based Schmitt trigger
- D. Current amplifier

Q36 Part B (Electronics Mechanic)

What is the output waveform of a half-wave rectifier considering input as a sinusoidal AC signal?

- A. Square wave
- B. Pulsating DC wave ✓
- C. Triangular wave
- D. Perfect sine wave

Q37 Part B (Electronics Mechanic)

Which of the following types of pliers is used to shape loops in wires and to form curves in light metal strips?

- A. Flat nose pliers
- B. Round nose pliers ✓
- C. Slip-joint pliers
- D. End cutting pliers

Q38 Part B (Electronics Mechanic)

A circuit consists of three resistors; 15 ohms, 10 ohms, and 20 ohms. The 15-ohm resistor is in series with the parallel combination of the 10-ohm and 20-ohm resistors. If a 24 V battery is applied across the circuit, what is the total current flowing through the circuit?

- A. 3.1 A
- B. 0.1 A
- C. 1.1 A ✓
- D. 2.1 A



Q39 Part B (Electronics Mechanic)

What happens when an object enters the sensing range of a capacitive proximity switch?

- A. The resistance of the circuit increases.
- B. The capacitance of the LC circuit changes.**
- C. The inductance of the LC circuit changes.
- D. The circuit stops oscillating permanently.

Q40 Part B (Electronics Mechanic)

What should be the current rating of an induction type watt meter, in general, if a current transformer is used for measurement of power?

- A. 2 A
- B. 10 A
- C. 30 A
- D. 5 A**

Q41 Part B (Electronics Mechanic)

What is the condition for a transistor to operate in the saturation region?

- A. The base-emitter junction is reverse-biased and the collector-emitter junction is forward-biased.
- B. The base-emitter junction is forward-biased and the collector-emitter junction is reverse-biased.
- C. The base-emitter junction is reverse-biased.
- D. The base-emitter junction is forward-biased and the collector-emitter junction is also forward-biased.**

Q42 Part B (Electronics Mechanic)

A message signal made of multiple frequency components has a maximum frequency value of 4 KHz. Find the minimum sampling frequency required according to the sampling theorem.

- A. 8 KHz**
- B. 6 KHz
- C. 2 KHz
- D. 4 KHz

Q43 Part B (Electronics Mechanic)

Why is it important for every person to follow safety procedures in the workplace?

- A. To increase overall production efficiency
- B. To minimise risks and avoid accidents**
- C. To reduce operational costs significantly
- D. To limit the need for frequent supervision

Q44 Part B (Electronics Mechanic)

What is the advantage of giving heat treatment to a material?

- A. To decrease the melting point of the material
- B. To increase the weight of the material
- C. To change it from one element to another element
- D. To make surgical knives of sharp edges**

Q45 Part B (Electronics Mechanic)

Which type of light source is commonly used in photoelectric switches?

- A. Fluorescent lamp
- B. Infrared LED**
- C. Halogen lamp
- D. Incandescent bulb

Q46 Part B (Electronics Mechanic)

What is the effect of a decrease in base area region due to a rise in base width modulation on the collector current in a PNP transistor?

- A. The collector current becomes zero.
- B. The collector current increases.**
- C. The collector current remains the same.
- D. The collector current decreases.

Q47 Part B (Electronics Mechanic)

What is the primary advantage of the bit-addressable area in the 8051's internal RAM?

- A. It allows bit-level access to data memory, providing precise control for applications like I/O operations.**
- B. It is used for storing large amounts of data in a compressed format.
- C. It increases the overall size of the internal RAM.
- D. It reduces the power consumption by allowing individual bits to be turned off.

Q48 Part B (Electronics Mechanic)

How are flip flops used in digital counters?

- A. Flip-flops store the count value in binary form and change state with each clock pulse.**
- B. Flip-flops convert analogue input signals to a digital count.
- C. Flip-flops perform addition operations for the counter.
- D. Flip-flops generate a clock signal for the counter.



Q49 Part B (Electronics Mechanic)

The loading effect of a voltmeter is determined by ____.

- A. the input resistance of the voltmeter ✓
- B. the weight of the voltmeter
- C. the frequency of the circuit
- D. the size of the voltmeter display

Q50 Part B (Electronics Mechanic)

Which of the following hand-operated drilling machines is used for drilling small diameter holes up to 6 mm?

- A. Electric hand drill
- B. Ratchet drilling machine
- C. Breast drilling machine
- D. Bevel gear type drilling machine ✓

Q51 Part B (Electronics Mechanic)

Manganese is used as a shunt resistor for extension of range in an Ammeter because ____.

- A. manganese is a highly resistive material
- B. manganese is a superior conductor
- C. there won't be any variation in resistance due to temperature ✓
- D. there won't be any magnetic loss

Q52 Part B (Electronics Mechanic)

In a lead-acid battery, what is the chemical composition of the material used for the positive plate during discharge?

- A. Sulphuric acid (H_2SO_4)
- B. Lead (Pb)
- C. Lead dioxide (PbO_2) ✓
- D. Lead sulfate (PbSO_4)

Q53 Part B (Electronics Mechanic)

What is the typical sensitivity of commercially available LVDTs?

- A. 0.1 to 0.5 mV/mm
- B. 50 to 300 mV/mm ✓
- C. 5 to 10 mV/mm
- D. 0.5 to 5 mV/mm

Q54 Part B (Electronics Mechanic)

What is the significance of beta (β) in a transistor?

- A. Current gain in common base configuration
- B. Power gain in common base configuration
- C. Power gain in common emitter configuration
- D. Current gain in common emitter configuration ✓

Q55 Part B (Electronics Mechanic)

What should you do to ensure your personal safety at work?

- A. Wear personal protective equipment. ✓
- B. Work in a hurry without checking equipment.
- C. Ignore warning signs and instructions.
- D. Take risks to finish tasks quickly.

Q56 Part B (Electronics Mechanic)

Select the correct statement regarding amplitude modulation.

- A. The modulation index of AM is inversely proportional to peak amplitude of the analog modulating signal and the carrier signal.
- B. The modulation index of AM is directly proportional to peak amplitude of the analog modulating signal and the carrier signal.
- C. The modulation index of AM is directly proportional to peak amplitude of the carrier signal and inversely proportional to the peak amplitude of the analog modulating signal.
- D. The modulation index of AM is directly proportional to peak amplitude of the analog modulating signal and inversely proportional to the peak amplitude of the carrier signal. ✓

Q57 Part B (Electronics Mechanic)

What is the primary reason for electrical injuries when a person comes in contact with electrical equipment?

- A. Electrical equipment is not properly grounded.
- B. Current flows through the body causing harm. ✓
- C. Devices are used for too long.
- D. Electrical devices are too powerful.



Q58 Part B (Electronics Mechanic)

If the current flowing through a conductor is 5 A and the resistance of the conductor is 10 ohms, what will be the voltage across the conductor, according to Ohm's Law?

A. 15 V

B. 50 V

C. 5 V

D. 10 V

Q59 Part B (Electronics Mechanic)

Which of the following vices consists of a handle and a small collet chuck at one end?

A. Hand vice

B. Pin vice

C. Pipe vice

D. Toolmaker's vice

Q60 Part B (Electronics Mechanic)

Non-functional dimensions are _____.

A. not essential for the function of the space or component

B. essential for the function of the space or component

C. derived from the values of the related features of a drawing

D. directly derived from the values given on a drawing

Q61 Part B (Electronics Mechanic)

Which of the following configurations, commonly used in audio amplifiers, has a high current gain and a good voltage gain?

A. Common Emitter (CE)

B. Common Base (CB)

C. Common Drain (CD)

D. Common Collector (CC)

Q62 Part B (Electronics Mechanic)

To implement an OR gate using only NAND gates, how many NAND gates are required?

A. 1

B. 3

C. 2

D. 4

Q63 Part B (Electronics Mechanic)

The purpose of copper shading rings in an induction type single phase energy meter is:

A. to produce phase difference between flux and voltage in a pressure coil

B. to produce magnetic force

C. to produce controlling force

D. to produce eddy current damping

Q64 Part B (Electronics Mechanic)

While using a pulse code modulator circuit, the output of the quantizer is fed to the _____.

A. decoder

B. encoder

C. mixer

D. multiplexer

Q65 Part B (Electronics Mechanic)

The pointer of the dynamo meter type power factor meter moved to the left of the centre. Which of the following does it indicate?

A. Capacitive load and power factor lagging

B. Inductive load and power factor lagging

C. Capacitive load and power factor leading

D. Inductive load and power factor leading

Q66 Part B (Electronics Mechanic)

Arrange the following steps in the correct order to draw an equilateral triangle with each side of 35 mm.

1. Join CA and CB.

2. Draw a line and mark AB 35 mm as the side of the triangle.

3. With radius AB and center A and B, draw arcs cutting at C.

4. ABC is the required triangle.

A. 2, 3, 1, 4

B. 1, 2, 4, 3

C. 2, 1, 3, 4

D. 3, 2, 1, 4



Q67 Part B (Electronics Mechanic)

Which of the following is an important safety measure during a power failure?

- A. Using candles for lighting
- B. Continuing to use equipment without verifying power status
- C. Ensuring all machines and electrical equipment are turned off ✓
- D. Ignoring alarm systems

Q68 Part B (Electronics Mechanic)

The 8051 microcontroller supports the bit-addressable memory feature that is located at the memory locations ____.

- A. RAM addresses 0x20 to 0x2F ✓
- B. RAM addresses 0x0 to 0x1F
- C. RAM addresses 0x30 to 0x7F
- D. RAM addresses 0x80 to 0xFF

Q69 Part B (Electronics Mechanic)

What is the purpose of an emergency evacuation plan?

- A. To ensure safe and orderly evacuation during emergencies ✓
- B. To avoid safety drills
- C. To increase productivity
- D. To allow workers to leave early

Q73 Part B (Electronics Mechanic)

How many minimum number of NAND gates will be required to implement the Boolean expression $F = A \cdot \bar{B} + C$ using only NAND gate?

- A. 3
- B. 4 ✓
- C. 5
- D. 6

Q70 Part B (Electronics Mechanic)

What is the sum output of a Full Adder when the inputs $A = 1$, $B = 1$, and $C_{in} = 0$?

- A. 1
- B. 2
- C. 0 ✓
- D. 3

Q71 Part B (Electronics Mechanic)

In a JK Flip-Flop, if $J = 0$, $K = 0$ and the clock pulse occurs, what will happen to the output Q?

- A. The output will remain unchanged. ✓
- B. The output will be set to 1.
- C. The output will toggle.
- D. The output will be reset to 0.

Q72 Part B (Electronics Mechanic)

If a 1 : 4 demux has an input of logic 1 and the select lines (S_1, S_0) are set to 01, what will be the output?

- A. Output 1 will be 1. ✓
- B. Output 2 will be 1.
- C. Output 3 will be 1.
- D. Output 0 will be 1.



Q74 Part B (Electronics Mechanic)

$$\left(\frac{3}{8}\right) + \left(\frac{5}{12}\right)$$

A. $\frac{17}{24}$

B. $\frac{19}{24}$ 

C. $\frac{8}{20}$

D. $\frac{7}{12}$

Q75 Part B (Electronics Mechanic)

$\cos\theta$

A. $\frac{3}{5}$

B. $\frac{4}{5}$ 

C. $\frac{5}{4}$

D. $\frac{3}{4}$



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Part B (Electronics Mechanic)

75 Questions • Answer Key

Q1 Part B (Electronics Mechanic)

A device operates at 240 V and consumes 480 W of power. What is the current flowing through the device?

A. 2 A



B. 1 A

C. 1.5 A

D. 2.5 A

Q2 Part B (Electronics Mechanic)

If a continuous time analog signal is sampled using a pulse train, then the spectrum of the PAM signal is a/an ____.

A. triangular function

B. sinc function



C. impulse function

D. step function

Q3 Part B (Electronics Mechanic)

What is an advantage of using RTDs (Resistance Temperature Detectors)?

A. High sensitivity

B. RTDs are linear over wide operating range



C. Not affected by shock and vibrations

D. Lower cost than other temperature transducers

Q4 Part B (Electronics Mechanic)

Which type of semiconductor material(s) is/are NOT doped with any impurities?

A. Only intrinsic semiconductor



B. Doped semiconductor

C. Both intrinsic and extrinsic semiconductors

D. Only extrinsic semiconductor

Q5 Part B (Electronics Mechanic)

Why does the pointer of a dynamo meter type power factor meter denote some reading even when load is not connected to the meter?

A. Because there is no eddy current

B. Due to the residual magnetism in the current coil

C. Because there is no control mechanism



D. Due to the residual magnetism in the pressure coil

Q6 Part B (Electronics Mechanic)

In a four band colour coded resistor, yellow colour in fourth band represents ____ tolerance.

A. $\pm 10\%$ B. $\pm 4\%$ C. $\pm 3\%$ D. $\pm 5\%$

Q7 Part B (Electronics Mechanic)

What is the maximum range of current to be measured by a multimeter for the red probe to be connected to the mA terminal of the multimeter?

A. 1000 mA

B. 200 mA



C. 100 mA

D. 500 mA

Q8 Part B (Electronics Mechanic)

Which of the following statements is true for the loading effect of a voltmeter?

A. It is related to the sensitivity of the voltmeter and thus the voltmeter gives correct reading.

B. It is related to the permittivity of the voltmeter and thus the voltmeter gives correct reading.

C. It is related to the permittivity of the voltmeter and thus the voltmeter gives incorrect reading.

D. It is related to the sensitivity of the voltmeter and thus the voltmeter gives incorrect reading.



Q9 Part B (Electronics Mechanic)

What is the effect of doping on the Fermi level of a semiconductor for n-type doping?

A. Fermi level moves below the valence band.

B. Fermi level remains unchanged.

C. Fermi level moves closer to the valence band.

D. Fermi level moves closer to the conduction band.



Q10 Part B (Electronics Mechanic)

Which of the following statements is/are correct?
 Statement I - The annealing process uses heat to reduce the hardness and increase the ductility and toughness of various steels, cast iron, and alloys.
 Statement II - Quenching is a rapid cooling process that alters specific properties of materials by manipulating the cooling rate.

- A. Statement (I) is correct but Statement (II) is incorrect.
- B. Statement (I) and (II) both are correct.**
- C. Statement (I) is incorrect but Statement (II) is correct.
- D. Statement (I) and (II) both are incorrect.

Q11 Part B (Electronics Mechanic)

In a 1 : 4 demux with active high outputs and an enable input, which condition will result in an output logic high at Output 3?

- A. Enable = 1, Select = 10
- B. Enable = 0, Select = 00
- C. Enable = 1, Select = 11**
- D. Enable = 0, Select = 11

Q12 Part B (Electronics Mechanic)

What is waste?

- A. Natural resources for living organisms
- B. Valuable substances for agriculture
- C. Useful materials for industries
- D. Unwanted or unusable materials**

Q13 Part B (Electronics Mechanic)

What is the main function of a 1-to-4 demultiplexer?

- A. To transmit a single input signal to one of the four outputs**
- B. To combine multiple input signals into one output
- C. To generate a new input signal for each output
- D. To duplicate the input signal to all outputs

Q14 Part B (Electronics Mechanic)

The amplitude and frequency of calibration signals of the oscilloscope are indicated on the ____ side of the panel.

- A. back
- B. right
- C. front**
- D. left

Q15 Part B (Electronics Mechanic)

Which of the following parts of a hammer-head is used for shaping and forming work like riveting and bending?

- A. Face
- B. Eyehole
- C. Pein**
- D. Cheek

Q16 Part B (Electronics Mechanic)

In an inverting amplifier circuit, if the input resistor (R_{in}) is increased while keeping the feedback resistor (R_f) constant, what happens to the voltage gain?

- A. The gain decreases.**
- B. The gain remains unchanged.
- C. The gain saturates to +VSAT.
- D. The gain increases.

Q17 Part B (Electronics Mechanic)

Which of the following options represents the inputs of an RS Flip-Flop?

- A. Data and Control
- B. Reset and Set**
- C. Input and Output
- D. Clock and Enable

Q18 Part B (Electronics Mechanic)

Match the correct length and breadth of the Trimmed sizes of sheets.

Designation	Trimmed size
A. A0	P. 297 × 420
B. A1	Q. 420 × 594
C. A2	R. 594 × 841
D. A3	S. 841 × 1189

- A. A - R, B - S, C - Q, D - P
- B. A - P, B - R, C - Q, D - S
- C. A - S, B - R, C - P, D - Q
- D. A - S, B - R, C - Q, D - P**



Q19 Part B (Electronics Mechanic)

When drawing a curved line of a specific length in an engineering drawing, which tool is most appropriate for ensuring accuracy?

- A. Protractor
- B. Straightedge
- C. French Curve
- D. Compass



Q20 Part B (Electronics Mechanic)

What is the chemical effect that occurs in a battery during the charging process of a Lead Acid battery?

- A. Lead reacts with sulphur to form lead sulphate
- B. Water dissociation into hydrogen and oxygen
- C. Lead sulphate decomposes into lead and sulphuric acid
- D. Sulphuric acid dissociates into hydrogen and sulphate ions



Q21 Part B (Electronics Mechanic)

How do flip-flops play a role in the implementation of a finite state machine (FSM)?

- A. Flip-flops generate the input signals required for state transitions.
- B. Flip-flops are used for timing control in FSM-based circuits.
- C. Flip-flops are used to store the state of the FSM and transition between states based on input conditions.
- D. Flip-flops provide the logic gates necessary for FSM output generation.



Q22 Part B (Electronics Mechanic)

Which of the following is NOT a type of error in measurement?

- A. Absolute error
- B. Systematic error
- C. Gross error
- D. Random error



Q23 Part B (Electronics Mechanic)

When did India implement the Hazardous Wastes (Management and Handling) Rules to regulate the disposal and handling of hazardous waste?

- A. 1987
- B. 2000
- C. 1989
- D. 1982



Q24 Part B (Electronics Mechanic)

Which of the following types of wooden mallets are used for general purpose work such as flattening and bending?

- A. Bossing mallets
- B. Side-faked mallets
- C. Standard wooden mallets
- D. End-faked mallets



Q25 Part B (Electronics Mechanic)

To make a carbon film resistor on a _____ tube, a thin layer of carbon is deposited.

- A. ceramic
- B. glass
- C. manganese
- D. silicon carbide



Q26 Part B (Electronics Mechanic)

In engineering drawing, what is defined as the path of a moving point with no thickness?

- A. Angle
- B. Curve
- C. Point
- D. Line



Q27 Part B (Electronics Mechanic)

What does an optical pyrometer measure?

- A. The relative density of liquids
- B. The temperature of the surface
- C. The volume of liquids
- D. The pressure of gases



Q28 Part B (Electronics Mechanic)

What is the term used to describe the region in a P-N junction where electrons and holes recombine?

- A. Transition region
- B. Drift region
- C. P region
- D. Depletion region



Q29 Part B (Electronics Mechanic)

In a transistor, what happens to the current flowing through the Emitter and Collector regions when the Base-Emitter voltage is increased?

- A. The current through both the Emitter and Collector increases.
- B. The current through both the Emitter and Collector decreases.
- C. The current through the Emitter decreases, while the current through the Collector increases.
- D. The current through the Emitter increases, while the current through the Collector decreases.



Q30 Part B (Electronics Mechanic)

What happens when a voltmeter with low input resistance is used in a circuit?

- A. It eliminates the need for calibration.
- B. It blocks the current flow completely.
- C. It draws more current, affecting the circuit voltage.
- D. It provides more accurate readings.



Q31 Part B (Electronics Mechanic)

Which of the following is the key difference between a fuse and a circuit breaker?

- A. A fuse can be reset after tripping, while a circuit breaker must be replaced.
- B. A fuse is used for high-voltage circuits, while a circuit breaker is used for low-voltage circuits.
- C. A fuse is a mechanical device, while a circuit breaker is an electronic device.
- D. A fuse is a one-time-use device, while a circuit breaker can be reset and reused.



Q32 Part B (Electronics Mechanic)

If a machine has an efficiency of 80%, it means:

- A. the machine produces more output than input
- B. the machine has a velocity ratio and mechanical advantage both equal to 80
- C. the machine does not have any loss in input energy
- D. the machine loses 20% of the input



Q33 Part B (Electronics Mechanic)

What is the purpose of a shunt capacitor connected at the output of a full wave rectifier circuit?

- A. To control power dissipation
- B. To smooth out the output waveform
- C. To regulate the output voltage
- D. To increase the output AC voltage



Q34 Part B (Electronics Mechanic)

What is the primary principle behind the generation of electrical energy in a piezoelectric device?

- A. Conversion of thermal energy into electrical energy
- B. Conversion of chemical energy into electrical energy
- C. Conversion of light energy into electrical energy
- D. Conversion of mechanical stress into electrical energy



Q35 Part B (Electronics Mechanic)

Which of the following types of wooden mallets are used for hollowing panel beatings?

- A. Standard wooden mallets
- B. End-faked mallets
- C. Side-faked mallets
- D. Bossing mallets



Q36 Part B (Electronics Mechanic)

What is the primary condition for oscillation in an electronic circuit?

- A. The loop gain must be greater than 1.
- B. The loop gain must be less than 1.
- C. The loop gain must be equal to 1.
- D. The loop gain must be negative.



Q37 Part B (Electronics Mechanic)

What is the primary function of the 8051 address bus?

- A. To provide power to the memory
- B. To select a specific memory location or I/O port ✓
- C. To control the flow of data
- D. To carry data between the CPU and memory

Q38 Part B (Electronics Mechanic)

What is the blade length of the T1 'T' square, as per IS:1360-1989?

- A. 500 mm
- B. 1500 mm
- C. 700 mm
- D. 1000 mm ✓

Q39 Part B (Electronics Mechanic)

In engineering drawing (lettering and numbering), a single stroke means that the _____.

- A. thickness of the line of the letter or number is obtained in one stroke of the pencil ✓
- B. thickness of the line of the letter or number is obtained in three strokes of the pencil
- C. thickness of the line of the letter or number is obtained in no strokes of the pencil
- D. thickness of the line of the letter or number is obtained in two strokes of the pencil

Q40 Part B (Electronics Mechanic)

Which of the following logic gates are used to implement the Sum and Carry outputs in a half adder?

- A. NOR gate and OR gate
- B. OR gate and AND gate
- C. NAND gate and XOR gate
- D. XOR gate and AND gate ✓

Q41 Part B (Electronics Mechanic)

Which of the following logic gates can be directly implemented using a single NOR gate?

- A. OR
- B. AND
- C. NOT ✓
- D. EXOR

Q42 Part B (Electronics Mechanic)

What does a power factor of 0.8 lagging indicate in an AC circuit?

- A. The load is purely resistive.
- B. The load has inductive components. ✓
- C. The circuit has only capacitive elements.
- D. The load is resistive and capacitive.

Q43 Part B (Electronics Mechanic)

What is the working principle of an inductive transducer?

- A. Converts physical motion into change in resistance
- B. Converts physical motion into change in capacitance
- C. Converts physical motion into change in impedance
- D. Converts physical motion into change in inductance ✓

Q44 Part B (Electronics Mechanic)

Which of the following statements about a NOT gate is FALSE?

- A. A NOT gate has only one input and one output.
- B. A NOT gate can be used to invert the output of another logic gate.
- C. A NOT gate can be implemented using a NAND gate by connecting both inputs together.
- D. A NOT gate can be used to implement the AND operation directly. ✓

Q45 Part B (Electronics Mechanic)

Which of the following is a common application of flip-flops in digital electronics?

- A. Signal amplification
- B. Data storage ✓
- C. Signal modulation
- D. Analog-to-digital conversion

Q46 Part B (Electronics Mechanic)

Why is it important to follow proper disposal procedures for industrial waste?

- A. To allow waste to decompose anywhere
- B. To reduce the number of trash bins needed
- C. To save time and effort in sorting waste
- D. To comply with environmental regulations and reduce pollution ✓



Q47 Part B (Electronics Mechanic)

Which of the following is a better option to implement a NOT gate using NOR gate?

- A. Use one NOR gate and one NOT gate.
- B. Use one NOR gate with both inputs tied together. ✓
- C. Use two NOR gates in parallel.
- D. Use two NOR gates in series.

Q48 Part B (Electronics Mechanic)

How is creeping in an energy meter prevented?

- A. By adding more turns in the current coil
- B. By using a braking magnet
- C. By increasing the supply voltage
- D. By providing a small hole in the rotating disk ✓

Q49 Part B (Electronics Mechanic)

A transducer that does NOT require any power source for its operation is called:

- A. passive transducer
- B. digital transducer
- C. active transducer ✓
- D. smart transducer

Q50 Part B (Electronics Mechanic)

Why is a level shifter used in the internal block diagram of an op-amp?

- A. To amplify high-frequency signals
- B. To shift the DC voltage level to match the output stage requirements ✓
- C. To reduce the gain
- D. To reduce power consumption

Q51 Part B (Electronics Mechanic)

Which of the following statements correctly describes the placement and purpose of orientation marks on a drawing sheet?

1. Orientation marks are placed at two opposite corners of the drawing sheet to indicate the correct orientation on the drawing board.
2. Orientation marks consist of arrow heads placed across the frame, with one at the shorter side and one at the longer side, coinciding with the centering marks.
3. One of the orientation marks always points towards the draughtsman, indicating the direction in which the drawing sheet should be placed.
4. Orientation marks are used to mark the midpoint of each side of the drawing sheet for accurate centering.

- A. 1, 2, and 3 only
- B. 1 and 4 only
- C. 2 and 3 only ✓
- D. 1, 2, and 4 only

Q52 Part B (Electronics Mechanic)

Which of the following is a key advantage of using Thyristors in power control applications?

- A. High frequency switching ✓
- B. High efficiency and low power loss
- C. Small size and low cost
- D. Low voltage handling capabilities

Q53 Part B (Electronics Mechanic)

Which of the following is an example of a p-type semiconductor?

- A. Silicon doped with phosphorus
- B. Silicon doped with arsenic
- C. Silicon doped with boron ✓
- D. Germanium doped with phosphorus

Q54 Part B (Electronics Mechanic)

Which of the following uses of wire gauge is INCORRECT?

- A. It measures the diameter of a wire.
- B. It does not help determine how much current a wire can carry. ✓
- C. Using the wrong wire gauge can damage appliances and electronic devices.
- D. It is used in electrical installations, welding and other applications.



Q55 Part B (Electronics Mechanic)

What is the primary function of the 8051's pins 29 (PSEN)?

- A. To provide an external clock signal
- B. To enable external programme memory access ✓
- C. To enable external data memory access
- D. To reset the microcontroller

Q56 Part B (Electronics Mechanic)

Select the most suitable electronic circuit used to obtain sampled signal as an output if the input is a continuous time sinusoidal analog signal.

- A. Electronic switch ✓
- B. Amplifier
- C. Low pass filter
- D. Oscillator

Q57 Part B (Electronics Mechanic)

What force (effort) will be required to push a load, initially at rest, of mass 500 g, so that at a distance of 20 m, its final velocity is 20 m/sec [Assume that there is no friction and 'g' = 10 m/s²].

- A. 5 J
- B. 10 N
- C. 5 N ✓
- D. 10 J

Q58 Part B (Electronics Mechanic)

Which of the following punches is used to make deeper witness marks on scribed lines and make it easier for the drill to start correctly?

- A. Solid punch
- B. Centre punch ✓
- C. Pin punch
- D. Prick punch

Q59 Part B (Electronics Mechanic)

What is the typical input impedance of a BJT CE voltage amplifier?

- A. Low impedance (less than 10 Ω)
- B. Very high impedance (greater than 1000 k Ω)
- C. Medium impedance (1 k Ω to 10 k Ω) ✓
- D. High impedance (greater than 100 k Ω)

Q60 Part B (Electronics Mechanic)

Which of the following statements is correct about a protractor?

Statements:

1. A protractor can be used to measure angles from both sides.
2. A protractor is typically made of a rigid metal material.

- A. Neither statement is true
- B. Only statement 2 is true
- C. Only statement 1 is true ✓
- D. Both statements are true

Q61 Part B (Electronics Mechanic)

What is the ideal input impedance of an operational amplifier?

- A. Infinite ✓
- B. Zero
- C. 10 k Ω
- D. 1 M Ω

Q62 Part B (Electronics Mechanic)

What type of oscillator uses an inductive voltage divider as the feedback network?

- A. Crystal oscillator
- B. RC oscillator
- C. Hartley oscillator ✓
- D. Colpitts oscillator

Q63 Part B (Electronics Mechanic)

In frequency modulation, what is the modulation index defined as?

- A. Ratio of maximum frequency deviation to modulating frequency ✓
- B. Ratio of modulating frequency to maximum frequency deviation
- C. Ratio of carrier frequency to maximum frequency deviation
- D. Ratio of maximum frequency deviation to carrier frequency



Q64 Part B (Electronics Mechanic)

What is the significance of alpha (α) in a transistor?

- ☒ A. Current gain in common base configuration
- ☐ B. Power gain in common emitter configuration
- ☐ C. Current gain in common emitter configuration
- ☐ D. Power gain in common base configuration

Q65 Part B (Electronics Mechanic)

The discharge transistor in an IC 555 timer operates in which mode?

- ☐ A. High-impedance mode
- ☐ B. Linear mode
- ☐ C. Active mode
- ☒ D. Saturation and cutoff mode

Q66 Part B (Electronics Mechanic)

What is the purpose of the tank circuit in a Colpitts oscillator?

- ☐ A. To provide earthing stability to oscillation
- ☐ B. To provide a stable supply voltage
- ☒ C. To provide a resonant circuit that determines the frequency of oscillation
- ☐ D. To make heat loss zero for the oscillator

Q67 Part B (Electronics Mechanic)

How does the 8051 microcontroller use its address bus in a typical memory-mapped I/O system?

- ☐ A. It acts as a buffer between the microcontroller and external devices.
- ☐ B. It determines the direction of data transfer.
- ☐ C. It stores configuration data for peripheral devices.
- ☒ D. It carries memory addresses for accessing external I/O devices and memory.

Q68 Part B (Electronics Mechanic)

What does 'Dark On' operation mean in a photoelectric switch?

- ☐ A. The photoelectric switch remains off regardless of light interruption.
- ☐ B. The photoelectric switch is energised when the beam of light reaches the receiver.
- ☒ C. The photoelectric switch is energised when the beam of light is interrupted.
- ☐ D. The photoelectric switch is always on when no object is present.

Q69 Part B (Electronics Mechanic)

Minimum number of NOR gate required to implement AND gate using only NOR gate are:

- ☐ A. 2
- ☐ B. 5
- ☒ C. 3
- ☐ D. 4

Q70 Part B (Electronics Mechanic)

If the coefficient of linear expansion of a material is $2 \times 10^{-5} \text{ } ^\circ\text{C}^{-1}$, what does it mean?

- ☐ A. The material expands by 2×10^{-5} times its original area per degree Celsius
- ☐ B. The material expands by 2×10^{-5} times its original volume per degree Celsius
- ☒ C. The material expands by 2×10^{-5} times its original length per degree Celsius
- ☐ D. The material always increases by $2 \times 10^{-5} \text{ kg}$ when temperature is increased by 1°C

Q71 Part B (Electronics Mechanic)

Pencils are rated in engineering drawings based on the _____.

- ☒ A. hardness or softness of the lead
- ☐ B. colour of the lead
- ☐ C. durability of the lead
- ☐ D. shape of the lead

Q72 Part B (Electronics Mechanic)

In an 8051-based system, which bus is used to distinguish between memory access and I/O port access?

- ☐ A. Address bus
- ☐ B. Interrupt bus
- ☒ C. Control bus
- ☐ D. Data bus

Q73 Part B (Electronics Mechanic)

Which of the following is a fundamental unit?

- ☐ A. newton
- ☒ B. metre
- ☐ C. pascal
- ☐ D. watt



Q74 Part B (Electronics Mechanic)

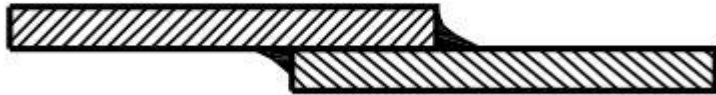
Which of the following punch marks is used for the correct location and seating of the divider point?

- A. Centre punch marks of 30°
- B. Centre punch marks of 60°
- C. Prick punch marks of 120°
- D. Prick punch marks of 30°



Q75 Part B (Electronics Mechanic)

Identify the type of brazed joint shown below.



- A. Joggle Lap
- B. Simple Lap
- C. Strapped Lap
- D. Butted Flange



Part B (Electronics Mechanic)

75 Questions • Answer Key

Q1 Part B (Electronics Mechanic)

The SI unit of 'ultimate stress' is _____.

- A. pascal (Pa) ✓
- B. newton (N)
- C. newton per meter (N/m)
- D. joule per square meter (J/m²)

Q2 Part B (Electronics Mechanic)

Why do cars have treaded tyres?

- A. To increase friction and grip on the road ✓
- B. To reduce weight
- C. To decrease friction
- D. To increase speed

Q3 Part B (Electronics Mechanic)

A rectangular floor measuring 10 m × 8 m is to be tiled. If each tile covers 0.25 m², how many tiles are needed?

- A. 200
- B. 300
- C. 320 ✓
- D. 250

Q4 Part B (Electronics Mechanic)

Which of the following statements is/are true about Non-Functional Dimensions (NF) in engineering drawing?

Statement 1: Non-functional Dimensions are shown without limits, as they do not affect the functionality of the component or space.

Statement 2: Non-Functional Dimensions are typically used for reference purposes only, and do not impact the assembly or performance of the component or space.

- A. Only statement 2 is true ✓
- B. Only statement 1 is true
- C. Both statements are true
- D. Neither statement is true

Q5 Part B (Electronics Mechanic)

Why is a braking system used in an energy meter?

- A. To maintain a uniform rotation proportional to power consumption ✓
- B. To decrease the friction in the moving parts
- C. To reduce the power consumption of the meter itself
- D. To increase the speed of the rotating disk

Q6 Part B (Electronics Mechanic)

An LVDT has a secondary voltage of 5 V for a displacement of ±10 mm. Determine the output voltage for a core displacement of 6 mm.

- A. 1.5 V
- B. 0.5 V
- C. 3 V ✓
- D. 4.5 V

Q7 Part B (Electronics Mechanic)

What will happen if resistance is measured in a powered circuit?

- A. The multimeter may get damaged. ✓
- B. The resistance value will be higher than expected.
- C. The test leads will heat up.
- D. The reading will be accurate.

Q8 Part B (Electronics Mechanic)

What is the purpose of the two voltage coils in a power factor meter?

- A. To measure power factor at two different frequencies
- B. To create a rotating field for phase angle measurement ✓
- C. To improve measurement accuracy in DC circuits
- D. To measure active and reactive power



Q9 Part B (Electronics Mechanic)

In a logic circuit, three SPST (Single Pole Single Throw) switches are used to implement a logic gate. The switches are connected in series. What is the output of the circuit if all switches are closed?

A. Undefined

B. 1



C. The output will depend on the type of gate used

D. 0

Q10 Part B (Electronics Mechanic)

What will be the output of a Zero Crossing Detector if the input signal is a triangular wave instead of a sine wave?

A. The output will be a triangular waveform.

B. The output will still be a square wave but maybe with unequal high and low periods.



C. The output will have multiple transitions at each crossing.

D. The output will remain at zero.

Q11 Part B (Electronics Mechanic)

What is the working principle of an analogue vibrating reed frequency meter?

A. Electromagnetic resonance



B. Electrostatic attraction

C. Piezoelectric effect

D. Thermal expansion

Q12 Part B (Electronics Mechanic)

An angle greater than 180 degrees is referred to as _____.

A. a right angle

B. an acute angle

C. an obtuse angle

D. a reflex angle



Q13 Part B (Electronics Mechanic)

For which of the following calipers, a screw and nut are provided for opening and closing the caliper legs?

A. Spring joint calipers



B. Firm joint calipers

C. Simple calipers

D. Leg and point calipers

Q14 Part B (Electronics Mechanic)

Which of the following actions is a part of the emergency response team's responsibilities during an active emergency?

A. Preparing reports on emergency incidents

B. Rescuing persons in immediate danger



C. Conducting routine safety checks

D. Scheduling regular evacuation drills

Q15 Part B (Electronics Mechanic)

What is the primary reason for the heating effect in a conductor when an electric current passes through it?

A. The electric field in the conductor causes heat generation.

B. The movement of electrons causes heat generation.



C. The conductor absorbs heat from the surrounding environment.

D. The movement of protons causes heat generation.

Q16 Part B (Electronics Mechanic)

The colour code of a resistor to be measured is yellow, violet, red and silver for the first, second, third and fourth bands, respectively. What is the maximum value of the resistor?

A. 6,130 ohms

B. 7,210 ohms

C. 4,230 ohms

D. 5,170 ohms



Q17 Part B (Electronics Mechanic)

What is the function of the resistor connected between Pin 7 (discharge) and Vcc in a monostable multivibrator?

A. It provides a feedback path.

B. It limits the current through the IC.

C. It sets the output frequency.

D. It controls the charging time of the capacitor.



Q18 Part B (Electronics Mechanic)

What is the primary reason for conducting a vehicle road test?

A. To test how fast the vehicle can go

B. To avoid the need for inspections

C. To increase fuel efficiency

D. To ensure the vehicle is functioning safely and correctly



Q19 Part B (Electronics Mechanic)

What is the primary goal of the 5S concept?

- A. To replace traditional safety measures
- B. To increase the number of safety regulations
- C. To improve workplace organisation and efficiency ✓
- D. To eliminate the need for maintenance

Q20 Part B (Electronics Mechanic)

What is the impact of using a buffered parallel I/O port compared to a non-buffered one in terms of data transfer speed and reliability?

- A. Buffered I/O ports only work in unidirectional data transfer applications.
- B. Non-buffered I/O ports are faster but less reliable.
- C. Buffered I/O ports provide faster data transfer with a lower risk of data loss or corruption. ✓
- D. Buffered I/O ports are slower but more reliable.

Q21 Part B (Electronics Mechanic)

A 100-mm centre-punch could have a 10-mm diameter body and a 6-mm diameter point ground to an angle of _____.

- A. 120°
- B. 90° ✓
- C. 60°
- D. 30°

Q22 Part B (Electronics Mechanic)

What is the function of a 4-to-1 multiplexer?

- A. It multiplies four data inputs to one output.
- B. It routes four data inputs to one output without selection.
- C. It selects one of four select lines based on two data inputs.
- D. It selects one of four data inputs based on two select lines. ✓

Q23 Part B (Electronics Mechanic)

What is the Boolean expression for the sum output of a full adder with inputs A, B and Carry-in (Cin)?

- A. $A \cdot B \cdot C_{in}$
- B. $A \cdot B + A' \cdot B$
- C. $A \oplus B \oplus C_{in}$ ✓
- D. $A + B + C_{in}$

Q24 Part B (Electronics Mechanic)

In a monostable multivibrator using IC 555, what triggers the output pulse?

- A. Connecting a capacitor to ground
- B. Resetting the flip-flop manually
- C. Applying a pulse with voltage going below $\frac{1}{3} V_{cc}$ ✓
- D. Applying a high voltage of value equal to V_{cc} at pin 5

Q25 Part B (Electronics Mechanic)

Which option shows the correct answer when 27°C is converted to the kelvin scale?

- A. - 300 K
- B. 246 K
- C. 300 K ✓
- D. - 246 K

Q26 Part B (Electronics Mechanic)

What is the term used to describe programs that distinguish between uppercase and lowercase letters, treating "yes" and "YES" as different inputs?

- A. Case-insensitive
- B. Numerical
- C. Case-sensitive ✓
- D. Alphabetical

Q27 Part B (Electronics Mechanic)

What is the primary function of a 1:4 demux?

- A. To combine multiple signals into one output
- B. To direct one input signal to four output lines ✓
- C. To store input signals for later use
- D. To amplify an input signal

Q28 Part B (Electronics Mechanic)

What is the output of an RS flip-flop when Set = 0 and Reset = 0?

- A. $Q = 1, Q' = 0$
- B. $Q = 0, Q' = 1$
- C. No change in output ✓
- D. Invalid state



Q29 Part B (Electronics Mechanic)

Which of the following conversions are correct?

- A. 1 L = 1000 dm³ and 1 mL = 1000 cm³
- B. 1000 L = 1 dm³ and 1000 mL = 1 cm³
- C. 1 L = 1 dm³ and 1 mL = 1 cm³ ✓
- D. 1000 L = 1 dm³ and 1 mL = 1000 cm³

Q30 Part B (Electronics Mechanic)

In a positive feedback oscillator, what is the effect of increasing the gain of the amplifier (A) on the frequency of oscillation?

- A. The frequency of oscillation becomes unstable.
- B. The frequency of oscillation remains unchanged. ✓
- C. The frequency of oscillation increases.
- D. The frequency of oscillation decreases.

Q31 Part B (Electronics Mechanic)

What is the primary purpose of preventive maintenance?

- A. To increase the workload of employees
- B. To reduce unexpected equipment failures ✓
- C. To delay repairs until breakdowns occur
- D. To eliminate the need for regular inspections

Q32 Part B (Electronics Mechanic)

Which of the following screwdrivers has cross-shaped tips that are unlikely to slip from the cruciform slots in Philips recessed head screws?

- A. Stumpy screwdriver
- B. Offset screwdriver
- C. Cross-recess screwdriver ✓
- D. Ratchet screwdriver

Q33 Part B (Electronics Mechanic)

Match the following designations of sheets with their respective trimmed sizes in length and breadth.

Designation Trimmed Size

- A) A0 P) 297 × 420
- B) A1 Q) 420 × 594
- C) A2 R) 594 × 841
- D) A3 S) 841 × 1189

- A. A-S ; B-R ; C-Q ; D-P ✓
- B. A-Q ; B-R ; C-S ; D-P
- C. A-S ; B-P ; C-Q ; D-R
- D. A-P ; B-R ; C-Q ; D-S

Q34 Part B (Electronics Mechanic)

What is the purpose of the feedback network in an oscillator circuit?

- A. To filter out unwanted frequencies
- B. To provide positive feedback to sustain oscillations ✓
- C. To provide impedance matching
- D. To provide a stable output voltage

Q35 Part B (Electronics Mechanic)

How can you extend a half adder to handle multi-bit binary addition?

- A. By using multiple half adders in series
- B. By combining half adders and full adders ✓
- C. By adding more XOR gates
- D. By cascading half adders with carry propagation

Q36 Part B (Electronics Mechanic)

What is the effect of temperature changes on the frequency stability of a crystal oscillator?

- A. The frequency stability remains constant with changing temperature.
- B. The frequency stability increases with increasing temperature.
- C. The frequency stability decreases with increasing temperature. ✓
- D. The frequency stability is affected by temperature changes, but the effect is negligible.

Q37 Part B (Electronics Mechanic)

_____ recommend(s) 20 mm wide margins for sheet sizes A0 and A1 in engineering drawings.

- A. Borders and frames: SP: 46 (2003) ✓
- B. Geographic coordinate systems
- C. Custom grids
- D. Grid reference system

Q38 Part B (Electronics Mechanic)

Which of the following is the primary advantage of using parallel I/O ports over serial I/O ports?

- A. They are faster due to simultaneous transmission of data bits. ✓
- B. They require fewer wires for data transmission.
- C. They consume less power.
- D. They are more commonly used in modern systems than serial I/O ports.



Q39 Part B (Electronics Mechanic)

A 200 V voltmeter has an internal resistance of 20 k Ω . To extend its range to 1,000 V, what should be the value of the series multiplier resistance?

- A. 120 k Ω
- B. 100 k Ω
- C. 200 k Ω
- D. 80 k Ω ✓

Q40 Part B (Electronics Mechanic)

The accuracy of measurement by a try square is about:

- A. 0.02 mm per 10 mm length
- B. 0.001 mm per 10 mm length
- C. 0.004 mm per 10 mm length
- D. 0.002 mm per 10 mm length ✓

Q41 Part B (Electronics Mechanic)

What is the main advantage of using a Colpitts oscillator over a Hartley oscillator in terms of frequency stability?

- A. The frequency stability of both oscillators is dependent on the values of the components used.
- B. The Hartley oscillator has a more stable frequency than the Colpitts oscillator due to its inductive voltage divider.
- C. The Colpitts oscillator has a more stable frequency than the Hartley oscillator due to its capacitive voltage divider. ✓
- D. The frequency stability of both oscillators is the same.

Q42 Part B (Electronics Mechanic)

Electrical energy is measured in which unit?

- A. Joule
- B. Ampere-hour (Ah)
- C. Watt
- D. Kilowatt-hour (kWh) ✓

Q43 Part B (Electronics Mechanic)

How much is the energy gap between the valence band and conduction band of silicon (Si)?

- A. 3.5 eV
- B. 1.1 eV ✓
- C. 2.5 eV
- D. 0.5 eV

Q44 Part B (Electronics Mechanic)

What does 'OL' or '1' indicate when measuring voltage with a digital multimeter?

- A. The test leads are shorted.
- B. The voltage exceeds the selected range. ✓
- C. The battery is low.
- D. The voltage is too low.

Q45 Part B (Electronics Mechanic)

What is the purpose of the resistor 'R' in an RC oscillator?

- A. To provide a means of stabilising the supply voltage
- B. To provide a path for the output signal
- C. To provide a means of adjusting the frequency of oscillation ✓
- D. To provide a means of filtering out all frequencies

Q46 Part B (Electronics Mechanic)

What is the gain of a voltage amplifier if the input voltage is 2 V and the output voltage is 10 V?

- A. 10
- B. 20
- C. 2
- D. 5 ✓

Q47 Part B (Electronics Mechanic)

What is the typical output of a Zero Crossing Detector using an op-amp if the input applied is a sinusoidal ac signal?

- A. A sinusoidal wave
- B. A triangular wave
- C. A trapezoidal wave
- D. A square wave ✓

Q48 Part B (Electronics Mechanic)

Which of the following points is NOT relevant to a LVDT?

- A. Prone to more friction ✓
- B. Less rugged
- C. Low power consumption
- D. Low sensitivity



Q49 Part B (Electronics Mechanic)

Sine bars are used when a high degree of accuracy less than _____ is needed for measuring angles.

- A. 1 degree
- B. 30 degrees
- C. 1 minute
- D. 30 minutes



Q50 Part B (Electronics Mechanic)

If the multimeter reading shows '0.00' when measuring current, what could be the possible reason?

- A. The fuse in the multimeter is blown.
- B. The battery of the multimeter is low.
- C. The circuit has no current flow.
- D. The probes are reversed.



Q51 Part B (Electronics Mechanic)

Which of the following care and maintenance of a marking table is INCORRECT?

- A. The marking table should be protected from damage.
- B. The marking table should be protected from rust.
- C. After use, the marking table should be cleaned with a soft cloth.
- D. The surface of the marking table should not be given a thin layer of oil.



Q52 Part B (Electronics Mechanic)

A multimeter's internal fuse is rated at 250 mA. If a circuit draws 1 A, what will happen when measuring current?

- A. The multimeter will automatically adjust to the correct range.
- B. The fuse will blow, and no current will be measured.
- C. The reading will be lower than expected.
- D. The multimeter will read 1A accurately.



Q53 Part B (Electronics Mechanic)

Which of the following is a primary difference between a primary and a secondary electrochemical cell?

- A. A secondary cell produces more energy than a primary cell.
- B. A primary cell can be recharged, while a secondary cell cannot be recharged.
- C. A primary cell cannot be recharged, while a secondary cell can be recharged.
- D. There is no difference between primary and secondary cells.



Q54 Part B (Electronics Mechanic)

In a JK flip-flop, if $J = 0$, $K = 1$ and the current state is $Q = 1$, what will be the next output after one clock pulse?

- A. The output will be undefined.
- B. Q will toggle to 0; Q' will toggle to 1
- C. Q will remain 1; Q' will remain 0
- D. Q will be reset to 0; Q' will be set to 1



Q55 Part B (Electronics Mechanic)

What is the function of a half-wave rectifier in a power supply?

- A. To convert AC voltage to DC voltage
- B. To amplify the output voltage
- C. To filter the output voltage
- D. To regulate the output voltage



Q56 Part B (Electronics Mechanic)

How can an AND gate be implemented using only NAND gates?

- A. By connecting two NAND gates in Parallel
- B. By connecting OR gate to NAND gate
- C. By inverting the output of a NAND gate
- D. By connecting the inputs of a NAND gate to logic 1



Q57 Part B (Electronics Mechanic)

Which type of circuit is used to convert both the half-cycles of an AC waveform into a pulsating DC waveform?

- A. Clamper circuit
- B. Clippers circuit
- C. Half-wave rectifier
- D. Full-wave rectifier



Q58 Part B (Electronics Mechanic)

What is the primary function of the Program Status Word (PSW) SFR in the 8051?

- A. To store the address of the next instruction
- B. To store arithmetic flags and register bank select bits
- C. To enable external interrupts
- D. To control the timer modes



Q59 Part B (Electronics Mechanic)

For a JK flip-flop, if the J input is held at 1 and the K input is held at 0, what will happen?

- ☒ A. The output will be set to 1.
- ☐ B. The output will always be 1.
- ☐ C. The output will always be 0.
- ☐ D. The output will toggle on each clock pulse.

Q60 Part B (Electronics Mechanic)

What is the main advantage of using a crystal oscillator over an RC oscillator?

- ☐ A. Lower output amplitude
- ☐ B. Higher output amplitude
- ☒ C. Higher frequency stability
- ☐ D. Lower frequency stability

Q61 Part B (Electronics Mechanic)

Which of the following is INCORRECT about line standard?

- ☒ A. More accurate due to line thickness
- ☐ B. Subject to parallax error
- ☐ C. Quick measurements over a wide range
- ☐ D. Used to measure the distance between two engraved lines

Q62 Part B (Electronics Mechanic)

Natural rubber is soft at high temperatures and brittle at low temperatures; hence raw rubber is heated with sulphur and other additives at a temperature range between 373 – 415 K to make it strong. This process is called ____ of rubber.

- ☒ A. vulcanisation
- ☐ B. molding
- ☐ C. latex
- ☐ D. extrusion

Q63 Part B (Electronics Mechanic)

Identify the circuit most suitable for demodulating or processing the PAM signal at the receiver end.

- ☐ A. Oscillator
- ☒ B. Low pass filter
- ☐ C. Attenuator
- ☐ D. Mixer

Q64 Part B (Electronics Mechanic)

What is the output state of a JK flip-flop when J = 0 and K = 0?

- ☐ A. Output Q = 1, Q' = 0
- ☒ B. No change in output
- ☐ C. Output Q = 1, Q' = 1
- ☐ D. Output Q = 0, Q' = 1

Q65 Part B (Electronics Mechanic)

Match the following sensor selection criteria with their correct definitions.

Criteria	Definition
I. Operating range	A. Chosen to allow sufficient output
II. Sensitivity	B. Chosen to maintain range required
III. Frequency response	C. Flat over entire desired range

- ☒ A. I-B, II- A, III-C
- ☐ B. I-A, II- C, III-B
- ☐ C. I-A, II- B, III-C
- ☐ D. I-B, II- C, III-A

Q66 Part B (Electronics Mechanic)

In a circuit with a NTC type thermistor and a fixed resistor connected in series connected to a DC power supply, what will happen to the output voltage if there is a rise in temperature?

- ☒ A. The output voltage will increase.
- ☐ B. The output voltage will remain constant.
- ☐ C. The output voltage will fluctuate depending on the resistor value.
- ☐ D. The output voltage will decrease.

Q67 Part B (Electronics Mechanic)

Which of the following is a key electrical safety tip in a workshop?

- ☐ A. Operate machines with wet hands
- ☐ B. Ignore frayed wires if the device is still working
- ☐ C. Use water to clean electrical panels
- ☒ D. Ensure electrical equipment is properly grounded



Q68 Part B (Electronics Mechanic)

Which of the following is a major risk associated with fuel spillage?

A. Fire hazards and environmental contamination ✓

B. Better lubrication for workshop floors

C. Increased productivity

D. Reduced need for ventilation

Q69 Part B (Electronics Mechanic)

A statement and conclusion for pictorial drawing are given below. Determine the logical relationship between them.

Statement: Pictorial drawings are three-dimensional and provide a visual representation of an object.

Conclusion: Therefore, pictorial drawings are useful for describing the shape of a piece part or component.

A. The conclusion does not logically follow from the statement.

B. The conclusion is partially supported by the statement.

C. The conclusion is unrelated to the statement.

D. The conclusion logically follows from the statement. ✓

Q70 Part B (Electronics Mechanic)

What is the primary purpose of shielding in electrical cables?

A. To increase the voltage capacity of the cable

B. To increase the current-carrying capacity of the cable

C. To protect the cable from external electromagnetic interference ✓

D. To prevent heat loss from the cable

Q71 Part B (Electronics Mechanic)

Which parameter of the carrier pulse is impacted during pulse width modulation of pulse train due to continuous time varying analog signal?

A. Both amplitude and frequency

B. Duty cycle ✓

C. Only amplitude

D. Only frequency

Q72 Part B (Electronics Mechanic)

How can an OR gate be implemented using only NAND gates?

A. Use three NAND gates - 2 as NOT gates and 1 for the NAND operation. ✓

B. Use one NAND gate - 1 for the OR operation directly.

C. Use two NAND gates - 1 as NOT gates and 1 for the OR operation.

D. Use four NAND gates - 2 as NOT gates and 2 for the NAND operation.

Q73 Part B (Electronics Mechanic)

The use of the modulation process helps in shifting the given message signal frequencies to a _____ range where it can occupy only _____ percentage of the spectrum.

A. very low frequency; high

B. very high frequency; high

C. very high frequency; very small ✓

D. very low frequency; very small

Q74 Part B (Electronics Mechanic)

Which of the following is the size of the internal RAM in the 'Standard 8051' microcontroller?

A. 1 kilo bytes

B. 256 bytes

C. 512 bytes

D. 128 bytes ✓



Q75 Part B (Electronics Mechanic)

The given equation represents the relationship between temperature and resistance of an RTD.

$$R_t = R_{ref}(1 + \alpha \Delta t)$$

What does Δt represent?

- A. Difference between operating and environmental temperature
- B. Operating temperature
- C. Reference temperature
- D. Difference between operating and reference temperature



Part B (Electronics Mechanic)

75 Questions • Answer Key

Q1 Part B (Electronics Mechanic)

Which of the following statements about title block is/are true?

Statement 1: The title block is situated in the bottom right-hand corner of the drawing sheet.

Statement 2: The contents of the title block are standardised and cannot be modified to suit individual company needs.

- A. Both statements are false
- B. Statement 1 is false, but statement 2 is true
- C. Statement 1 is true, but statement 2 is false ✓
- D. Both statements are true

Q2 Part B (Electronics Mechanic)

Where should the probes be connected when measuring voltage in a circuit?

- A. In series with the circuit
- B. Across the circuit breaker only
- C. In parallel with the circuit ✓
- D. Across the fuse only

Q3 Part B (Electronics Mechanic)

Which of the following materials can be detected by an inductive proximity switch?

- A. Glass
- B. Paper
- C. Stainless steel ✓
- D. Wood

Q4 Part B (Electronics Mechanic)

Which of the following metals has the lowest melting point?

- A. Mercury ✓
- B. Iron
- C. Lead
- D. Gold

Q5 Part B (Electronics Mechanic)

In a series circuit, three resistors of 10 ohms, 20 ohms, and R ohms are connected in series with a 12 V battery. What is the value of resistance R if current flowing in the circuit is 0.2 A?

- A. 10 ohms
- B. 20 ohms
- C. 30 ohms ✓
- D. 40 ohms

Q6 Part B (Electronics Mechanic)

Which of the following types of chisels is used for separating metals after chain drilling?

- A. Cross-cut chisel
- B. Flat chisel
- C. Web chisel ✓
- D. Diamond point chisel

Q7 Part B (Electronics Mechanic)

What is the primary disadvantage of using a digital frequency counter in high-frequency measurements?

- A. Increased power consumption
- B. Inability to measure AC voltages
- C. Limited resolution at very high frequencies due to counting limitations ✓
- D. High sensitivity to temperature variations

Q8 Part B (Electronics Mechanic)

Which of the following is the main property of the OR gate?

- A. It produces a high output only when all inputs are low.
- B. It produces a low output only when all inputs are high.
- C. It produces a high output when at least one input is high. ✓
- D. It produces a low output when at least one input is low.



Q9 Part B (Electronics Mechanic)

What happens to the conductivity of a semiconductor when it is heated?

- A. Conductivity decreases
- B. Conductivity becomes zero
- C. Conductivity remains constant
- D. Conductivity increases ✓

Q10 Part B (Electronics Mechanic)

What is the advantage of using a differential amplifier in a voltage amplifier circuit?

- A. It decreases the power consumption of the amplifier.
- B. It increases the common-mode rejection ratio (CMRR) of the amplifier. ✓
- C. It increases the gain of the amplifier.
- D. It increases the noise sensitivity of the amplifier.

Q11 Part B (Electronics Mechanic)

Which of the following colours is commonly used for caution signs?

- A. Blue
- B. Yellow ✓
- C. Red
- D. Green

Q12 Part B (Electronics Mechanic)

How can a NOT gate be implemented using a 2-input NOR gate?

- A. By connecting both inputs of the NOR gate to the same input signal ✓
- B. By connecting two NOR gates in parallel
- C. It is not possible to create a NOT gate using a NOR gate.
- D. By connecting two NOR gates in series

Q13 Part B (Electronics Mechanic)

How can stability be improved in a practical differentiator circuit using an op-amp?

- A. By increasing the gain of the op-amp
- B. By adding a resistor in series with the capacitor of the input path ✓
- C. By decreasing the input voltage
- D. By removing the capacitor

Q14 Part B (Electronics Mechanic)

Which SFR in the 8051 is used to control the serial communication mode and baud rate?

- A. SMOD
- B. TCON
- C. SCON ✓
- D. TMOD

Q15 Part B (Electronics Mechanic)

What is the effect of increasing the base current on the collector current in a transistor amplifier?

- A. The collector current increases. ✓
- B. The collector current becomes zero.
- C. The collector current decreases.
- D. The collector current remains constant.

Q16 Part B (Electronics Mechanic)

The wave set of hacksaw teeth set has a pitch of _____.

- A. 2.0 mm
- B. 0.5 mm
- C. 0.8 mm ✓
- D. 1.0 mm

Q17 Part B (Electronics Mechanic)

What is the correct way to connect a multimeter when measuring current in a circuit?

- A. In series with the circuit ✓
- B. Across the power supply terminals
- C. Across a resistor
- D. In parallel with the circuit

Q18 Part B (Electronics Mechanic)

Which of the following information is necessary to construct a rectangle?

- A. Length of two adjacent sides ✓
- B. Length of one side and the area of the rectangle
- C. Only the length of one side
- D. Only the length of the diagonal



Q19 Part B (Electronics Mechanic)

Why should the highest voltage range be selected first when measuring an unknown voltage?

- A. To save the battery power
- B. To increase the measurement accuracy
- C. To improve the response time of the display
- D. To protect the multimeter from damage ✓

Q20 Part B (Electronics Mechanic)

Which type of semiconductor has an excess of holes?

- A. p-type semiconductor ✓
- B. n-type semiconductor
- C. Intrinsic semiconductor
- D. Pure conductor

Q21 Part B (Electronics Mechanic)

Which of the following configurations is commonly used in Darlington amplifier circuits due to its high current gain and low input impedance?

- A. Common Emitter with a Common Base stage (CE-CB) ✓
- B. Common Base (CB)
- C. Common Collector (CC)
- D. Common Emitter (CE)

Q22 Part B (Electronics Mechanic)

Who is authorised to conduct road tests on workshop vehicles?

- A. Only trained and certified personnel ✓
- B. Visitors to the workshop
- C. Any employee
- D. The company accountant

Q23 Part B (Electronics Mechanic)

What is the purpose of negative feedback in a voltage amplifier?

- A. To increase the gain of the amplifier
- B. To increase the noise sensitivity of the amplifier
- C. To decrease the gain of the amplifier ✓
- D. To decrease the bandwidth of the amplifier

Q24 Part B (Electronics Mechanic)

Select the correct statement regarding an antenna application.

- A. A biconical antenna is not used for UHF signal.
- B. It is possible to cover the VHF and UHF bands with the one antenna. ✓
- C. It is impossible to cover the VHF and UHF bands with the one antenna.
- D. A Yagi-Uda antenna does not contain a reflector and dipole as its component.

Q25 Part B (Electronics Mechanic)

Find the lateral surface area of a cube with side length 5 cm.

- A. 125 cm²
- B. 150 cm²
- C. 200 cm²
- D. 100 cm² ✓

Q26 Part B (Electronics Mechanic)

How many comparators are present in the internal block diagram of IC 555?

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

Q27 Part B (Electronics Mechanic)

Which of the following statements is NOT correct for using scribes?

- A. Scriber points are very sharp, so they are to be handled very carefully.
- B. While scribing lines, the scriber is used like a pencil.
- C. Do not put the scriber in your pocket.
- D. Place a cork on the point when in use to prevent accidents. ✓

Q28 Part B (Electronics Mechanic)

What precaution should be taken when measuring resistance in a circuit with capacitors?

- A. Reverse the test leads multiple times.
- B. Use the highest resistance range.
- C. Measure resistance in AC mode.
- D. Discharge the capacitors before testing. ✓



Q29 Part B (Electronics Mechanic)

What does 'Light On' operation mean in a photoelectric switch?

- A. The photoelectric switch is energised when the beam of light is interrupted.
- B. The photoelectric switch is always on, even when an object is detected.
- C. The photoelectric switch remains off regardless of light interruption.
- D. The photoelectric switch is energised when the beam of light reaches the receiver. ✓

Q30 Part B (Electronics Mechanic)

What is the primary function of a NOT gate in a digital circuit?

- A. To combine multiple input signals
- B. To amplify the input signal
- C. To invert the input signal ✓
- D. To delay the input signal

Q31 Part B (Electronics Mechanic)

What happens when both the Set (S) and Reset (R) inputs of an RS Flip-Flop are 0?

- A. The output remains unchanged. ✓
- B. The output is reset to 0.
- C. The flip-flop is in an invalid state.
- D. The output is set to 1.

Q32 Part B (Electronics Mechanic)

For your safety at work, which of the following should be ensured?

1. All the required protective clothing and equipment are used.
2. Training and instruction necessary for performing tasks safely have been received.

- A. Only statement 1
- B. Neither statement 1 nor 2
- C. Only statement 2
- D. Both statements 1 and 2 ✓

Q33 Part B (Electronics Mechanic)

Which of the following calipers are used for marking lines, parallel to inside and outside edges and for locating the centre of round bars?

- A. Spring joint calipers
- B. Leg and point calipers ✓
- C. Simple calipers
- D. Firm joint calipers

Q34 Part B (Electronics Mechanic)

If a potential transformer has a turns ratio of 100 : 1 and the primary voltage is 11 kV, what will be the secondary voltage?

- A. 110 V ✓
- B. 11 V
- C. 1.1 V
- D. 1,100 V

Q35 Part B (Electronics Mechanic)

What happens when both the J and K inputs of a JK Flip-Flop are HIGH (1)?

- A. The output toggles. ✓
- B. The output is set to 1.
- C. The output is reset to 0.
- D. The output remains the same.

Q36 Part B (Electronics Mechanic)

What is the SI unit of 'volume'?

- A. Litres
- B. Cubic centimetre
- C. Cubic metre ✓
- D. Millilitres

Q37 Part B (Electronics Mechanic)

Which of the following 'V' blocks will have one 'V' groove and two grooves (slots) on either side for clamping in two positions?

- A. Double level single groove 'V' block
- B. Matched pair 'V' block
- C. Single level double groove 'V' block ✓
- D. Single level single groove 'V' block

Q38 Part B (Electronics Mechanic)

Which of the following is true about Port 0 in the 8051 microcontrollers?

- A. Port 0 pins are not programmable.
- B. Port 0 can be used for both input and output operations, but requires external pull-ups. ✓
- C. Port 0 is exclusively used for input only.
- D. Port 0 cannot be used for output operations.

Q39 Part B (Electronics Mechanic)

When creating 10 mm single-stroke capital letters in vertical style, what does the 10 mm distance between horizontal parallel lines represent?

- A. Letter width
- B. Letter height ✓
- C. Stroke thickness
- D. Interline spacing

Q40 Part B (Electronics Mechanic)

In the 8051 microcontroller, what is the memory address range reserved for Special Function Registers (SFRs)?

- A. 20h to 2Fh
- B. 0000h to FFFFh
- C. 80h to FFh ✓
- D. 00h to 7Fh

Q41 Part B (Electronics Mechanic)

For an 'N' bit uniform quantizer, the number of quantization levels is given by:

- A. 2N
- B. 2^N ✓
- C. 2+N
- D. N/2

Q42 Part B (Electronics Mechanic)

What is the typical temperature range of a mercury-based clinical thermometer?

- A. 0°C to 100°C
- B. 35°C to 42°C ✓
- C. 0°C to 50°C
- D. -10°C to 110°C

Q43 Part B (Electronics Mechanic)

What is the advantage of using a transistor as a switch in a digital circuit?

- A. High voltage gain
- B. High current gain
- C. Low sensitivity
- D. High switching speed ✓

Q44 Part B (Electronics Mechanic)

What are the two main outputs of a half adder?

- A. Sum and Carry ✓
- B. Carry and Borrow
- C. Sum and Difference
- D. Sum and Quotient

Q45 Part B (Electronics Mechanic)

A voltmeter with a resistance of 10,000 ohms is connected across a circuit that has a voltage of 50 V. What is the current flowing through the voltmeter?

- A. 2 mA
- B. 1 mA
- C. 5 mA ✓
- D. 4 mA

Q46 Part B (Electronics Mechanic)

When passing stationary vehicles, keep a watch on _____ who may come out suddenly from the front of the stationary vehicle. While overtaking, it should be done on the _____ side. Always keep a good _____ between your vehicle and others.

- A. cyclists; left; interval
- B. vehicles; right; gap
- C. drivers; left; space
- D. pedestrians; right; distance ✓

Q47 Part B (Electronics Mechanic)

Which of the following is the primary reason why copper is widely used as a conductor in electrical wiring?

- A. Copper has low resistance and high conductivity. ✓
- B. Copper has a low melting point.
- C. Copper is abundant and inexpensive.
- D. Copper has high resistance to electricity.



Q48 Part B (Electronics Mechanic)

The SI unit of temperature is/are ____.

- A. both kelvin and celsius
- B. celsius
- C. kelvin
- D. fahrenheit

Q49 Part B (Electronics Mechanic)

Which of the following is a common calibration method for electrical measuring instruments?

- A. Approximation method
- B. Estimation method
- C. Null method
- D. Guesswork method

Q50 Part B (Electronics Mechanic)

A 100-mm prick punch with a 7-mm diameter body could have a 2.5-mm diameter point ground to an angle of ____.

- A. 90°
- B. 30°
- C. 120°
- D. 45°

Q51 Part B (Electronics Mechanic)

Why is an electrodymanometer-type power factor meter preferred in AC circuits?

- A. It can measure both single-phase and three-phase power factors.
- B. It does not require voltage connections.
- C. It can measure DC power factor accurately.
- D. It has a faster response time.

Q52 Part B (Electronics Mechanic)

Which of the following is the correct implementation of the Boolean equation $F = (A \cdot B) + (C \cdot D)$ using only AND and OR gates?

- A. One AND gate and two OR gates
- B. Two OR gates followed by one AND gate
- C. Two AND gates followed by one OR gate
- D. One AND gate followed by one OR gate

Q53 Part B (Electronics Mechanic)

A voltage amplifier has a gain of 20 and an input resistance of 1 k Ω . If the input signal is 0.1 V, what is the output voltage and the current drawn from the input signal source?

- A. Output voltage = 2 V, Input current = 3 mA
- B. Output voltage = 2 V, Input current = 1 mA
- C. Output voltage = 5 V, Input current = 0.1 mA
- D. Output voltage = 2 V, Input current = 0.1 mA

Q54 Part B (Electronics Mechanic)

Which of the following types of errors can be minimised by proper instrument calibration?

- A. Random error
- B. Gross error
- C. Systematic error
- D. Observational error

Q55 Part B (Electronics Mechanic)

What is the purpose of using a transistor in a relay driver circuit?

- A. To filter out noise
- B. To amplify the input signal
- C. To switch on the relay coil
- D. To provide high input impedance in ON state

Q56 Part B (Electronics Mechanic)

An AND gate is used in a digital circuit to enable a certain function. Under what condition will the function be enabled?

- A. When all the inputs are low
- B. When any one of the inputs is high
- C. When all the inputs are high
- D. When any one of the inputs is low

Q57 Part B (Electronics Mechanic)

What is a DC LVDT?

- A. DC LVDT does not exist.
- B. It operates on AC power supply and has an AC output.
- C. It operates on DC power supply and has a DC output.
- D. It operates on DC power supply and has an AC output.



Q58 Part B (Electronics Mechanic)

Match the following types of lines with their correct descriptions according to their orientation and characteristics.

Description	Type of Line
A. A line that is neither parallel to a horizontal plane nor perpendicular to it.	1. Horizontal line
B. A line that is perpendicular to horizontal lines.	2. Vertical line
C. A line that changes its direction continuously.	3. Inclined line
D. A line that is parallel to a horizontal plane.	4. Curved line

A. A - 1, B - 2, C - 3, D - 4

B. A - 2, B - 3, C - 4, D - 1

C. A - 3, B - 2, C - 4, D - 1

D. A - 2, B - 1, C - 4, D - 3

Q59 Part B (Electronics Mechanic)

Which of the following statements is INCORRECT about end standard?

A. It measures the distance between two parallel flat surfaces.

B. Faces are subject to wear.

C. It is slower but more accurate.

D. It is used to measure the distance between two engraved lines.

Q60 Part B (Electronics Mechanic)

The generation of an electrostatic field is a characteristic of which type of sensor?

A. Ultrasonic sensor

B. Capacitive proximity sensor

C. Optical sensor

D. Inductive proximity sensor

Q61 Part B (Electronics Mechanic)

What does 'traceability' in calibration mean?

A. The calibration process is linked to an internationally recognised standard

B. The ability to track past measurements

C. The instrument's accuracy depends on user experience

D. The ability to repeat measurements consistently

Q62 Part B (Electronics Mechanic)

How does the 8051's internal RAM organisation affect the efficiency of interrupt service routines (ISRs) that require saving and restoring register values?

A. The general-purpose RAM area allows for large amounts of data to be pushed onto the stack, making ISRs more versatile.

B. The multiple register banks allow for switching to a different bank, reducing the need to push and pop registers, thus increasing efficiency.

C. The lack of hardware stack pointer in the internal RAM limits the efficiency of ISRs.

D. The bit-addressable area allows for fast saving and restoring of individual flags, improving ISR efficiency.

Q63 Part B (Electronics Mechanic)

In a logic circuit, two inputs A and B are applied to an AND gate, and the output of the AND gate is connected to the input of a NOT gate. If the inputs A and B are both at logic 0, what will be the output of the entire circuit?

A. Undefined

B. 0

C. 1

D. 2

Q64 Part B (Electronics Mechanic)

What is the minimum age for employment in factories or mines or other hazardous employment, according to Article 24 of the Indian Constitution?

A. 14 years

B. 12 years

C. 16 years

D. 18 years



Q65 Part B (Electronics Mechanic)

If the length of a resistor is doubled, what happens to its resistance, assuming all other factors remain constant?

- ☒ A. The resistance is doubled.
- ☐ B. The resistance remains the same.
- ☐ C. The resistance is halved.
- ☐ D. The resistance quadruples.

Q66 Part B (Electronics Mechanic)

Which type of line is used to represent hidden edges or surfaces in a technical drawing, as per BIS SP 46-2003?

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

Q67 Part B (Electronics Mechanic)

In a PCM pulse code modulator, if the output of the encoder is 1 Byte sequence, then determine the number of bits of the encoder and number of quantization levels required by the quantizer.

- ☐ A. 16 and 64, respectively
- ☐ B. 16 and 128, respectively
- ☒ C. 8 and 256, respectively
- ☐ D. 8 and 64, respectively

Q68 Part B (Electronics Mechanic)

Convert 8.5% into a decimal.

- ☐ A. 0.85
- ☐ B. 8.5
- ☒ C. 0.085
- ☐ D. 85

Q69 Part B (Electronics Mechanic)

Which of the following terms in the 5S concept refers to making a habit of maintaining the established procedures?

- ☐ A. Shine
- ☐ B. Set
- ☐ C. Sort
- ☒ D. Sustain

Q70 Part B (Electronics Mechanic)

The input stage of an operational amplifier is typically a/an:

- ☐ A. voltage regulator
- ☒ B. differential amplifier
- ☐ C. oscillator
- ☐ D. buffer circuit

Q71 Part B (Electronics Mechanic)

A basic inverting integrator using OP-AMP is unstable at low frequencies. What modification is commonly made to stabilise it?

- ☒ A. Add a resistor in parallel with the capacitor in the feedback path
- ☐ B. Increase the op-amp gain
- ☐ C. Add a resistor in series with the capacitor in the feedback path
- ☐ D. Use a low-power op-amp

Q72 Part B (Electronics Mechanic)

Which of the following Boolean expressions represents the behaviour of a 3-input AND gate?

- ☐ A. $A + B + C$
- ☒ B. $A * B * C$
- ☐ C. $(A * B) + C$
- ☐ D. $(A + B) * C$

Q73 Part B (Electronics Mechanic)

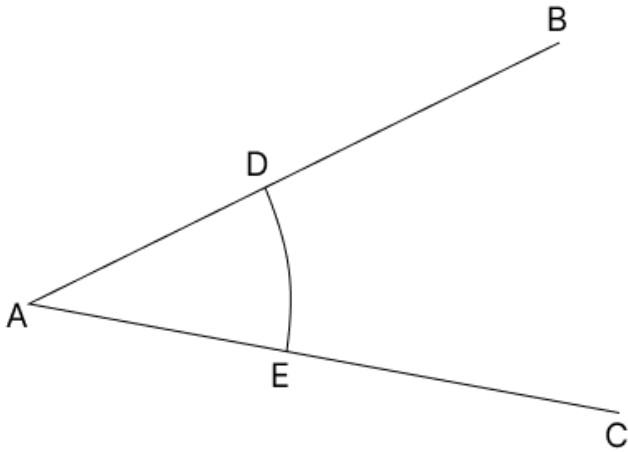
What is the significance of the cut-off region in the output characteristic of a transistor?

- ☒ A. It indicates the region where the transistor is fully turned off.
- ☐ B. It indicates the minimum collector-emitter voltage.
- ☐ C. It indicates the maximum collector current.
- ☐ D. It indicates the region where the transistor is fully turned on.



Q74 Part B (Electronics Mechanic)

In the process of bisecting angle BAC in the given figure, why do we draw arcs from points D and E?



- A. To find midpoint AB
- B. To mark equal lengths
- C. To intersect line AC
- D. To intersect above A



Q75 Part B (Electronics Mechanic)

Which logic gate configuration can be used to implement the Boolean function $F = \overline{A \cdot (B + C)}$?

- A. NOT gate, followed by one AND gate and one OR gate
- B. One AND gate, followed by a NOT gate
- C. One AND gate, followed by a NOT gate and one OR gate
- D. One OR gate, followed by one AND gate and one NOT gate

