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RRB ALP 2025 CBT 2

Assistant Loco Pilot · CEN 01/2025 · CBT 2 · Armature & Coil Winder Trade · Part B (Armature & Coil Winder) · Question Paper

English

All 2 Shifts (Sets) · Part B (Armature & Coil Winder) Section · Official Answer Key

About this Compilation

This booklet contains all 2 shift papers of the RRB ALP 2025 CBT 2 (Armature & Coil Winder) examination in English (Part B (Armature & Coil Winder) 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 (Armature & Coil Winder)

75 Questions • Answer Key

Q1 Part B (Armature & Coil Winder)

During nameplate installation after the Impregnation, Balancing, and Final Assembly stage of an electrical machine, which sequence follows the correct standard industrial installation procedure?

- A. Position the nameplate, secure fasteners, clean the mounting surface, mark drilling locations, and drill mounting holes
- B. Drill mounting holes, mark drilling locations, clean the mounting surface, position the nameplate, and secure the nameplate using fasteners
- C. Clean the mounting surface, position the nameplate, mark drilling locations, drill mounting holes, and secure the nameplate using fasteners ✓
- D. Mark drilling locations, position the nameplate, clean the mounting surface, drill mounting holes, and secure the nameplate using fasteners

Q2 Part B (Armature & Coil Winder)

Direct material cost is ₹22,000 and direct labor cost is ₹8000. If factory overhead is charged at 25% of direct labor cost, find the factory cost.

- A. ₹30,000
- B. ₹32,000 ✓
- C. ₹31,000
- D. ₹33,000

Q3 Part B (Armature & Coil Winder)

Which process step is performed first during the vacuum pressure impregnation process of electrical machine windings?

- A. Creating a vacuum inside the impregnation chamber containing the windings ✓
- B. Baking the impregnated winding assembly for curing
- C. Filling the impregnation chamber with insulating resin
- D. Applying positive pressure inside the impregnation chamber

Q4 Part B (Armature & Coil Winder)

During the winding design calculation of a 3-phase AC motor, how many stator coil groups are required for a motor having 6 poles?

- A. 18 ✓
- B. 6
- C. 3
- D. 9

Q5 Part B (Armature & Coil Winder)

What is the mathematical term for equality between two ratios?

- A. Fraction
- B. Expression
- C. Proportion ✓
- D. Percentage

Q6 Part B (Armature & Coil Winder)

A DC machine has 8 poles and 128 conductors. If the winding is short-pitched by 2 conductors, what is the coil span?

- A. 14 Conductors ✓
- B. 18 Conductors
- C. 20 Conductors
- D. 16 Conductors

Q7 Part B (Armature & Coil Winder)

What is the primary objective of conducting an on-load operational test during the Impregnation, Balancing, and Final Assembly process of a rotating electrical machine?

- A. Measure insulation resistance of winding insulation before equipment energization
- B. Evaluate equipment performance under rated electrical and mechanical operating conditions ✓
- C. Verify dimensional alignment and fastening of assembled mechanical components
- D. Confirm removal of surface contaminants from assembled equipment

Q8 Part B (Armature & Coil Winder)

Why should the face of a claw hammer be kept smooth and clean?

- A. To prevent damage during regular use ✓
- B. To reduce weight during regular use
- C. To secure the handle more firmly
- D. To improve grip during regular use



Q9 Part B (Armature & Coil Winder)

A parallel circuit has two branches containing $10\ \Omega$ and $20\ \Omega$ resistors. If the total current supplied is 3 A, determine the current flowing through the $10\ \Omega$ resistor.

- A. 1.5 A
- B. 1 A
- C. 0.5 A
- D. 2 A

**Q10 Part B (Armature & Coil Winder)**

What happens to the insulation resistance of an insulating material when the temperature increases?

- A. It remains constant
- B. It increases rapidly
- C. It decreases
- D. It becomes infinite

**Q11 Part B (Armature & Coil Winder)**

In a motor sketch, what is the most effective way to represent the winding terminals?

- A. By sketching freehand outlines of terminals
- B. By omitting important terminal connection details
- C. By using standardized symbols and clear labels
- D. By assigning random letters to the terminals

**Q12 Part B (Armature & Coil Winder)**

To achieve controlled step-by-step rotation in a stepper motor, which of the following input signals is applied?

- A. High-frequency audio signal
- B. Controlled digital pulse signal
- C. Continuous sinusoidal signal
- D. Random analog pulse signal

**Q13 Part B (Armature & Coil Winder)**

During the post-winding polarity verification test of a rewound multi-pole single-phase fan motor, what is the most likely effect if the polarity of one or more stator coils is incorrectly reversed?

- A. The motor develops a uniform reverse rotating magnetic field causing normal reverse rotation
- B. The motor develops an unbalanced magnetic field causing reduced torque and excessive heating
- C. The motor produces an immediate phase-to-phase short circuit during energization
- D. The motor maintains normal magnetic field distribution and operates at rated performance

**Q14 Part B (Armature & Coil Winder)**

The no-load voltage of an alternator is 525 V and the full-load voltage is 500 V. What is the voltage regulation?

- A. 3%
- B. 5%
- C. 6%
- D. 4%

**Q15 Part B (Armature & Coil Winder)**

Why is retrogressive winding rarely used in practice in DC machines?

- A. It does not follow the natural direction of rotation
- B. It increases generated EMF
- C. It reduces number of conductors
- D. It causes mechanical imbalance

**Q16 Part B (Armature & Coil Winder)**

Which of the following types of voltmeters is suitable for measuring the voltage across a component in a high resistance circuit?

- A. Voltmeter having low input impedance
- B. Voltmeter having high frequency response
- C. Voltmeter having high current rating
- D. Voltmeter having high input impedance



Q17 Part B (Armature & Coil Winder)

Which application specifically requires a motor that must not run at no-load condition due to risk of over speeding?

- A. Centrifugal pump
- B. Electric traction ✓
- C. Printing press
- D. Conveyor belt

Q18 Part B (Armature & Coil Winder)

During the Impregnation, Balancing, and Final Assembly process of a three-phase star-connected induction motor, what is the most likely consequence if one phase winding is incorrectly connected to the common neutral junction?

- A. The motor will develop unbalanced phase currents resulting in abnormal vibration and uneven operation ✓
- B. The motor will develop a direct short circuit simultaneously between all three phase windings
- C. The motor will experience reduced and equal phase voltage across all three stator windings
- D. The motor will operate at a rotational speed higher than the rated synchronous speed

Q19 Part B (Armature & Coil Winder)

In practical transformer design, which winding type is preferred for reducing leakage reactance in power transformers?

- A. Spiral winding
- B. Lap winding
- C. Sandwich winding ✓
- D. Concentric winding

Q20 Part B (Armature & Coil Winder)

During transformer oil preparation in the Impregnation, Balancing, and Final Assembly process, what corrective action is recommended if the transformer oil breakdown voltage remains below 30 KV RMS as specified in IS 335:1983 during dielectric strength testing?

- A. Increase the applied dielectric test voltage beyond the specified test limit
- B. Perform transformer oil filtration to remove moisture and suspended contaminants ✓
- C. Replace the dielectric test electrodes without treating the transformer oil condition
- D. Repeat the dielectric strength test without changing the transformer oil condition

Q21 Part B (Armature & Coil Winder)

If an energy meter disc rotates in the reverse direction under leading power factor loads, which corrective measure should be taken?

- A. Adjust current coil tap
- B. Reverse the polarity of the pressure coil ✓
- C. Increase brake magnet strength
- D. Change disc material

Q22 Part B (Armature & Coil Winder)

Which symbol usually indicates a coil in a starter circuit diagram?

- A. A triangle with a pointed shape
- B. A zigzag line with angled bend
- C. A rectangle with a text label
- D. A circle with a center marking ✓

Q23 Part B (Armature & Coil Winder)

When observing the chemical storage area, what is the most critical factor to check for immediate health and environmental safety?

- A. Proper segregation of incompatible chemical materials ✓
- B. Availability of protective equipment near storage area
- C. Accessibility of emergency spill response equipment
- D. Presence of clearly visible emergency contact signage

Q24 Part B (Armature & Coil Winder)

In a three-phase star-connected (Y-connected) system, what is the relationship between line current and phase current?

- A. Line current is double the phase current
- B. Line current is half the phase current
- C. Line current is zero
- D. Line current equals phase current ✓

Q25 Part B (Armature & Coil Winder)

If two AC waveforms are said to be 'in phase', what does this indicate?

- A. Their amplitudes are identical
- B. Their peaks and troughs occur at the same time ✓
- C. Their directions are opposite
- D. They have the same frequency but different timing



Q26 Part B (Armature & Coil Winder)

What is the reason for movement of the pointer of an analog multimeter in the opposite direction during measurement of DC voltage?

- A. Low internal battery
- B. Probe polarity connection ✓
- C. Blown fuse
- D. Incorrect scale selected

Q27 Part B (Armature & Coil Winder)

A shaft measurement is recorded as 24.98 mm, while the standard size is 25 mm. This indicates:

- A. severe shaft bending
- B. incorrect supply voltage
- C. excessive insulation failure
- D. minor dimensional deviation ✓

Q28 Part B (Armature & Coil Winder)

In a DC generator, the brushes are placed along the magnetic neutral axis (MNA). What is the reason for this placement?

- A. To increase armature current
- B. To increase generated EMF
- C. To ensure sparkless commutation ✓
- D. To reduce brush wear

Q29 Part B (Armature & Coil Winder)

A uniform material has mass 200 kg and volume 5 m³. Find its density.

- A. 30 kg/m³
- B. 40 kg/m³ ✓
- C. 20 kg/m³
- D. 50 kg/m³

Q30 Part B (Armature & Coil Winder)

An elevator driven by a DC motor fails to lift load but motor runs. What is the most probable cause?

- A. High speed
- B. Open armature
- C. Weak field flux ✓
- D. Low supply voltage

Q31 Part B (Armature & Coil Winder)

What is the primary goal of the 5S methodology in industrial workplaces?

- A. To ensure compliance with industrial safety regulations only
- B. To promote teamwork activities among factory workers only
- C. To improve workplace organization and operational efficiency ✓
- D. To clean production equipment and machinery every day

Q32 Part B (Armature & Coil Winder)

In a DC generator, what is the consequence if the cooling fan fails during continuous operation at rated load?

- A. Commutator voltage becomes zero
- B. Generated EMF increases
- C. Temperature rise leads to insulation deterioration ✓
- D. Armature resistance decreases

Q33 Part B (Armature & Coil Winder)

A house has a total load of 2500 watts and operates at 250 volts. What is the required current rating for the main earthing conductor?

- A. 20 amperes
- B. 10 amperes ✓
- C. 5 amperes
- D. 15 amperes

Q34 Part B (Armature & Coil Winder)

In the rewinding of a three-phase squirrel-cage induction motor stator, which winding arrangement is commonly used to achieve symmetrical phase distribution and balanced rotating magnetic field production?

- A. Double-layer distributed stator winding ✓
- B. Wave winding
- C. Lap winding
- D. Single-phase concentrated field winding



Q35 Part B (Armature & Coil Winder)

A DC generator is specified with 20 commutator segments and uses a simplex lap winding. How many armature coils does it have?

- A. 10
- B. 15
- C. 20
- D. 40



Q36 Part B (Armature & Coil Winder)

Which device is mainly used for automatically opening or closing an electrical circuit in wiring systems?

- A. Relay
- B. Switch
- C. Fuse
- D. MCB



Q37 Part B (Armature & Coil Winder)

Which of the following is a recommended use for Tinman's shears?

- A. Making straight sheet cuts
- B. Making electrical connections
- C. Producing threaded fasteners
- D. Cutting small internal holes



Q38 Part B (Armature & Coil Winder)

Which sequence correctly describes the standard procedure for dynamic balancing of a rotating electrical machine armature?

- A. Mount armature on balancing machine, rotate at specified speed, detect unbalance, apply corrective weight
- B. Mount armature on balancing machine, rotate at specified speed, apply corrective weight, detect unbalance
- C. Mount armature on balancing machine, apply corrective weight, detect unbalance, rotate at specified speed
- D. Rotate at specified speed, mount armature on balancing machine, detect unbalance, apply corrective weight



Q39 Part B (Armature & Coil Winder)

How is a digital multimeter connected for measuring the circuit current?

- A. Both series and parallel connections are correct
- B. Across the power supply terminals
- C. In parallel with the circuit
- D. In series with the circuit



Q40 Part B (Armature & Coil Winder)

If the number of parallel paths in a DC machine using wave winding is doubled, what type of winding is being used?

- A. A lap winding is being used.
- B. A simplex wave winding is being used.
- C. A progressive winding is being used.
- D. A duplex wave winding is being used.



Q41 Part B (Armature & Coil Winder)

Which parts are responsible for connecting the winding to the external circuit in conductors in case of domestic wiring?

- A. Bus bars
- B. Commutators
- C. Slip rings
- D. End connection leads



Q42 Part B (Armature & Coil Winder)

What causes EMF generation in the armature winding of an alternator?

- A. Continuous heating of rotor conductors
- B. Chemical action inside stator insulation
- C. Relative motion between flux and conductors
- D. Friction between shaft and bearings



Q43 Part B (Armature & Coil Winder)

Suppose a DC armature is wound with a lap winding and the number of parallel paths is increased beyond the number of poles. What operational problem is most likely to occur?

- A. The machine will produce more torque per path
- B. All armature coils will carry equal current regardless
- C. Current in each path will decrease, causing uneven load sharing
- D. Back EMF will be higher in each path, increasing speed



Q44 Part B (Armature & Coil Winder)

What function does the traverse mechanism perform in a coil winding machine used for DC machines?

- A. To insulate the conductor.
- B. To guide the wire uniformly across the winding space. ✓
- C. To supply electrical current to the winding.
- D. To rotate the armature core.

Q45 Part B (Armature & Coil Winder)

Which of the following is used for supplying power at medium voltages in electrical installations?

- A. Flexible wire
- B. Twin core wire
- C. Armored cable ✓
- D. Telephone wire

Q46 Part B (Armature & Coil Winder)

A DC machine has 6 poles and 72 conductors. Calculate the pole pitch in terms of number of conductors.

- A. 60 conductors
- B. 12 conductors ✓
- C. 72 conductors
- D. 18 conductors

Q47 Part B (Armature & Coil Winder)

Which action would violate the principles of 5S?

- A. Cleaning workplace stations on a regular basis
- B. Storing excess inventory within factory walkways ✓
- C. Organizing tools according to their specific function
- D. Labeling shelves for storage for material placement

Q48 Part B (Armature & Coil Winder)

During transformer core assembly in the Impregnation, Balancing, and Final Assembly process, which core lamination material is used to minimize magnetizing current requirement and hysteresis power loss under alternating magnetic flux conditions?

- A. Aluminum
- B. Copper
- C. Ferrite
- D. Silicon steel ✓

Q49 Part B (Armature & Coil Winder)

Which of the following statements describes the materials classified under Class Y insulation in terms of their properties and limitations?

- A. They are untreated organic materials with a limiting temperature of 90°C. ✓
- B. They are synthetic materials with a limiting temperature of 130°C.
- C. They are impregnated fibers with a limiting temperature of 90°C.
- D. They are untreated organic materials with a limiting temperature of 180°C.

Q50 Part B (Armature & Coil Winder)

Which statement correctly differentiates between Progressive and Retrogressive winding?

- A. Retrogressive is used only in AC machines.
- B. Progressive advances, retrogressive goes backward. ✓
- C. Both have identical commutator connections.
- D. Progressive has $Y_c = -1$, retrogressive has $Y_c = +1$.

Q51 Part B (Armature & Coil Winder)

During the rewinding process of a three-phase AC induction motor, which instrument is specifically used to measure winding insulation resistance between the stator winding and motor frame?

- A. Megger ✓
- B. Wattmeter
- C. Voltmeter
- D. Ammeter

Q52 Part B (Armature & Coil Winder)

During magnetic core loss testing of ferromagnetic cores used in electromechanical assemblies, which two loss components constitute the total core loss?

- A. Leakage loss and copper loss
- B. Dielectric loss and leakage loss
- C. Hysteresis loss and eddy current loss ✓
- D. Copper loss and dielectric loss



Q53 Part B (Armature & Coil Winder)

A technician is tasked with installing an Earth Leakage Circuit Breaker (ELCB) in a facility where sensitive electronic equipment is used. Which installation method will ensure that the ELCB correctly detects and isolates earth faults without causing unnecessary interruptions?

- A. Connect the ELCB so that all circuit conductors, including the neutral, pass through the ELCB's sensing coil** ✓
- B. Connect the ELCB only to the phase wire before the load
- C. Install the ELCB on the earth wire between equipment and ground rod
- D. Wire the ELCB to the load side conductors, but not the return path

Q54 Part B (Armature & Coil Winder)

If an electrical drawing includes a symbol of two parallel lines with a gap between them, what component does this depict?

- A. Capacitor** ✓
- B. Single wire
- C. Battery
- D. Resistor

Q55 Part B (Armature & Coil Winder)

What distinguishes an on-load performance test from a no-load test during the Impregnation, Balancing, and Final Assembly process of an electrical machine?

- A. It verifies dimensional alignment of assembled mechanical components without energization
- B. It evaluates machine performance while supplying or consuming rated output power** ✓
- C. It measures winding insulation resistance using a megohmmeter under de-energized conditions
- D. It evaluates machine performance with the shaft mechanically uncoupled from all loads

Q56 Part B (Armature & Coil Winder)

A three-phase alternator gives 440 V at no load and 400 V at full load. Calculate the percentage voltage regulation.

- A. 8%
- B. 10%** ✓
- C. 12%
- D. 15%

Q57 Part B (Armature & Coil Winder)

Which of the following is the primary purpose of applying impregnation treatment during the rewinding process of an AC motor?

- A. To modify electromagnetic flux distribution within the rotating magnetic field system
- B. To mechanically secure winding conductors and improve insulation protection against moisture and contaminants** ✓
- C. To reduce magnetic hysteresis and eddy current losses within the laminated stator core
- D. To increase dimensional uniformity of the air gap between the stator and rotor assemblies

Q58 Part B (Armature & Coil Winder)

Which of the following must exist to generate EMF in a DC generator?

- A. Only resistance
- B. Only conductor
- C. Relative motion between conductor and magnetic field** ✓
- D. Only magnetic field

Q59 Part B (Armature & Coil Winder)

During the rewinding process of a three-phase AC motor stator, which procedure must be repeatedly performed for each pole group until completion of the main winding?

- A. Apply insulating varnish immediately after winding each individual pole group
- B. Repeat coil insertion, coil placement, and temporary slot wedging operations for each pole group** ✓
- C. Replace the stator winding conductor with a different wire gauge for each pole group
- D. Perform insulation resistance measurement after winding each individual pole group

Q60 Part B (Armature & Coil Winder)

Which of the following best explains the purpose of transformer oil filtration during the Impregnation, Balancing, and Final Assembly process?

- A. It applies lubricating properties to mechanical assembly contact surfaces
- B. It increases transformer oil temperature to reduce oil viscosity during circulation
- C. It removes moisture and suspended contaminants to improve dielectric insulation performance** ✓
- D. It modifies transformer oil chemical composition to alter dielectric characteristics



Q61 Part B (Armature & Coil Winder)

An electrical grid in a coastal region needs to select a conductor material that balances weight, cost, and resistance to corrosion. Given these considerations, which is the suitable choice?

- A. Steel conductors are preferred for their mechanical durability and low cost.
- B. Aluminium conductors are preferred due to their light weight, lower cost, and good corrosion resistance. ✓
- C. Copper conductors are preferred for their high conductivity and strength.
- D. Silver conductors are preferred for their excellent conductivity and reliability.

Q62 Part B (Armature & Coil Winder)

An organization aims to improve future job planning by collecting accurate failure history data for reliability analysis. Which documentation method will best support this goal?

- A. Recording detailed fault reports for every equipment failure event ✓
- B. Maintaining yearly breakdown summaries for workshop equipment records
- C. Recording preventive maintenance schedules without equipment faults
- D. Depending mainly on operator observations for equipment fault history

Q63 Part B (Armature & Coil Winder)

What is the function of an autotransformer starter used with a three-phase induction motor?

- A. To increase the frequency of supply
- B. To increase the running speed of motor
- C. To reverse the direction of rotation
- D. To reduce the starting current drawn ✓

Q64 Part B (Armature & Coil Winder)

Which equipment is primarily used to conduct the high-speed test in the Impregnation, Balancing, Final Assembly process?

- A. Megger insulation tester
- B. Dynamic balancing machine ✓
- C. Digital voltmeter
- D. Torque wrench

Q65 Part B (Armature & Coil Winder)

Which combination of mechanical components is correctly associated with the assembly of a shaft coupling used to transmit rotational power between two rotating shafts?

- A. Fixed resistors and rolling bearings
- B. Washers and light-emitting diodes
- C. Inductors and electromagnetic relays
- D. Rotating shafts and mechanical couplings ✓

Q66 Part B (Armature & Coil Winder)

A protection engineer is designing a protection and metering scheme for a three-phase transformer using Current Transformers (CTs) and Potential Transformers (PTs). What is the purpose of the PTs in this system?

- A. To isolate the transformer during fault conditions automatically
- B. To supply excitation power to CTs
- C. To measure line current for overload detection
- D. To provide proportional voltage signals for relays and meters ✓

Q67 Part B (Armature & Coil Winder)

Which condition ensures that all armature conductors are included in a single closed wave winding?

- A. Number of commutator segments must be prime
- B. Number of poles must be even
- C. Armature resistance must be low
- D. Winding pitch must satisfy proper closure condition ✓

Q68 Part B (Armature & Coil Winder)

According to the law of conservation of energy, energy can neither be:

- A. Stored nor transferred
- B. Converted nor utilized
- C. Measured nor calculated
- D. Created nor destroyed ✓

Q69 Part B (Armature & Coil Winder)

What type of line is used to indicate hidden internal features in a motor sketch?

- A. Continuous line
- B. Thick line
- C. Dashed line ✓
- D. Chain line



Q70 Part B (Armature & Coil Winder)

In electromechanical assembly operations, which statement correctly distinguishes a jig from a fixture?

- A. A fixture is exclusively used for welding operations, whereas a jig is used for machining operations
- B. A jig only clamps the workpiece, whereas a fixture only guides the cutting tool
- C. A jig and a fixture perform identical functions in all manufacturing operations
- D. A jig accurately locates the workpiece and guides the cutting tool, whereas a fixture only locates and secures the workpiece ☒

Q71 Part B (Armature & Coil Winder)

Where is the Buchholz relay typically installed in an oil-immersed transformer?

- A. At the external cooling fins
- B. Inside the transformer core
- C. On the primary winding
- D. Between the main tank and conservator ☒

Q72 Part B (Armature & Coil Winder)

What is a critical step before storing cutting tools after use in woodworking?

- A. Wiping tools dry and removing debris carefully ☒
- B. Leaving tools unattended on the workbench area
- C. Placing tools in closed boxes without cleaning
- D. Soaking tools in water before storage overnight

Q73 Part B (Armature & Coil Winder)

In a three-phase star (Y) connection, what is the relationship between line voltage (V_L) and phase voltage (V_{ph})?

A. $V_L = \sqrt{3} V_{ph}$ ☒

B. $V_L = \frac{V_{ph}}{\sqrt{3}}$

C. $V_L = V_{ph}$

D. $V_L = 3 V_{ph}$

Q74 Part B (Armature & Coil Winder)

Why is AC electrical power commonly transmitted at very high voltage over long distances?

A. To reduce current and minimize $I^2 R$ losses ☒

B. To increase current and improve heating effect

C. To convert AC power into DC power

D. To avoid the use of transformers

Q75 Part B (Armature & Coil Winder)

In a three-phase star-connected system, the phase voltage (V_{ph}) is 230 V. Determine the line voltage (V_L).

A. 230 V

B. 460 V

C. $230\sqrt{3}$ V ☒

D. $\frac{230}{\sqrt{3}}$ V



Part B (Armature & Coil Winder)

75 Questions • Answer Key

Q1 Part B (Armature & Coil Winder)

What is the most significant insulation property of leatheroid paper used in rewinding of AC motor windings?

- A. It provides low electrical insulation resistance for rapid heat dissipation in winding assemblies
- B. It provides improved ageing resistance and high dielectric strength for winding insulation applications ✓
- C. It provides high magnetic permeability for improved alternating current motor flux distribution
- D. It provides conductive bonding characteristics for direct electrical connection between winding layers

Q2 Part B (Armature & Coil Winder)

Which material is used as insulation on winding wires in conductors?

- A. Paper wrapping
- B. Rubber sheathing
- C. Cotton braiding
- D. Enamel coating ✓

Q3 Part B (Armature & Coil Winder)

A technician is tasked with installing earthing for a commercial building using the plate earthing method. Which sequence of steps ensures safety and long-term effectiveness during the installation process?

- A. Dig deep pit, place plate without connecting earth wire, fill with stones and soil
- B. Dig shallow trench, lay plate horizontally, connect earth wire, cover with sand only
- C. Excavate pit, place plate vertically, connect earth wire, fill with alternate charcoal and salt layers ✓
- D. Excavate pit, place plate diagonally, connect earth wire, fill with only soil

Q4 Part B (Armature & Coil Winder)

What is the technical purpose of preheating an electrical machine winding before varnish impregnation during final assembly?

- A. To remove absorbed moisture from insulation and winding layers before varnish impregnation ✓
- B. To permanently increase varnish fluidity after curing
- C. To thermally strengthen conductor insulation by direct heat treatment
- D. To increase the direct current resistance of the winding conductor

Q5 Part B (Armature & Coil Winder)

Which method is effective for improving earth resistance in an earthing system?

- A. Using a single deep electrode
- B. Connecting earth wire directly to neutral
- C. Adding multiple earth electrodes ✓
- D. Applying oil to the earth pit

Q6 Part B (Armature & Coil Winder)

In a DC shunt generator, the field winding is connected _____.

- A. In series with armature
- B. In series with load
- C. Independently from armature
- D. In parallel with armature ✓

Q7 Part B (Armature & Coil Winder)

During final testing of a fully assembled electrical machine after impregnation and balancing, what is the primary objective of conducting a temperature rise test under rated operating conditions?

- A. To verify dielectric insulation resistance characteristics between winding conductors and frame
- B. To verify that winding and machine temperatures remain within specified insulation-class thermal limits ✓
- C. To verify correct electrical phase relationship and stator winding terminal polarity
- D. To verify dynamic mechanical stability of the rotating assembly during continuous operation

Q8 Part B (Armature & Coil Winder)

What is the function of the no-voltage coil (NVC) in a DC motor starter?

- A. Increase torque
- B. Protect against overload
- C. Increase speed
- D. Protect against supply failure ✓



Q9 Part B (Armature & Coil Winder)

During the transformer transformation ratio test performed in the Impregnation, Balancing, and Final Assembly stage, how should the secondary winding be connected while the rated test voltage is applied to the primary winding?

- A. Kept open-circuited without any external electrical load connection ✓
- B. Connected to an external resistive load bank during voltage application
- C. Kept short-circuited through a low-resistance conductive path
- D. Connected to earth potential through one secondary terminal during measurement

Q10 Part B (Armature & Coil Winder)

During the Class E motor stator winding impregnation process, after varnish draining, the stator is heated to 120°C for two hours and then to 140°C for a minimum of ten hours. To satisfy the post-baking inspection requirement, the insulation resistance measured immediately after baking shall not be less than:

- A. 2 megaohms ✓
- B. 10 kilohms
- C. 100 megaohms
- D. 500 ohms

Q11 Part B (Armature & Coil Winder)

When two dimension lines must be close together, what is the best practice to avoid misinterpretation?

- A. Placing dimension figures together in straight alignment
- B. Reducing dimension figure size for closer placement
- C. Omitting one of the required dimension value figures
- D. Staggering dimension figures to improve reading clarity ✓

Q12 Part B (Armature & Coil Winder)

A DC shunt motor shows a sudden increase in speed during operation. What may be the probable cause?

- A. Increase in armature resistance
- B. Decrease in supply voltage
- C. Increase in load
- D. Field circuit open or weakened ✓

Q13 Part B (Armature & Coil Winder)

If: $\sin\theta = 5/13$ and θ is an acute angle, find the value of $\cos\theta$.

- A. 13/12
- B. 12/5
- C. 12/13 ✓
- D. 5/12

Q14 Part B (Armature & Coil Winder)

In the context of liquid insulation materials, what is the probable effect when solid impurities align themselves along the electric field?

- A. It increases the chances of insulation breakdown ✓
- B. It enhances the dielectric strength of the liquid
- C. It strengthens the insulation against breakdown
- D. It reduces the possibility of insulation failure

Q15 Part B (Armature & Coil Winder)

In a transformer tap changer, changing the tap position directly alters which transformer parameter?

- A. Effective turns ratio of the transformer ✓
- B. Frequency of operation
- C. Core material permeability
- D. Magnetic flux waveform shape

Q16 Part B (Armature & Coil Winder)

Which of the following is a type of riveted joint?

- A. Seam joint
- B. Groove joint
- C. Edge joint
- D. Lap joint ✓

Q17 Part B (Armature & Coil Winder)

A technician must choose the most suitable conductor for wiring in a high-temperature industrial environment. Considering mechanical strength, electrical conductivity, and resistance to corrosion, which material offers the best overall performance for long-term reliability?

- A. Aluminum wire
- B. Iron wire
- C. Copper wire ✓
- D. Steel wire



Q18 Part B (Armature & Coil Winder)

During pre-varnish thermal conditioning of electric motor windings in the impregnation and balancing process, what is the effect of excessive preheating duration?

- A. Complete elimination of winding moisture content
- B. Increase in mechanical rigidity of conductor insulation
- C. Thermal degradation of winding insulation material ✓
- D. Acceleration of varnish polymerization before impregnation

Q19 Part B (Armature & Coil Winder)

In a three-phase alternator, which winding type is commonly used to achieve a sinusoidal output voltage and reduce harmonics?

- A. Wave winding
- B. Full-pitch winding
- C. Short-pitch winding ✓
- D. Lap winding

Q20 Part B (Armature & Coil Winder)

What is the effect of rapid deterioration of air-drying varnishes during storage on their service performance?

- A. They lose their intended insulating and protective performance characteristics over time ✓
- B. They become completely transparent and free from volatile odor compounds
- C. They cure into a permanently hardened glass-like insulating layer
- D. They develop improved resistance to petroleum-based insulating oils

Q21 Part B (Armature & Coil Winder)

Which of the following methods is recommended for extending the range of a 5A ammeter to measure currents up to 100A?

- A. By connecting a resistance of suitable value in series with the ammeter
- B. By connecting a shunt resistance of suitable value in parallel with the ammeter ✓
- C. By connecting multiplier resistor in series with the ammeter
- D. By connecting current transformer in series with the ammeter

Q22 Part B (Armature & Coil Winder)

A single phasing preventer is installed for protecting:

- A. Universal motor operated appliances
- B. Three-phase induction motor circuits ✓
- C. Direct current shunt motor drives
- D. Single-phase induction motor systems

Q23 Part B (Armature & Coil Winder)

Which of the following is the advantage of wave winding condition?

- A. High voltage generation ✓
- B. Requires many brushes
- C. High current capacity
- D. Low voltage generation

Q24 Part B (Armature & Coil Winder)

Which statement correctly describes the thermal shrink fitting process used for permanent interference assembly of cylindrical electromechanical components?

- A. A cooled inner component is mechanically compressed and inserted into a heated outer component, producing a permanent clearance fit after assembly.
- B. Both mating components are cooled before assembly, producing a permanent interference fit after returning to ambient temperature.
- C. Both mating components are heated uniformly before assembly, producing a clearance fit after cooling to ambient temperature.
- D. A metallic outer component is heated to expand its internal diameter and assembled over a cooler mating component, producing an interference fit after cooling to ambient temperature. ✓

Q25 Part B (Armature & Coil Winder)

What is the role of communication during an industrial system failure?

- A. To assign responsibilities only to selected workers
- B. To withhold information from concerned external agencies
- C. To coordinate actions and keep everyone properly informed ✓
- D. To communicate details only with higher management staff



Q26 Part B (Armature & Coil Winder)

What type of tachometer uses changes in frequency to measure rotational speed?

- A. Mechanical tachometer
- B. Electronic tachometer** ✓
- C. Analog tachometer
- D. Thermal tachometer

Q27 Part B (Armature & Coil Winder)

An electrical workshop uses 15 lamps of 100 W each for 5 hours daily. If the workshop operates 25 days in a month, what is the total energy consumed in kilowatt-hours (kWh) per month?

- A. 150.0
- B. 187.5** ✓
- C. 125.0
- D. 112.5

Q28 Part B (Armature & Coil Winder)

Which property of a resistor determines how much it resists the flow of electric current?

- A. Inductance
- B. Capacitance
- C. Resistance** ✓
- D. Conductance

Q29 Part B (Armature & Coil Winder)

Why is HV testing performed after insulation resistance (IR) test?

- A. To measure current
- B. To reduce voltage
- C. To avoid damage due to weak insulation.** ✓
- D. To increase efficiency

Q30 Part B (Armature & Coil Winder)

Which of the following numbers has a square root that is irrational?

- A. 25
- B. 16
- C. 20** ✓
- D. 36

Q31 Part B (Armature & Coil Winder)

Which of the following is a disadvantage of a single-phase system compared with a three-phase system?

- A. It is more stable under heavy load
- B. It has lower losses
- C. It is better for large motors
- D. It delivers less power for the same current rating** ✓

Q32 Part B (Armature & Coil Winder)

A maintenance engineer must select a varnish for an emergency field rewinding repair of a three-phase AC motor at a remote site without access to baking equipment. Which varnish type is most suitable for rapid restoration of motor operation?

- A. Solventless epoxy impregnation varnish requiring specialized processing equipment for curing
- B. Air-drying shellac spirit varnish allowing rapid insulation drying under ambient conditions** ✓
- C. Thermosetting baking varnish requiring controlled heat curing for insulation hardening
- D. Oleoresinous baking varnish requiring prolonged thermal curing for impregnation stability

Q33 Part B (Armature & Coil Winder)

A technician is making a former for diamond winding used in a transformer. Which step is essential for achieving the desired coil shape?

- A. Maintaining uniform winding tension throughout the coil
- B. Applying a protective coating to the former surface
- C. Forming precise angles and dimensions at the coil corners** ✓
- D. Selecting thicker insulation material for the winding wire

Q34 Part B (Armature & Coil Winder)

Which statement correctly defines the function of a jig in electromechanical assembly and machining operations?

- A. Supporting rotating machine elements during machining operations
- B. Rigidly supporting the workpiece without guiding the cutting tool
- C. Temporarily applying holding force during assembly operations
- D. Securely holding the workpiece and accurately guiding the cutting tool** ✓



Q35 Part B (Armature & Coil Winder)

Which of the following best describes the dual role of stakes in sheet metal work?

- A. They serve as heating and bending tools
- B. They serve as cutting and welding tools
- C. They serve as measuring and marking tools
- D. They serve as supporting and forming tools ✓

Q36 Part B (Armature & Coil Winder)

Which operating condition produces positive voltage regulation in an alternator?

- A. Leading power factor load condition
- B. Zero excitation operating condition
- C. Lagging power factor load condition ✓
- D. No load open circuit condition

Q37 Part B (Armature & Coil Winder)

A vertical tower standing on level ground casts a shadow 15 m long when the angle of elevation of the Sun from the ground is 45°. Find the height of the tower.

- A. 15 m ✓
- B. 12 m
- C. 10 m
- D. 18 m

Q38 Part B (Armature & Coil Winder)

Which equipment is used to maintain controlled and uniform tension on the insulated winding wire during the stator rewinding process of a three-phase alternating current motor?

- A. Soldering station with insulated terminal attachments
- B. Manual wire pulling arrangement without tension control
- C. Wire reel stand equipped with an adjustable tensioning mechanism ✓
- D. Digital voltmeter configured for continuity measurement

Q39 Part B (Armature & Coil Winder)

Which fundamental law states the conversion of mechanical energy into electrical energy with reference to a DC generator?

- A. Coulomb's Law
- B. Faraday's Law of Electromagnetic Induction ✓
- C. Thermal Conduction
- D. Mechanical Resonance

Q40 Part B (Armature & Coil Winder)

A workshop uses $\frac{3}{5}$ m of wire for each identical coil. Find the total wire required to make 15 coils.

- A. 8 m
- B. 7 m
- C. 9 m ✓
- D. 6 m

Q41 Part B (Armature & Coil Winder)

Complete the statement: The working principle of a DC generator is based on _____.

- A. Electrostatic induction
- B. Mutual induction
- C. Electromagnetic induction ✓
- D. Self-induction

Q42 Part B (Armature & Coil Winder)

What is the main function of a single-phase transformer in an AC electrical circuit?

- A. To store electrical energy magnetically
- B. To generate AC voltage at fixed frequency
- C. To change AC voltage at the same frequency ✓
- D. To convert AC voltage into DC voltage

Q43 Part B (Armature & Coil Winder)

Which of the following is a direct benefit of implementing safety standards at work?

- A. Increased employee working hours during production
- B. Higher financial taxes imposed on company employees
- C. Reduced duration of scheduled employee lunch breaks
- D. Reduced likelihood of workplace injuries and accidents ✓

Q44 Part B (Armature & Coil Winder)

A technician performs insulation resistance testing on a single-phase induction motor using a Megger. Which set of measurements is correctly recorded in the insulation resistance table?

- A. Phase to neutral, phase to phase, and neutral to earth
- B. Armature to commutator, brush to spring, and shaft to body
- C. Body to starting winding, body to running winding, and between windings ✓
- D. Starter to fuse, switch to relay, and cable to terminal



Q45 Part B (Armature & Coil Winder)

Which maintenance step ensures a draw spike remains effective for pattern withdrawal?

- A. Moistening the surface before each use
- B. Keeping it straight and checking for wear
- C. Applying oil to the surface regularly
- D. Sharpening the tip and polishing regularly ✓

Q46 Part B (Armature & Coil Winder)

A 3-phase AC machine winding is designed with a coil span of 150 degrees electrical instead of 180 degrees. Which statement best describes the outcome?

- A. The fundamental EMF is increased substantially
- B. The third harmonic EMF is minimized in the output voltage ✓
- C. The phase sequence of the machine is reversed
- D. The winding resistance is reduced significantly

Q47 Part B (Armature & Coil Winder)

Which single-phase motor is preferred for sewing machines requiring high-speed operation?

- A. Squirrel cage motor
- B. Reluctance motor
- C. Universal motor ✓
- D. Shaded pole motor

Q48 Part B (Armature & Coil Winder)

Consider a 4-pole DC generator with a lap winding. If each parallel path carries 20 A, what is the total armature current?

- A. 60 A
- B. 80 A ✓
- C. 20 A
- D. 40 A

Q49 Part B (Armature & Coil Winder)

In a workshop, a technician receives a written instruction containing job details, quantity, and delivery date before starting work. What is this document called?

- A. Material return slip
- B. Attendance register
- C. Job order ✓
- D. Inspection tag

Q50 Part B (Armature & Coil Winder)

What is the purpose of name plate fixing during the Impregnation, Balancing, and Final Assembly stage of an electrical machine?

- A. To provide additional mechanical reinforcement for rotating and stationary assembly components
- B. To provide standardized equipment identification and rated operating specifications for the assembled electrical machine ✓
- C. To provide dynamic balancing correction for the rotating assembly during high-speed operation
- D. To provide supplementary electrical insulation between energized conductive machine components

Q51 Part B (Armature & Coil Winder)

Why is alternating voltage commonly generated in large power stations?

- A. Because rotating alternators naturally produce sinusoidal alternating emf ✓
- B. Because batteries directly produce alternating voltage
- C. Because alternating voltage produces no heating loss
- D. Because DC voltage cannot be converted into AC voltage

Q52 Part B (Armature & Coil Winder)

During manual coil winding handling procedures for a split-phase induction motor stator, which sequence correctly follows standard winding practice?

- A. Remove conductor insulation, wind all stator coils, and terminate end connections
- B. Start with the outermost coil, insert slot wedges, and wind remaining stator coils
- C. Wind the innermost coil first, continue with progressively larger coils, and bring out end connections ✓
- D. Insert insulating guide paper, wind all stator coils simultaneously, and clamp winding ends

Q53 Part B (Armature & Coil Winder)

In a purely capacitive AC circuit, what is the power factor value?

- A. 0 ✓
- B. 1
- C. -1
- D. 0.5



Q54 Part B (Armature & Coil Winder)

Which sequence correctly describes the standard order of making end connections during rewinding of a three-phase AC motor stator winding?

- A. First coil-group connections, then terminal lead connections, and finally inter-coil connections
- B. First terminal lead connections, then coil-group connections, and finally inter-coil connections
- C. First terminal lead connections, then inter-coil connections, and finally coil-group connections
- D. First inter-coil connections, then coil-group connections, and finally terminal lead connections

Q55 Part B (Armature & Coil Winder)

How is the correctness of a three-phase delta winding connection verified during the Final Assembly stage of rotating electrical machine manufacturing?

- A. By measuring winding resistance between each line terminal and a neutral connection point
- B. By confirming phase continuity and closed-loop electrical paths between all phase terminal pairs
- C. By measuring phase voltage between line terminals and an electrical neutral point
- D. By measuring insulation resistance between winding conductors and grounded machine body

Q56 Part B (Armature & Coil Winder)

Which action ensures minimal power consumption by the pressure coil in a dynamometer wattmeter during high-voltage measurements?

- A. Using a high resistance in series with the pressure coil
- B. Lowering the resistance of the coil
- C. Connecting a low resistance in parallel with the coil
- D. Reducing the number of turns in the coil

Q57 Part B (Armature & Coil Winder)

What does it indicate if an armature rotor, during static balancing, comes to rest at different angular positions after repeated free rolling?

- A. An additional balancing counterweight is required on the rotor
- B. The armature rotor is statically balanced
- C. Further static balancing correction is required on the rotor assembly
- D. The armature winding resistance distribution is electrically nonuniform

Q58 Part B (Armature & Coil Winder)

A drafter must select between vertical and inclined lettering. According to engineering drawing standards, what is the recommended angle for inclined lettering?

- A. Inclined at 60 degrees to the horizontal
- B. Inclined at 90 degrees to the horizontal
- C. Inclined at 75 degrees to the horizontal
- D. Inclined at 45 degrees to the horizontal

Q59 Part B (Armature & Coil Winder)

A Megger is an instrument which is used to measure _____.

- A. Insulation resistance
- B. Current
- C. Voltage
- D. Capacitance

Q60 Part B (Armature & Coil Winder)

Why is Insulation Resistance test performed before DC HiPot (High Potential) test on a DC machine winding?

- A. To calculate fixed losses
- B. To increase the test voltage
- C. To reduce testing time
- D. To ensure insulation can withstand high voltage

Q61 Part B (Armature & Coil Winder)

Which pre-rewinding test result most strongly indicates that the existing winding insulation of an AC motor has deteriorated to a condition requiring rewinding?

- A. Presence of electrical continuity across all winding terminals during continuity verification testing
- B. Stable conductor resistance value obtained during low-voltage resistance measurement testing
- C. Minor imbalance in phase winding resistance measured under ambient temperature conditions
- D. Significant reduction in insulation resistance value under specified direct voltage testing conditions



Q62 Part B (Armature & Coil Winder)

Which statement describes chlorinated hydrocarbons as used in electrical insulation?

- A. They are gaseous insulants commonly referred to as silicone oil.
- B. They are synthetic liquid insulants commercially called Askarel. ✓
- C. They are natural solid insulants used as mineral oil.
- D. They are ceramic-based insulants known as mica.

Q63 Part B (Armature & Coil Winder)

Why is Aluminium less preferred than Copper for DC machine windings?

- A. Higher melting point
- B. Higher resistivity ✓
- C. Lower density
- D. Better conductivity

Q64 Part B (Armature & Coil Winder)

Complete the following statement with regards to DC machine.

Wave winding is used for _____.

- A. high voltage, low current applications ✓
- B. low voltage, high current applications
- C. only high current applications
- D. low speed machines

Q65 Part B (Armature & Coil Winder)

What does a symbol with a circle and a cross inside usually indicate in an electrical schematic?

- A. Lamp ✓
- B. Fuse
- C. Resistor
- D. Ground

Q66 Part B (Armature & Coil Winder)

An alternator has total losses of 8 kW when supplying an output of 192 kW. What is the efficiency of the alternator?

- A. 94%
- B. 96% ✓
- C. 92%
- D. 98%

Q67 Part B (Armature & Coil Winder)

Which condition defines a balanced load in a three-phase electrical system?

- A. All phase currents have equal magnitude and are 120 degrees apart ✓
- B. All phase currents are unequal and randomly phased
- C. One phase has zero current while others have current
- D. All phase currents are in phase with each other

Q68 Part B (Armature & Coil Winder)

Which of the following options defines a fractional horsepower (FHP) motor?

- A. A motor rated below one Watt output power
- B. A motor operating above 1000 r.p.m speed only
- C. A motor rated below one horsepower output power ✓
- D. A motor operating only with direct current supply

Q69 Part B (Armature & Coil Winder)

In wave winding, what is the consequence if the front and back pitches are not odd numbers?

- A. Improper commutation ✓
- B. Increased voltage
- C. Better efficiency
- D. Reduced speed

Q70 Part B (Armature & Coil Winder)

What is the primary purpose of using an MCB (Miniature Circuit Breaker) in an electrical wiring system?

- A. To provide backup power during outages
- B. To control the current flow during normal operation
- C. To increase the voltage supplied to devices
- D. To automatically switch off electrical supply in case of overload or short circuit ✓

Q71 Part B (Armature & Coil Winder)

A 24 V battery is connected in series with 3 Ω and 5 Ω resistors. Calculate the power dissipated by the 5 Ω resistor.

- A. 72 watts
- B. 24 watts
- C. 60 watts
- D. 45 watts ✓



Q72 Part B (Armature & Coil Winder)

How does vacuum pressure impregnation of stator or rotor windings contribute to the long-term reliability of electrical machinery?

- A. By actively controlling the operating temperature of the electrical machine
- B. By increasing the physical cross-sectional area of the conductor windings
- C. By reducing the manufacturing assembly time of the electrical machine
- D. By preventing moisture ingress, improving insulation bonding, and reducing partial discharge within windings ✓

Q73 Part B (Armature & Coil Winder)

During stator rewinding of a three-phase alternating current induction motor, what is the primary function of the guide paper inserted inside stator slots before coil placement?

- A. To increase magnetic flux density within the stator core structure
- B. To provide an electrically conductive path between adjacent stator slot surfaces
- C. To prevent mechanical abrasion of winding conductors during coil insertion into stator slots ✓
- D. To provide a thermal cooling medium for stator winding heat dissipation

Q74 Part B (Armature & Coil Winder)

When treating a suspected fracture at work, which basic first aid action should be avoided?

- A. Immobilize the injured limb with a splint
- B. Call for professional medical help promptly
- C. Support the area above and below the injury
- D. Attempt to realign the bone manually at that moment ✓

Q75 Part B (Armature & Coil Winder)

Which of the following best describes a regular hexagon as used in the engineering drawing of geometrical figures?

- A. A six-sided polygon with only opposite sides equal
- B. A six-sided polygon with equal sides but unequal angles
- C. A six-sided polygon with equal sides and equal angles ✓
- D. A six-sided polygon with unequal sides

