



RRB ALP 2025 CBT 2

Assistant Loco Pilot · CEN 01/2025 · CBT 2 · Heat Engine Trade · Part B (Heat Engine) · Question Paper

English

All 2 Shifts (Sets) · Part B (Heat Engine) Section · Official Answer Key

About this Compilation

This booklet contains all 2 shift papers of the RRB ALP 2025 CBT 2 (Heat Engine) examination in English (Part B (Heat Engine) 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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Index — All Sets (click to open)

Set 1

28 Jul 2026

9:30 AM - 12:00 PM

Set 2

28 Jul 2026

2:30 PM - 5:00 PM

Part B (Heat Engine)

75 Questions • Answer Key

Q1 Part B (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

Which process involves joining two metals by melting them at the joint?

- A. Soldering
- B. Brazing
- C. Welding
- D. Riveting



Q9 Part B (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

Ferrous metals generally contain major amounts of:

- A. Iron
- B. Zinc
- C. Aluminium
- D. Copper



Q36 Part B (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

What is the SI unit of magnetic flux?

- A. Weber ✓
- B. Tesla
- C. Joule
- D. Henry

Q71 Part B (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

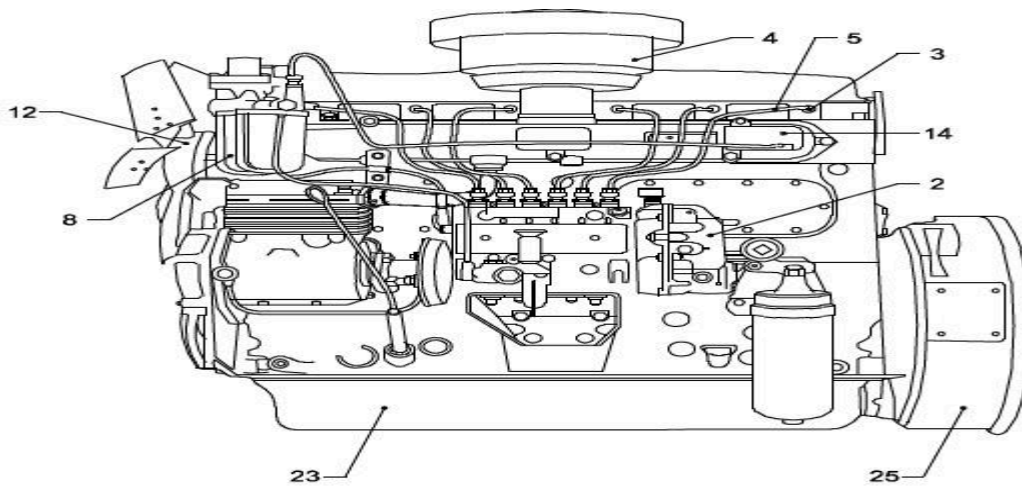
What is a primary challenge associated with increasing the compression ratio in internal combustion engines?

- A. Reduced fuel injection pressure
- B. Increased engine lubrication
- C. Higher risk of engine knocking ✓
- D. Lower engine temperature



Q75 Part B (Heat Engine)

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 (Heat Engine)

75 Questions • Answer Key

Q1 Part B (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)**

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 (Heat Engine)

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 (Heat Engine)**

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 (Heat Engine)**

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

Which component is directly responsible for opening and closing the engine valves?

- A. Connecting rod
- B. Crankshaft
- C. Camshaft ☒
- D. Piston



Q64 Part B (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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 (Heat Engine)

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



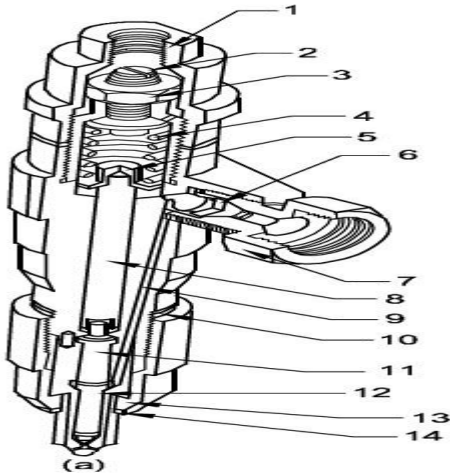
Q74 Part B (Heat Engine)

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 (Heat Engine)

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

