



RRB JE 2024 CBT-2 Electrical

Junior Engineer · Electrical Engineering · CEN 03/2024 · CBT-2 · Question Paper

English

All 3 Shifts (Sets) · Official Answer Key

About this Compilation

This booklet contains all **3 shift papers** of the **RRB JE 2024 CBT-2 (Electrical Engineering)** examination in **English**, with the correct option marked as per the official answer key.

✓ Correct option (highlighted green)

Paper short in the source: 04 Jun 2025 shift. Only 144 of its 150 questions are saved (General Abilities 47 of 50, Technical Abilities 97 of 100); the 6 missing questions are not in any edition we hold, so that set prints 144 questions. The two 22 Apr 2025 shifts are complete.

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

22 Apr 2025
9:00 AM - 11:00 AM

Set 3

04 Jun 2025
9:00 AM - 11:00 AM

Set 2

22 Apr 2025
2:30 PM - 4:30 PM

General Abilities

50 Questions • Answer Key

Q1 General Abilities

Which of the following is NOT a source of collection of municipal solid waste?

- A. Waste from hospitals
- B. Radioactive waste ✓
- C. Waste from homes
- D. Waste from schools

Q2 General Abilities

Due to global warming, the temperature of the earth has increased by _____

- A. 0.6°C ✓
- B. 0.7°C
- C. 0.5°C
- D. 0.8°C

Q3 General Abilities

What happens when you click on the 'Forward' button in an email?

- A. The original message is copied into a new email draft. ✓
- B. The email is permanently deleted.
- C. The email is automatically sent to all contacts.
- D. A blank email opens.

Q4 General Abilities

Who among the following established the Bengal Chemical Swadeshi Stores?

- A. Dadabhai Naoroji
- B. Surendranath Banerjee
- C. Acharya PC Ray ✓
- D. BG Tilak

Q5 General Abilities

A solution is prepared by dissolving 40 g of NaCl in 200 g of water. What is the mass per cent of NaCl in the solution?

- A. 20%
- B. 45%
- C. 16.67% ✓
- D. 25%

Q6 General Abilities

What is the primary function of a computer firewall?

- A. To detect and remove computer viruses
- B. To prevent unauthorised access to a private network ✓
- C. To store user passwords securely
- D. To speed up internet connectivity

Q7 General Abilities

The people of _____ were famously involved in execution of the Chipko movement.

- A. Delhi
- B. Assam
- C. Garhwal Himalayas ✓
- D. Gujarat

Q8 General Abilities

Which operating system is known for its open-source nature and community-driven development for desktops and laptops?

- A. Windows
- B. Linux ✓
- C. macOS
- D. iOS

Q9 General Abilities

For the protection and improvement of the environmental quality, the Environment Protection Act came into force in the year _____.

- A. 1972
- B. 1992
- C. 1984
- D. 1986 ✓



Q10 General Abilities

In an aquatic ecosystem, the phenomenon of biomagnification can best be studied in the case of _____.

- A. phosphates
- B. chlorine
- C. DDT
- D. organochlorine

Q11 General Abilities

A metal wire is stretched, but it does not break easily. This property is known as:

- A. brittleness
- B. ductility
- C. hardness
- D. malleability

Q12 General Abilities

The wavelength of ultraviolet radiations which is most powerful and causes damage to the DNA is _____.

- A. UV-D
- B. UV-A
- C. UV-B
- D. UV-C

Note on the key: answer shown as per the official RRB key (UV-B). Strictly, UV-C (100-280 nm) has the shortest wavelength and highest energy and damages DNA the most, but the ozone layer absorbs it; UV-B is the most harmful UV that reaches the Earth's surface and damages DNA (NCERT Class 12 Biology, 2014 reprint, Ch. 16 'Environmental Issues', p. 283).

Q13 General Abilities

Where can one find the option to change a PowerPoint template?

- A. View → Slide Master
- B. Home → Layout
- C. Insert → Themes
- D. Design → Themes

Q14 General Abilities

The power to issue an ordinance when Parliament is NOT in session is given to the President under which Article?

- A. Article 123
- B. Article 356
- C. Article 72
- D. Article 110

Q15 General Abilities

A sound wave with a low frequency will have _____.

- A. a short wavelength
- B. a high pitch
- C. a low pitch
- D. a low amplitude

Q16 General Abilities

Which of the following correctly differentiates mixtures and compounds?

Feature

- A. Option C (Properties) is correct
- B. Option A (Separation) is correct
- C. Option D (Formation) is correct
- D. Option B (Composition) is correct

Q17 General Abilities

Who among the following developed the notation system for Hindustani classical music?

- A. Ustad Amjad Ali Khan
- B. Pandit Ravi Shankar
- C. Ustad Bismillah Khan
- D. Pandit Vishnu Narayan Bhatkhande

Q18 General Abilities

Which country proposed the idea of holding a United Nations conference on human interactions with the environment in 1968?

- A. Canada
- B. France
- C. United States
- D. Sweden



Q19 General Abilities

In January 2025, India launched the NVS-02 satellite to strengthen which of the following navigation systems?

- A. Galileo
- B. Global Navigation Satellite System (GLONASS)
- C. Navigation with Indian Constellation (NavIC) ✓
- D. Global Positioning System (GPS)

Q20 General Abilities

Which type of RAM is faster and DOES NOT require refreshing?

- A. SRAM ✓
- B. Flash Memory
- C. ROM
- D. DRAM

Q21 General Abilities

Which German optical technology firm inaugurated its first Global Capability Centre in Bengaluru in November 2024, with plans to double its workforce within three years?

- A. Leica
- B. Jenoptik
- C. Schneider Kreuznach
- D. Carl Zeiss AG ✓

Q22 General Abilities

The President has the power to dissolve which house of Parliament?

- A. Legislative Assembly
- B. Both Rajya Sabha and Lok Sabha
- C. Lok Sabha only ✓
- D. Rajya Sabha only

Q23 General Abilities

Who among the following referred to the Directive Principles as the 'life-giving provisions' of the Constitution of India?

- A. LM Singhvi ✓
- B. HM Seervai
- C. Ivor Jennings
- D. BR Ambedkar

Q24 General Abilities

A car moving at a constant speed of 123 km/hr along a straight road is an example of _____.

- A. non-uniform motion
- B. random motion
- C. rotational motion
- D. uniform motion ✓

Q25 General Abilities

Who among the following Indian female cricketers won the Best International Cricketer Award (Women) at the BCCI Naman Awards 2025?

- A. Harmanpreet Kaur
- B. Jhulan Goswami
- C. Mithali Raj
- D. Smriti Mandhana ✓

Q26 General Abilities

Which of the following options is NOT a greenhouse gas?

- A. Nitrous oxide
- B. Carbon tetrachloride ✓
- C. Carbon dioxide
- D. Methane

Q27 General Abilities

The atomic mass of sulphur is 32 u, and sulphur exists as S_8 molecules. What is the molecular mass of sulphur?

- A. 128 u
- B. 32 u
- C. 64 u
- D. 256 u ✓

Q28 General Abilities

An alloy is considered a homogeneous mixture because:

- A. it contains two or more phases
- B. its components can be separated by filtration
- C. its components are chemically combined in fixed proportions
- D. it exhibits uniform composition throughout ✓



Q29 General Abilities

The kinetic energy of an object is derived using which of the following equations of motion?

- A. $v = u + at$
- B. $a = (v - u) / t$
- C. $v^2 - u^2 = 2as$ ✓
- D. $s = ut + \frac{1}{2}at^2$

Q30 General Abilities

Which of the following MS Excel functions is used to convert a numeric value into a text with a specific format?

- A. TEXT() ✓
- B. VALUE()
- C. FORMAT()
- D. NUMBERTOTEXT()

Q31 General Abilities

What is the general orientation of the Himalayan ranges in the northwestern part of India?

- A. Northeast to Southwest
- B. Northwest to Southeast ✓
- C. East-South
- D. South-North

Q32 General Abilities

An object is placed 15 cm in front of a convex lens of focal length 25 cm. The image distance will be ____.

- A. 17.5 cm
- B. -37.5 cm ✓
- C. -9.37 cm
- D. -10.0 cm

Q33 General Abilities

Who is known as the leader of the Green Revolution in India?

- A. Prof. MS Swaminathan ✓
- B. Tribhuvandas Kishibhai Patel
- C. Dr. Rajendra Prasad
- D. C Subramaniam

Q34 General Abilities

Which formula should be entered in cell C2 to multiply the values of cells A2 and B2 in Excel?

- A. =A2*B2 ✓
- B. =A2-B2
- C. =MULTIPLY(A2,B2)
- D. =A2+B2

Q35 General Abilities

A ball of mass 50 grams is moving with a velocity of 15 m/s. What is its kinetic energy?

- A. 5.625 J ✓
- B. 7.500 J
- C. 1.875 J
- D. 3.750 J

Q36 General Abilities

Which of the following will increase the heat produced by a heating element?

- A. Using a wire of lower resistance
- B. Decreasing the applied voltage
- C. Using a material with high conductivity
- D. Increasing the current flowing through the wire ✓

Q37 General Abilities

What does LAN stand for?

- A. Limited Access Node
- B. Local Area Network ✓
- C. Large Area Network
- D. Linked Access Network

Q38 General Abilities

Why do covalent compounds generally have low melting and boiling points?

- A. They have weak intermolecular forces. ✓
- B. They have strong electrostatic forces.
- C. They have a rigid lattice structure.
- D. They contain metallic bonds.



Q39 General Abilities

Which of the following bridges is constructed over the Brahmaputra River in India?

- A. Howrah Bridge
- B. Pamban Bridge
- C. Dhola-Sadiya Bridge ✓
- D. Mahatma Gandhi Setu

Q40 General Abilities

Which function key is used to move text or graphics in a document?

- A. F2 ✓
- B. F1
- C. F5
- D. F12

Q41 General Abilities

A concave lens has a focal length of -2 cm. What is its power?

- A. 0.5 D
- B. -0.5 D
- C. -50 D ✓
- D. 25 D

Q42 General Abilities

What happens to the pH of pure water when a few drops of lemon juice are added?

- A. The pH decreases ✓
- B. The pH becomes neutral
- C. The pH remains the same
- D. The pH increases

Q43 General Abilities

Radiations that are emitted from nuclear wastes are known to cause _____ at a high rate.

- A. syndromes
- B. emotional defects
- C. mutations ✓
- D. diseases

Q44 General Abilities

Which of the following is NOT toxic to non-target organisms in the soil?

- A. Organic fertilisers ✓
- B. Herbicides
- C. Fungicides
- D. Pesticides

Q45 General Abilities

In which of the following events did Deepthi Jeevanji set a world record at the 2024 World Para Athletics Championships?

- A. 400 metres T20 ✓
- B. 200 metres T20
- C. 600 metres T20
- D. 100 metres T20

Q46 General Abilities

What is the primary function of a firewall tool in a computer network?

- A. To monitor and control incoming and outgoing network traffic ✓
- B. To store data securely
- C. To speed up internet connections
- D. To detect and remove viruses

Q47 General Abilities

The main reason for which we are dependent on air is our _____.

- A. digestion
- B. excretion
- C. osmoregulation
- D. respiration ✓

Q48 General Abilities

Which of the following was NOT an artisan guild during the Mauryan period?

- A. Potters
- B. Carpenters
- C. Astrologers ✓
- D. Bankers and Merchants



Q49 General Abilities

Electricity production is categorised under which of the following economic sectors?

- A. Quaternary sector
- B. Primary sector
- C. Secondary sector ✓
- D. Tertiary sector

Q50 General Abilities

Which of the following elements has an atomic number of 8?

- A. Hydrogen
- B. Nitrogen
- C. Oxygen ✓
- D. Carbon

Technical Abilities

100 Questions • Answer Key

Q51 Technical Abilities

What is the bias stability factor (S) for a fixed bias circuit?

- A. $S = (1 + \beta)$ ✓
- B. $S = (1 + \beta) / (1 + \beta + \beta^2)$
- C. $S = \beta / (1 + \beta)$
- D. $S = 1 / (1 + \beta)$

Q52 Technical Abilities

Fleming's Right-Hand Rule is used to determine the direction of:

- A. the induced electromotive force ✓
- B. magnetic field around a conductor
- C. force on a charged particle
- D. current flowing through a conductor

Q53 Technical Abilities

In Lambert's Cosine Law, the angle θ is measured between:

- A. horizontal and vertical plane
- B. source and observer
- C. reflected light and normal
- D. incident light and normal ✓

Q54 Technical Abilities

What is the purpose of a closed feeder ring in an interconnected system?

- A. To create a looped power supply network ✓
- B. To disconnect substations from each other
- C. To prevent power distribution
- D. To reduce voltage stability

Q55 Technical Abilities

In a Star-Delta Starter used for induction motors, the starting torque is reduced to approximately:

- A. 50% of full-load torque
- B. 33% of full-load torque ✓
- C. 66% of full-load torque
- D. 75% of full-load torque

Q56 Technical Abilities

Read the given Assertion (A) and Reason (R) carefully and select the correct option.

(A): Weakening of springs in PMMC is due to aging and temperature.
(R): Permanent magnets used in PMMC instruments tend to lose their strength over time.

- A. Both A and R are true, but R is not the correct explanation of A. ✓
- B. A is false, but R is true
- C. A is true, but R is false.
- D. Both A and R are true, and R is the correct explanation of A.

Q57 Technical Abilities

Why is voltage drop analysis important in an AC distribution system?

- A. To ensure voltage levels remain within acceptable limits ✓
- B. To reduce the system frequency
- C. To increase power losses
- D. To increase resistance in the conductors



Q58 Technical Abilities

The total collector current for a BJT operating in the active region is given by the relation _____ and the leakage current component is _____.

- A. $I_c = I_c(\text{majority}) + I_{co}(\text{minority})$; majority carrier component
- B. $I_c = I_{co}(\text{minority})$; majority carrier component
- C. $I_c = I_c(\text{majority})$; minority carrier component
- D. $I_c = I_c(\text{majority}) + I_{co}(\text{minority})$; minority carrier component ✓

Q59 Technical Abilities

Read the given Assertion (A) and Reason (R) carefully and select the correct option.

(A): The burden of an instrument transformer is usually expressed in volt-amperes (VA).

(R): Burden is the total impedance of the connected devices, including meters, relays, and wiring.

- A. Both A and R are true and R is the not the correct explanation of A. ✓
- B. A is false, but R is true.
- C. A is true, but R is false.
- D. Both A and R are true and R is the correct explanation of A.

Q60 Technical Abilities

Which of the following is characteristic of soft magnetic materials?

- A. Low relative permeability
- B. Large hysteresis loss
- C. Low absolute permeability
- D. Low coercivity ✓

Q61 Technical Abilities

When armature conductors carry a lower load current, the armature's MMF (magnetomotive force) causes:

- A. no effect on the main field flux
- B. the main field flux to strengthen
- C. a cross-magnetising effect ✓
- D. an increase in the induced emf

Q62 Technical Abilities

The collector to bias circuit in BJT has better stability than fixed bias circuit as _____.

- A. it can operate on higher power than fixed bias circuit
- B. its stability factor is lower than that of fixed bias ✓
- C. its stability factor is higher than that of fixed bias
- D. it can operate on higher supply voltages than that of fixed bias circuit

Q63 Technical Abilities

A nuclear reactor produces 3.2×10^{10} J of energy per second. How many fissions occur per second if each fission releases 200 MeV?

- A. 10^{19}
- B. 10^{10}
- C. 10^{11}
- D. 10^{21} ✓

Q64 Technical Abilities

Which of the following is NOT an advantage of a PMMC instrument?

- A. Linear scale
- B. Suitable for AC and DC measurements ✓
- C. High accuracy
- D. Low power consumption

Q65 Technical Abilities

How can polarity in transformers be verified?

- A. By conducting a short circuit test
- B. By using a voltmeter to measure the voltage difference ✓
- C. By measuring the input current
- D. By checking the voltage across the secondary winding

Q66 Technical Abilities

If the power factor of a three-phase system is 0.8, and the apparent power is 10 kVA, then what is the active power?

- A. 12 kW
- B. 6 kW
- C. 8 kW ✓
- D. 10 kW



Q67 Technical Abilities

Which of the following components is responsible for atomising the fuel in a diesel engine?

A. Injector



B. Turbocharger

C. Fuel pump

D. Carburetor

Q68 Technical Abilities

In a transformer, if the frequency of the supply voltage is increased, what happens to the induced voltage?

A. It decreases

B. It increases



C. It remains the same

D. It becomes zero

Q69 Technical Abilities

In a three-phase star-connected system with a neutral shift, how can the problem be corrected?

A. By disconnecting the neutral wire

B. By increasing the neutral wire resistance

C. By increasing the phase voltage

D. By balancing the load among the three phases

**Q70 Technical Abilities**

Which of the following best describes the role of cogeneration in energy conservation and how the application of a tariff system can help reduce energy bills?

A. Cogeneration increases energy consumption by producing excess electricity, and tariff systems are used to penalize high energy users without reducing bills.

B. Cogeneration and tariff systems are unrelated concepts, and neither contributes to energy conservation or cost reduction.

C. Cogeneration reduces energy waste by simultaneously producing electricity and useful thermal energy, while a well-designed tariff system incentivizes off-peak energy usage, lowering overall costs.



D. Cogeneration is only applicable in large industrial settings and has no impact on energy conservation, while tariff systems are solely used for revenue generation by utilities.

Q71 Technical Abilities

Calculate the potential difference of an energy source that provides 6.8 J for every milli-coulomb of charge that it delivers.

A. 0.68 V

B. 6.8 mV

C. 6.8 V

D. 6.8 kV

**Q72 Technical Abilities**

What is the primary purpose of estimation and costing in unit earthing for commercial installations?

A. To focus only on the decorative aspects of the installation

B. To determine the materials, labour and costs required for a safe and effective earthing system



C. To eliminate the need for earthing in electrical systems

D. To ensure the earthing system is aesthetically pleasing

Q73 Technical Abilities

Which of the following materials should NOT be placed in a microwave oven?

A. Aluminium foil



B. Plastic

C. Glass

D. Paper

Q74 Technical Abilities

In an auto transformer, if the voltage transformation ratio is 2 : 1, what is the ratio of the primary current to the secondary current?

A. 2 : 3

B. 1 : 2



C. 1 : 1

D. 2 : 1

Q75 Technical Abilities

The luminous intensity of a source emitting light uniformly in all directions of 10 lumens per steradian is:

A. 5 candela

B. 1 candela

C. 20 candela

D. 10 candela



Q76 Technical Abilities

The luminous intensity of a light source is defined as the luminous flux per unit:

- A. length
- B. solid angle
- C. volume
- D. area

Q77 Technical Abilities

A composite magnetic circuit consisting of three different magnetic material of different permeability are joined in the form of a ring. The total reluctance is:

- A. the sum of individual reluctances.
- B. inverse of the sum of individual reluctances
- C. thrice the reluctance of material 1
- D. the product of individual reluctances

Q78 Technical Abilities

The EMF equation of a transformer is given by:

- A. $E = 4.44f^2\phi N$
- B. $E = 4.44fN\phi$
- C. $E = 4.44NA\phi$
- D. $E = 4.44fNA\phi$

Q79 Technical Abilities

The difference between Capacity Factor and Load Factor represents _____.

- A. the plant's reserve capacity for future load growth
- B. the total energy consumed by the plant
- C. the maximum demand of the plant
- D. the plant's efficiency in converting fuel to electricity

Q80 Technical Abilities

Why is an electrodynamicometer-type wattmeter used as a standard instrument in laboratories?

- A. It has high accuracy and precision.
- B. It works only for low-power circuits.
- C. It is cheaper than other wattmeters.
- D. It requires no external power supply.

Q81 Technical Abilities

If the quality factor (Q) of a resonant series circuit increases, then what happens to the voltage magnification?

- A. It increases because energy losses decrease.
- B. It decreases because resistance increases.
- C. It remains the same because supply voltage is constant.
- D. It becomes zero because resonance cancels the reactance.

Q82 Technical Abilities

The direction of the induced EMF in a coil may be found with the help of:

- A. Steinmetz's law
- B. Fleming's left-hand rule
- C. Fleming's right-hand rule
- D. Faraday's law

Q83 Technical Abilities

Universal motors exhibit high starting torque due to _____.

- A. series connection of stator and rotor windings
- B. shunt winding configuration
- C. permanent magnet stators
- D. use of squirrel-cage rotors

Q84 Technical Abilities

In j-notation, used in phasor representation, the imaginary unit j^2 represents ____.

- A. 1
- B. -1
- C. $\sqrt{-1}$
- D. 0

Q85 Technical Abilities

The capacitance of a parallel plate capacitor depends upon:

- A. separation between plates
- B. type of metal used
- C. potential difference between plates
- D. thickness of plates



Q86 Technical Abilities

During the no-load test of a transformer, the secondary winding is:

- A. connected in parallel with the primary winding
- B. connected to a load
- C. short-circuited
- D. open-circuited ✓

Q87 Technical Abilities

Which connection method is correct when using a CT and PT with a wattmeter?

- A. CT is connected in series with the wattmeter current coil, and PT is connected in parallel with the voltage coil. ✓
- B. Both CT and PT are connected in series with the wattmeter.
- C. Both CT and PT are connected in parallel with the wattmeter.
- D. CT is connected in parallel with the wattmeter current coil, and PT is connected in series with the voltage coil.

Q88 Technical Abilities

Why does Kelvin's Law give different conductor sizes for two identical systems?

- A. Because one system uses overhead lines and the other uses underground cables
- B. Due to variations in interest rates, depreciation, and energy costs ✓
- C. Because the electrical load is different in both systems
- D. Because the resistance of conductors is always changing

Q89 Technical Abilities

Which of the following is a common internal fault in transformers?

- A. Excessive cooling system efficiency
- B. High power factor leading to overheating
- C. Winding inter-turn short circuits ✓
- D. Overvoltage due to lightning strikes

Q90 Technical Abilities

Which control method enables four-quadrant operation of induction motors?

- A. Direct On-Line (DOL) starting
- B. Rotor resistance control
- C. Stator voltage control
- D. Variable Frequency Drive (VFD) ✓

Q91 Technical Abilities

Which factor does NOT affect the starting torque of an induction start synchronous motor?

- A. Field excitation during startup ✓
- B. Rotor resistance
- C. Supply voltage
- D. Rotor reactance

Q92 Technical Abilities

How does the starting torque of a split-phase motor compare with that of a shaded-pole motor?

- A. Split-phase motors have higher starting torque. ✓
- B. Both have similar starting torque.
- C. Shaded-pole motors have higher starting torque.
- D. Split-phase motors have no starting torque.

Q93 Technical Abilities

A 0.5Ω shunt resistor is used to measure current with a CRO. If the measured voltage drop is 5V, what is the current?

- A. 20 A
- B. 2.5 A
- C. 5 A
- D. 10 A ✓

Q94 Technical Abilities

Which underground cable laying method requires re-excavation for load expansion, making modifications costly?

- A. Trough Laying ✓
- B. Overhead System
- C. Draw-in System
- D. Direct Laying



Q95 Technical Abilities

In a synchronous motor, If the load angle exceeds 90° , then the motor will:

- A. operate at leading power factor
- B. increase efficiency
- C. reduce copper losses
- D. lose synchronism and stall ✓

Q96 Technical Abilities

In a series RLC circuit, the total impedance is minimum when _____.

- A. the resistance is zero
- B. $X_L = X_C$ ✓
- C. $X_L > X_C$
- D. $X_L < X_C$

Q97 Technical Abilities

Stray load losses in synchronous motors are caused by _____.

- A. high rotor inertia
- B. poor lubrication in bearings
- C. leakage fluxes and harmonic effects ✓
- D. excessive field excitation

Q98 Technical Abilities

Electric Arc Welding is a type of:

- A. resistance welding
- B. fusion welding ✓
- C. pressure welding
- D. solid-state welding

Q99 Technical Abilities

What will be the voltage relationship of frequency domain relation for inductor having time domain $v(t) = L di/dt$?

- A. $V(s) = LsI(s)$
- B. $V(s) = LI(s) - Li(0)$
- C. $V(s) = LI(s)$
- D. $V(s) = LsI(s) - Li(0)$ ✓

Q100 Technical Abilities

Shaded pole motors are ideal for _____.

- A. high-vibration environments
- B. low-power, continuous-duty applications ✓
- C. intermittent heavy-load tasks
- D. precision speed control

Q101 Technical Abilities

In relay terminology, what does the term 'pickup value' refer to?

- A. The maximum current a relay can withstand without damage
- B. The time delay before the relay operates after detecting a fault
- C. The minimum value of the operating quantity (current, voltage, etc.) required to activate the relay ✓
- D. The voltage level at which the relay resets after a fault is cleared

Q102 Technical Abilities

In a transformer, the efficiency can be calculated with reasonable accuracy by knowing:

- A. the rated power
- B. the short-circuit current
- C. the input and output voltage
- D. the losses (core and copper losses) ✓

Q103 Technical Abilities

Which of the following is a commonly used light source in modern street light installations?

- A. Incandescent bulbs
- B. Fluorescent tubes
- C. High-Pressure Sodium (HPS) lamps ✓
- D. Candles

Q104 Technical Abilities

Which of the following is a critical factor in the installation and estimation of agricultural pumps and flourmills?

- A. Focusing only on the mechanical components of the system
- B. Ignoring the load characteristics to simplify the design
- C. Calculating the power requirements and selecting appropriate protective devices ✓
- D. Ensuring the system operates without any protective devices



Q105 Technical Abilities

What is a key factor in the installation and costing of electrical systems for commercial buildings?

- A. Focusing only on decorative lighting and aesthetics
- B. Ensuring compliance with electrical codes and standards while estimating materials and labour costs ✓
- C. Ignoring safety standards to reduce costs
- D. Eliminating the use of protective devices

Q106 Technical Abilities

Which of the following statements is NOT correct regarding the errors in a Potential Transformer?

- A. Voltage measurement in a Potential Transformer depends primarily on Ratio error.
- B. Power angle error alone affects Voltage measurement in a Potential Transformer. ✓
- C. Both Power angle error and Ratio error are important for measuring Voltage.
- D. Both Power angle error and Ratio error influence Power measurement.

Q107 Technical Abilities

What is the primary purpose of 'Inter-Turn Fault Protection' in an alternator?

- A. To protect against earth faults in the rotor winding
- B. To monitor the voltage imbalance in the alternator
- C. To detect faults between adjacent turns of the stator winding ✓
- D. To detect faults between the rotor and stator windings

Q108 Technical Abilities

The 'π (Pi) Model' or the 'T Model' is commonly used to represent which type of transmission line?

- A. Medium transmission line (80 km to 160 km) ✓
- B. Long transmission line (more than 160 km)
- C. Ultra-high voltage transmission line (above 1000 km)
- D. Short transmission line (less than 80 km)

Q109 Technical Abilities

Which type of transformer is best suited for applications that require a low leakage reactance?

- A. Laminated type transformer
- B. Core type transformer
- C. Shell type transformer ✓
- D. Ring type transformer

Q110 Technical Abilities

Magnetic fringing can be minimised by:

- A. reducing the air gap ✓
- B. scattering the magnetic flux
- C. using low quality magnetic material
- D. decreasing the temperature

Q111 Technical Abilities

With reference to energy band diagram of the NPN BJT, there exist _____ space charge regions and maximum band bending at _____ junction.

- A. two; base emitter ✓
- B. two; base collector
- C. three; base collector
- D. three; base emitter

Q112 Technical Abilities

What law explains the induction of eddy currents in the armature core?

- A. Ohm's Law
- B. Lenz's Law
- C. Ampere's Law
- D. Faraday's Law ✓

Q113 Technical Abilities

In Shunt Zener diode voltage regulator circuit, the purpose of the resistor (R) connected in series with the input voltage is:

- A. to filter out noise and ripples in the output voltage
- B. to limit the current through the Zener diode ✓
- C. to amplify the input voltage
- D. to add the input voltage and voltage drop across the resistor R and provide it to the Zener diode

Q114 Technical Abilities

Which of the following is NOT a condition for the parallel operation of transformers?

- A. Same polarity
- B. Same per unit impedance
- C. Same voltage ratio
- D. Same core material ✓



Q115 Technical Abilities

What is the role of heliostats in a power tower system?

- A. To convert thermal energy into electrical energy
- B. To generate electricity directly
- C. To track the Sun and direct sunlight to the receiver ✓
- D. To store solar energy for later use

Q116 Technical Abilities

What is the purpose of '100% Stator Earth Fault Protection' in an alternator?

- A. To detect and protect against earth faults occurring anywhere in the stator winding ✓
- B. To monitor the voltage regulation of the alternator
- C. To detect and protect against phase-to-phase faults in the stator winding
- D. To protect the rotor winding from overheating

Q117 Technical Abilities

Consider a fixed bias circuit using a NPN BJT transistor in CE configuration along with base resistance R_b , collector resistance R_c and supply voltage V_{cc} . If β is the current gain of the BJT, then the stability factor of the fixed bias circuit is:

- A. directly proportional to β ✓
- B. inversely proportional to β
- C. independent of β
- D. inversely proportional to square of β

Q118 Technical Abilities

For a P-N junction diode, as the temperature increases the forward knee voltage of the diode _____ and the reverse saturation current _____.

- A. decreases; increases ✓
- B. decreases; decreases
- C. increases; decreases
- D. increases; increases

Q119 Technical Abilities

Which of the following is a key characteristic of a slip ring induction motor?

- A. Low starting torque and high starting current
- B. High efficiency at all loads
- C. High starting torque and low starting current ✓
- D. Operates only at synchronous speed

Q120 Technical Abilities

Identify the correct statement related to switching speed of the BJT.

- A. Switching speed of BJT is less compared to switching speed on a MOSFET. ✓
- B. BJT is an amplifying device and hence cannot work as a switch. Therefore, switching speed parameter does not exist for a BJT.
- C. Switching speed of BJT is equal to switching speed on a MOSFET.
- D. Switching speed of BJT is greater than switching speed on a MOSFET.

Q121 Technical Abilities

Which of the following is the commonly used generator in a DC welding machine?

- A. Permanent magnet generator
- B. Compound generator ✓
- C. Series generator
- D. Shunt generator

Q122 Technical Abilities

In Norton's Theorem, the equivalent circuit consists of _____.

- A. a voltage source in series with a resistor
- B. a voltage source in parallel with a resistor
- C. a current source in series with a resistor
- D. a current source in parallel with a resistor ✓

Q123 Technical Abilities

Which of the following statements is NOT correct regarding the vector method in AC circuit analysis?

- A. The vector method helps in determining the phase difference between voltage and current.
- B. The vector method is used to represent sinusoidal AC quantities.
- C. Phasor diagrams are used to solve AC circuit problems involving impedance.
- D. Phasors in the vector method rotate in a clockwise direction in the complex plane. ✓



Q124 Technical Abilities

Which of the following is an example of a constant load application for a DC shunt generator?

- A. DC arc welding
- B. Electric motor
- C. Induction heating
- D. Centrifugal pump

**Q125 Technical Abilities**

How many types of heating elements are commonly used in electric irons?

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

**Q126 Technical Abilities**

Why are short-pitch windings preferred in alternators despite their lower induced EMF per coil?

- A. They allow for higher voltage ratings.
- B. They eliminate the need for insulation.
- C. They increase the length of end connections.
- D. They increase the overall efficiency.

**Q127 Technical Abilities**

A power system with a high reactive power demand will result in ____.

- A. low power factor
- B. no change in power factor
- C. high power factor
- D. unity power factor

**Q128 Technical Abilities**

For simple fixed bias BJT in common emitter configuration using NPN transistor, base resistance R_b , collector resistance R_c and supply voltage V_{cc} , the base current _____ with increase in R_b and the emitter current _____.

- A. decreases; increases
- B. decreases; decreases
- C. increases; increases
- D. increases; decreases

**Q129 Technical Abilities**

If the frequency of a series R-C circuit is increased, what happens to the capacitive reactance X_C ?

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

**Q130 Technical Abilities**

In a biomass power plant, what is the main purpose of the combustion/gasification chamber?

- A. To burn biomass or convert it into syngas for energy generation
- B. To distribute electricity to the grid
- C. To store biomass for future use
- D. To cool down the system after power generation

**Q131 Technical Abilities**

What is the main drawback of using an induction generator in a grid-connected wind turbine?

- A. It is not suitable for wind energy applications.
- B. It cannot operate at high speeds.
- C. It cannot generate active power.
- D. It requires external reactive power from the grid.

**Q132 Technical Abilities**

Winding in wire wound resistor is made up of _____.

- A. Nickel
- B. Nickel-chromium alloy
- C. Carbon
- D. Chromium cobalt

**Q133 Technical Abilities**

The eddy current loss in a transformer is caused by:

- A. resistance of the primary winding
- B. circulating currents within the core due to changing magnetic flux
- C. voltage drop across the windings
- D. saturation of the core material



Q134 Technical Abilities

Which of the following statements regarding active power in AC circuits is INCORRECT?

- A. The unit of active power is Watt (W).
- B. Active power is given by $P=VI\sin\phi$ in an AC circuit. ✓
- C. Active power increases with an increase in power factor.
- D. Active power is the real power consumed by the circuit.

Q135 Technical Abilities

In the torque-load characteristic curve of a DC series motor, what happens as the load increases?

- A. The torque decreases proportionally.
- B. The torque becomes constant.
- C. The torque increases proportionally to the square of the armature current. ✓
- D. The armature current decreases.

Q136 Technical Abilities

Power of an electrical system is measured in ____.

- A. newton-metre
- B. watt ✓
- C. watt-sec
- D. joule

Q137 Technical Abilities

In large-scale solar PV plants, why is string inverter technology preferred over central inverters in some cases?

- A. It reduces power losses due to shading and mismatch. ✓
- B. It eliminates the need for AC cabling.
- C. It requires fewer connections and is easier to maintain.
- D. It generates higher voltage DC output.

Q142 Technical Abilities

If the impedance of a parallel circuit is given by $Z = 5 - j4$, then the admittance is given by_____.

- A. $5 - j4$
- B. $5 + j4$
- C. 9
- D. $\frac{5 + j4}{41}$ ✓

Q138 Technical Abilities

Microwave heating is based on the principle of:

- A. arc heating
- B. induction heating
- C. conduction heating
- D. dielectric heating ✓

Q139 Technical Abilities

In arc heating, the arc is sustained by:

- A. heat conduction
- B. dielectric strength of air
- C. magnetic field
- D. ionisation of air ✓

Q140 Technical Abilities

In a power triangle, what is the relationship between active power (P), reactive power (Q) and apparent power (S)?

- A. $S^2 = P^2 + Q^2$ ✓
- B. $Q^2 = S^2 + P^2$
- C. $S = P + Q$
- D. $P^2 = S^2 + Q^2$

Q141 Technical Abilities

What is the first step in the design procedure for electrical installations in commercial buildings?

- A. Conducting a load analysis to determine power requirements ✓
- B. Installing protective devices without planning
- C. Ignoring safety standards to reduce costs
- D. Selecting decorative lighting fixtures



Q143 Technical Abilities

The relation between absolute permeability, μ and relative permeability μ_r of a material is given by:
(Given μ_0 is absolute permeability of air)

A. $\mu_r = \frac{\mu}{\mu_0}$



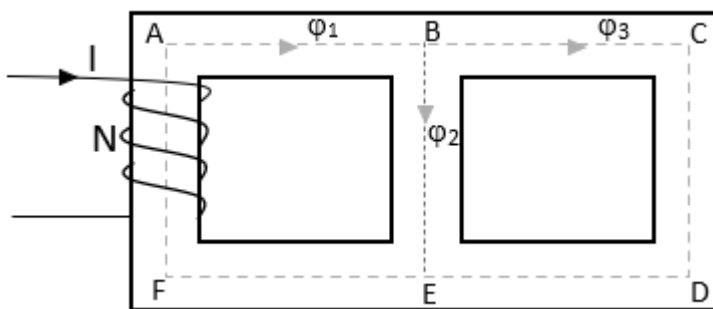
B. $\mu = \mu_r$

C. $\mu_0 = \frac{\mu_r}{\mu}$

D. $\mu = \frac{\mu_0}{\mu_r}$

Q144 Technical Abilities

Two magnetic paths BE and BCDE are in parallel and form a parallel magnetic circuit, as shown in the given figure. The Ampere Turn required for this parallel circuit is equal to:



A. inverse of Ampere Turn required for BE

B. square of Ampere Turn required for any one of the paths

C. sum of Ampere Turn required for BE and BCDE

D. ampere Turn required for any one of the paths

**Q145 Technical Abilities**

If laplace transform of voltage across capacitor of value 0.5 F is $V_c(s) = \frac{1}{s^2 + 1}$, the value of current through capacitor at $t = 0^+$ will be:

A. 2 A

B. 1 A

C. zero

D. 0.5 A



Q146 Technical Abilities

Coefficient of coupling between two coils is given as _____, where M = Mutual Inductance, L_1 = Self Inductance of coil 1 and L_2 = Self Inductance of coil 2

A. $\frac{M}{\sqrt{L_1 L_2}}$



B. $\frac{\sqrt{L_1 L_2}}{M}$

C. $M\sqrt{L_1 L_2}$

D. $L_1 \cdot L_2 \cdot M$

Q147 Technical Abilities

In a three – phase induction motor which component represents mechanical load in the equivalent circuit?

A. $R_2(1 - s)$

B. $\frac{sR_2(1 - s)}{s}$

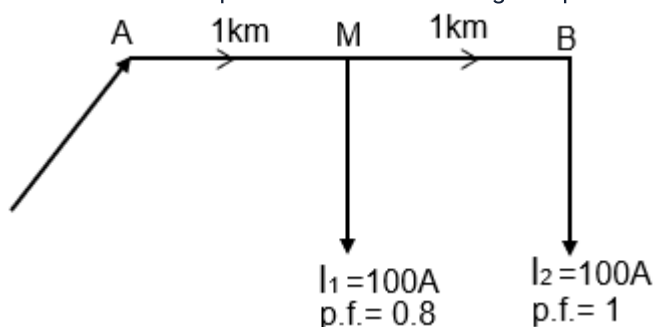
C. $\frac{R_2(1 - s)}{s}$



D. $\frac{R_2}{s}$

Q148 Technical Abilities

A single-phase distributor, 2 km long, has a line impedance of $(0.2 + 0.3j) \Omega/\text{km}$. It supplies a load at the far end, where the voltage V_B is 100 V and the current is 100 A at unity power factor. Additionally, a load of 100 A at 0.8 power factor lagging is connected at its midpoint. Calculate the voltage drop at the midpoint.



A. $120 + j15$

B. $120 + j30$



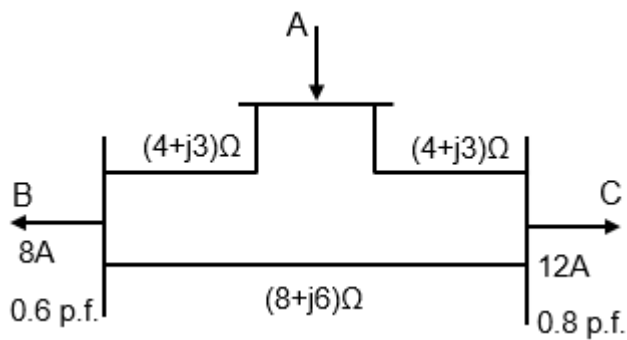
C. $110 + j15$

D. $210 + j15$



Q149 Technical Abilities

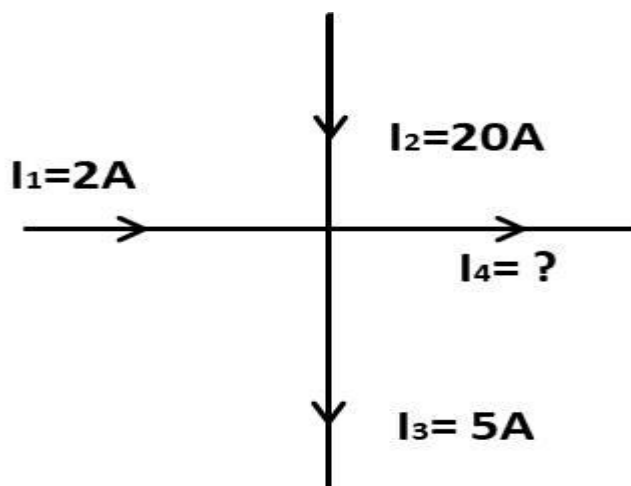
Find the total current fed at the sending end A, in the given ring distributor ABC_____.



- A. $(12 + j8)$
- B. $(8 + j6)$ A
- C. $(13.6 + j14.4)$ A
- D. $(14.4 + j13.6)$ A

**Q150** Technical Abilities

Find the current I_4 flowing in the circuit shown below.



- A. 27 A
- B. 13 A
- C. 17 A
- D. 23 A



General Abilities

50 Questions • Answer Key

Q1 General Abilities

Inertia depends on which property of an object?

- A. Shape
- B. Acceleration
- C. Velocity
- D. Mass



Q2 General Abilities

Which of the following companies announced plans in February 2025 to construct the world's longest undersea cable, aiming to enhance internet connectivity across five continents, with landing points in India?

- A. Amazon
- B. Meta
- C. Microsoft
- D. Google



Q3 General Abilities

What is India's global military ranking in the 2025 Global Firepower (GFP) index?

- A. 4th
- B. 3rd
- C. 2nd
- D. 5th



Q4 General Abilities

Which of the following CANNOT be considered as a measure to control global warming?

- A. Efficiently using energy
- B. Reduction in emission of greenhouse gases
- C. Causing deforestation
- D. Cutting down use of fossil fuel



Q5 General Abilities

The maximum sound is generated _____.

- A. from house chimneys
- B. from vehicular emissions
- C. from industrial smoke
- D. by the take off of a jet plane



Q6 General Abilities

The main use of chlorofluorocarbons is in _____.

- A. smog
- B. chimneys
- C. refrigerants
- D. vehicles



Q7 General Abilities

The Millennium Development Goals (MDGs) aimed to reduce extreme poverty by which year?

- A. 2008
- B. 2015
- C. 2014
- D. 2005



Q8 General Abilities

If the absolute refractive index of a medium is less than 1, it means _____.

- A. the medium is a perfect reflector
- B. light travels faster in that medium than in vacuum
- C. light travels slower in that medium than in vacuum
- D. the medium absorbs all light



Q9 General Abilities

Identify the correct formula for the compound formed between Mg^{2+} and PO_4^{3-} ions.

- A. $\text{Mg}_2(\text{PO}_4)_3$
- B. $\text{Mg}(\text{PO}_4)_3$
- C. MgPO_4
- D. $\text{Mg}_3(\text{PO}_4)_2$



Q10 General Abilities

Which official in the Gupta administration was responsible for peace and war matters?

- A. Vishayapati
- B. Mahapratihara
- C. Mahadandanayaka
- D. Sandhi-Vigrahika



Q11 General Abilities

The phenomenon of multiple echoes due to repeated reflections is called _____.

- A. resonance
- B. reverberation ✓
- C. diffraction
- D. refraction

Q12 General Abilities

If an object is dropped from rest, what will be its velocity after 15 seconds? ($g = 9.8 \text{ m/s}^2$)

- A. 143 m/s
- B. 147 m/s ✓
- C. 145 m/s
- D. 149 m/s

Q13 General Abilities

What was the main objective of the Extremists during the Indian National Movement?

- A. To attain complete independence (Swaraj) ✓
- B. To promote British goods in India
- C. To expand the legislative councils
- D. To bring social reforms

Q14 General Abilities

Which of the following is NOT a source of release of smokestacks?

- A. Smelters
- B. Industries
- C. Thermal power plants
- D. Rivers ✓

Q15 General Abilities

What is the purpose of the Collation option in the Print settings?

- A. To adjust the page orientation
- B. To print all the pages of a document as a set ✓
- C. To change the printer selection
- D. To select a custom print range

Q16 General Abilities

The glass panel used in greenhouses is known to retain _____.

- A. pH
- B. humidity
- C. rainfall
- D. heat ✓

Q17 General Abilities

Which Article provides Ministers the right to participate in parliamentary proceedings but without voting rights?

- A. Article 77
- B. Article 78
- C. Article 88 ✓
- D. Article 53

Q18 General Abilities

The fine powder that is obtained from the modified and recycled form of plastic is called _____.

- A. polystyrene
- B. polythene
- C. polyethylene
- D. polyblend ✓

Q19 General Abilities

The energy that is derived from the use of radioactive isotopes is termed as _____.

- A. solar energy
- B. thermal energy
- C. geothermal energy
- D. nuclear energy ✓

Q20 General Abilities

What happens when an acid reacts with a metal oxide?

- A. Only water is formed.
- B. A salt and hydrogen gas are formed.
- C. Only salt is formed.
- D. A salt and water are formed. ✓



Q21 General Abilities

What is the approximate pH of a neutral salt solution?

- A. More than 7
- B. Less than 7
- C. Depends on the temperature
- D. Equal to 7

**Q22 General Abilities**

In an electric circuit, what is the correct way to connect an ammeter?

- A. In series with the component
- B. In either series or parallel
- C. In parallel with the component
- D. In parallel with the source

**Q23 General Abilities**

What is the primary purpose of using a firewall on a Personal Computer?

- A. To clean up temporary files
- B. To speed up internet connectivity
- C. To block unauthorised access and protect the computer
- D. To increase storage space

**Q24 General Abilities**

Who among the following inaugurated the 38th National Games held in Dehradun in January 2025?

- A. Pushkar Singh Dhami
- B. Droupadi Murmu
- C. Anurag Thakur
- D. Narendra Modi

**Q25 General Abilities**

Which of the following is the correct way to insert a new column in a spreadsheet?

- A. Go to Home > Insert > Insert Sheet Columns.
- B. Go to File > New > Column.
- C. Press Ctrl + X and then Insert.
- D. Use Ctrl + Z to insert a column.

**Q26 General Abilities**

The Rudra Veena is predominantly associated with which genre of Hindustani music?

- A. Thumri
- B. Khayal
- C. Dhrupad
- D. Ghazal

**Q27 General Abilities**

What is the shortcut key to start a slideshow from the beginning?

- A. F5
- B. Shift + F5
- C. Alt + Tab
- D. Ctrl + P

**Q28 General Abilities**

The primary agent that helps in the decomposition of biodegradable matter in domestic sewage is _____.

- A. nitrate
- B. bacterium
- C. chloride
- D. phosphate

**Q29 General Abilities**

Which of the following is NOT toxic to non-target organisms in the soil?

- A. Fungicides
- B. Pesticides
- C. Herbicides
- D. Organic fertilisers

**Q30 General Abilities**

What is the first step to securing ones smartphone or tablet?

- A. Using only free Wi-Fi networks
- B. Setting a password/PIN-protected lock screen
- C. Installing more apps
- D. Turning off mobile data



Q31 General Abilities

Which defect of vision occurs due to the weakening of ciliary muscles with age?

- A. Myopia
- B. Astigmatism
- C. Presbyopia ✓
- D. Hypermetropia

Q32 General Abilities

According to the Tendulkar methodology, what was the estimated percentage of people below the poverty line in rural areas in 2011-12?

- A. 25.7% ✓
- B. 27.5%
- C. 15.5%
- D. 20%

Q33 General Abilities

Which state of matter shows the highest expansion when temperature is increased?

- A. Liquids
- B. Solids
- C. Plasma
- D. Gases ✓

Q34 General Abilities

In which of the following regions the Himalayas has the greatest width?

- A. Kashmir ✓
- B. Sikkim
- C. Arunachal Pradesh
- D. Himachal Pradesh

Q35 General Abilities

What happens when a computer is put into Sleep mode?

- A. It keeps the session active in RAM while using minimal power. ✓
- B. It shuts down completely.
- C. It restarts automatically after a few minutes.
- D. It stores data on the hard drive and powers off.

Q36 General Abilities

Which of the following correctly represents the chemical formula of a compound formed by aluminium and sulphate ions?

- A. Al_2SO_4
- B. $\text{Al}_2(\text{SO}_4)_3$ ✓
- C. $\text{Al}(\text{SO}_4)_3$
- D. $\text{Al}_3(\text{SO}_4)_2$

Q37 General Abilities

Which of the following states is NOT covered under the Atal Bhujal Yojana?

- A. Rajasthan
- B. Jharkhand ✓
- C. Uttar Pradesh
- D. Maharashtra

Q38 General Abilities

Why does a bee sting cause pain and irritation?

- A. The sting releases carbon dioxide gas.
- B. The sting injects a mild sugar solution.
- C. The sting injects methanoic acid. ✓
- D. The sting contains a strong base.

Q39 General Abilities

What is the primary function of the F4 key in MS Excel when editing a cell reference in a formula?

- A. Repeats the last action
- B. Toggles between absolute and relative references ✓
- C. Refreshes the worksheet
- D. Opens the Find and Replace dialog

Q40 General Abilities

Dr. BR Ambedkar described which part of the Indian Constitution as its 'novel features', while Granville Austin referred to it as the 'Conscience of the Constitution'?

- A. Fundamental Rights
- B. Fundamental Duties
- C. Directive Principles of State Policy ✓
- D. Preamble



Q41 General Abilities

Which of the following is a characteristic difference between colloids and true solutions?

- A. True solutions show the Tyndall effect, but colloids do not.
- B. True solutions exhibit Brownian motion, but colloids do not.
- C. True solutions have visible solute particles, whereas colloids have invisible dispersed particles.
- D. True solutions have a single-phase system, whereas colloids have a two-phase system. ✓

Q42 General Abilities

What is the maximum number of Ministers allowed in the Council of Ministers, including the Prime Minister, as per the 91st Amendment Act?

- A. 20% of Lok Sabha strength
- B. 12% of Lok Sabha strength
- C. 15% of Lok Sabha strength ✓
- D. 10% of Lok Sabha strength

Q43 General Abilities

Which of the following correctly explains why clothes dry faster on a windy day?

- A. Wind decreases the temperature of the water molecules.
- B. Wind reduces the surface area of the clothes.
- C. Wind removes the water vapour from the clothes' surroundings. ✓
- D. Wind increases the humidity around the clothes.

Q44 General Abilities

What does PCB stand for?

- A. Peripheral Connection Bus
- B. Primary Control Board
- C. Printed Circuit Board ✓
- D. Processing Circuit Board

Q45 General Abilities

What is the net force acting on an object if balanced forces are applied?

- A. Equal to acceleration
- B. Zero ✓
- C. Equal to the mass of the object
- D. Infinite

Q46 General Abilities

If you want the primary recipient to see that others have received a copy of an email, you should enter their email addresses in the _____ field.

- A. Cc ✓
- B. To
- C. Subject
- D. Bcc

Q47 General Abilities

Which of the following is NOT a component of a CPU?

- A. Hard Disk ✓
- B. Cache Memory
- C. Arithmetic Logic Unit (ALU)
- D. Control Unit (CU)

Q48 General Abilities

Which of the following cities hosted the inaugural Kho Kho World Cup in January 2025?

- A. New Delhi ✓
- B. Kolkata
- C. Mumbai
- D. Chennai

Q49 General Abilities

The practice of Jhum cultivation is prevalent in the _____.

- A. North east ✓
- B. South east
- C. South west
- D. North west

Q50 General Abilities

The Industrial Policy Resolution of 1956 categorised industries into how many groups?

- A. Nine
- B. Seven
- C. Five
- D. Three ✓



Q51 Technical Abilities

In the fabrication of a PNP transistor, what is the primary reason for using a buried layer of heavily doped P+ material beneath the N-type base region?

- A. To reduce the base-emitter voltage
- B. To reduce the collector-emitter saturation voltage
- C. To increase the emitter injection efficiency
- D. To prevent latchup and improve transistor stability ✓

Q52 Technical Abilities

In a street lighting ring network, what is the primary reason for considering voltage drop?

- A. To decrease conductor resistance
- B. To increase power loss for efficiency
- C. To ensure all lights receive equal brightness ✓
- D. To maximise current flow

Q53 Technical Abilities

For a P-N junction diode, with increase in the reverse bias potential, the width of the depletion region _____ and the transition capacitance _____.

- A. increases; decreases ✓
- B. decreases; increases
- C. increases; increases
- D. decreases; decreases

Q54 Technical Abilities

In a Schering Bridge, if the known capacitor $C_2 = 500 \text{ pF}$, known resistor $R_3 = 5 \text{ k}\Omega$, and the balancing resistor $R_4 = 1 \text{ M}\Omega$, what is the value of the unknown capacitor C_x ?

- A. 1 pF
- B. 100 nF ✓
- C. 10 pF
- D. 50 pF

Q55 Technical Abilities

A single-phase AC circuit has a voltage of 230 V and a current of 10 A. What is the apparent power (S)?

- A. 2300 VAR
- B. 23 VA
- C. 2.3 kW
- D. 2.3 kVA ✓

Q56 Technical Abilities

The use of electronic ballasts in CFLs helps to eliminate:

- A. excessive brightness
- B. slow starting and flickering ✓
- C. high voltage consumption
- D. overheating

Q57 Technical Abilities

How does the spear valve inside the nozzle enhance the operational efficiency of a Pelton turbine?

- A. By storing excess kinetic energy for later use
- B. By dynamically adjusting the jet velocity to match load demand ✓
- C. By creating turbulence to improve energy dissipation
- D. By diverting the water jet away from the buckets when needed

Q58 Technical Abilities

What is the primary scope of the National Electric Code (NEC) 2011?

- A. To define standards for power generation and transmission only
- B. To regulate the manufacturing of electrical appliances and devices
- C. To focus exclusively on renewable energy systems
- D. To provide guidelines for the design and installation of electrical systems to ensure safety and reliability ✓

Q59 Technical Abilities

In a series magnetic circuit, _____ flux ϕ flows through each part of the circuit.

- A. different
- B. the same ✓
- C. zero
- D. infinite



Q60 Technical Abilities

Which of the following best describes the role of a Time-of-Day (ToD) Tariff in energy conservation?

- A. It increases electricity costs uniformly throughout the day, regardless of demand variations.
- B. It applies only to industrial consumers and has no impact on residential users.
- C. It encourages consumers to shift electricity usage to off-peak hours, reducing peak demand and improving grid efficiency. ✓
- D. It eliminates the need for load management by ensuring a constant energy supply.

Q61 Technical Abilities

For a P-N junction diode, the built in barrier potential of the junction is _____ proportional to the doping concentration and _____ proportional to the intrinsic concentration.

- A. inversely; directly
- B. directly; directly
- C. directly; inversely ✓
- D. inversely; inversely

Q62 Technical Abilities

By which of the following is the welding current in an AC welding transformer controlled?

- A. Changing the output current
- B. Using an electric motor
- C. Varying the magnetic flux ✓
- D. Increasing the primary voltage

Q63 Technical Abilities

Which of the following options best describes the role of a gasifier in an agro-chemical-based power plant?

- A. It condenses steam to generate electricity.
- B. It stores chemical fertilisers for energy production.
- C. It converts solid biomass into a combustible gas through partial oxidation. ✓
- D. It directly burns biomass to produce heat.

Q64 Technical Abilities

Increasing the resistance R in a parallel RLC circuit will _____.

- A. have no effect on bandwidth
- B. increase resonance frequency
- C. decrease the bandwidth ✓
- D. increase the bandwidth

Q65 Technical Abilities

In the equivalent circuit without core losses, the magnetising branch consists of _____.

- A. X_m alone ✓
- B. R_c in parallel with X_m
- C. R_c alone
- D. X_m in series with R_c

Q66 Technical Abilities

If a residential area has an annual energy consumption of 28,908,000 kWh, what is its average demand?

- A. 3 kWh
- B. 2200 kWh
- C. 3300 kWh ✓
- D. 3000 kWh

Q67 Technical Abilities

What is a key factor in selecting street light pole structures?

- A. The colour of the pole.
- B. Focusing only on the aesthetic design of the pole.
- C. Ignoring wind load calculations to reduce costs.
- D. The height, material, and durability to withstand environmental conditions. ✓

Q68 Technical Abilities

Which statements about the maximum power output of a cylindrical rotor synchronous generator are correct?

- I. Maximum power output occurs when the load angle (δ) is 90° .
- II. Maximum power is proportional to the square of the terminal voltage (V).
- III. Over-excitation increases the generator's maximum power capability.
- IV. Maximum power is independent of the synchronous reactance (X_s).

- A. Statements I and IV only are correct.
- B. Statements II and IV only are correct.
- C. Statements II and III only are correct.
- D. Statements I and III only are correct. ✓



Q69 Technical Abilities

Arrange the circuits in ascending order as per the number of diodes required to realise the circuit.

- a. Full wave bridge rectifier circuit
- b. Half wave rectifier circuit
- c. Centre tapped full wave rectifier circuit

A. a-c-b

B. a-b-c

C. b-c-a



D. c-a-b

Q70 Technical Abilities

Which of the following factors determines the selection of voltage levels in primary and secondary transmission?

A. Only the type of transformers used

B. Distance of transmission and power demand



C. Only the number of consumers connected

D. Type of power generation used

Q71 Technical Abilities

Force on a current-carrying conductor will be _____ when it is placed at right angles to the direction of the magnetic field.

A. maximum



B. zero

C. minimum

D. infinite

Q72 Technical Abilities

What is the reflection of light from a smooth and shiny surface like a mirror called?

A. Specular reflection



B. Irregular reflection

C. Diffuse reflection

D. Spread reflection

Q73 Technical Abilities

Which of the following is a fundamental principle for electrical installations, according to safety standards?

A. Electrical circuits must be designed to operate without any protective devices

B. Electrical installations must ensure protection against electric shock, overcurrent and fault currents



C. Electrical systems should prioritise cost over safety considerations

D. Electrical installations do not require grounding or earthing systems

Q74 Technical Abilities

What is the function of the armature core in relation to the magnetic circuit?

A. To complete the magnetic circuit through the yoke and poles



B. To convert electrical energy into mechanical energy

C. To cool the armature conductors

D. To ensure electrical conductors do not short-circuit

Q75 Technical Abilities

Ferrites are ferromagnetic ceramics which have a fairly constant _____.

A. magnetic susceptibility

B. frequency response

C. relative permeability



D. hysteresis loss

Q76 Technical Abilities

Which type of damping is commonly used in PMMC voltmeters and ammeters?

A. Fluid friction damping

B. Air friction damping

C. Spring-controlled damping

D. Electromagnetic damping

**Q77 Technical Abilities**

Why are salient pole rotors NOT used in turbo alternators?

A. Mechanical instability at high speeds



B. Inefficient cooling

C. Low mechanical strength

D. High copper losses



Q78 Technical Abilities

Which of the following is a key requirement of a protective relay in terms of reliability?

- ☒ A. The relay must operate only when a fault occurs and remain stable during normal conditions.
- ☐ B. The relay must have a complex design to handle multiple fault types.
- ☐ C. The relay must reset immediately after a fault is cleared.
- ☐ D. The relay must operate with a significant time delay to ensure coordination.

Q79 Technical Abilities

In an inductor, if flux is maintained constant, _____ EMF will be induced.

- ☐ A. negative
- ☐ B. positive
- ☐ C. infinite
- ☒ D. no

Q80 Technical Abilities

Which safety factor is most important when designing transmission lines under ice and wind conditions?

- ☐ A. Thermal expansion factor
- ☒ B. Mechanical stress factor
- ☐ C. Magnetic field factor
- ☐ D. Electrical safety factor

Q81 Technical Abilities

Self inductance of a coil is directly proportional to the:

- ☐ A. flux and the current flowing in the coil
- ☐ B. current flowing in the coil only
- ☒ C. flux and number of turns of the coil
- ☐ D. number of turns and the current flowing in the coil

Q82 Technical Abilities

For the full wave rectifier circuit with sinusoidal ac signal as its input, if the peak value of the output signal increases, its rms value of the ac component _____.

- ☒ A. increases
- ☐ B. remains the same
- ☐ C. decreases
- ☐ D. becomes zero

Q83 Technical Abilities

Which of the following methods is NOT used for low resistance measurement?

- ☐ A. Potentiometer method
- ☐ B. Ammeter-Voltmeter method
- ☒ C. Loss of Charge method
- ☐ D. Kelvin Double Bridge method

Q84 Technical Abilities

Why does a single large generating unit lead to higher generating costs per unit?

- ☐ A. It eliminates the need for maintenance.
- ☐ B. It has zero fuel consumption.
- ☒ C. It operates inefficiently during periods of low demand.
- ☐ D. It always operates at maximum efficiency.

Q85 Technical Abilities

Which of the following are the two major elements required for Resistance Welding?

- ☐ A. Arc and time
- ☒ B. Current and pressure
- ☐ C. Current and resistance
- ☐ D. Arc and pressure

Q86 Technical Abilities

What effect does excessive heat in a transformer have on its windings?

- ☐ A. It has no significant effect.
- ☐ B. It increases transformer efficiency.
- ☒ C. It reduces insulation resistance and can cause damage.
- ☐ D. It improves insulation performance.

Q87 Technical Abilities

Which of the following applications makes use of capacitor?

- ☐ A. Toaster
- ☒ B. Electric vehicle
- ☐ C. Microwave
- ☐ D. Transformer



Q88 Technical Abilities

Under constant mechanical load, changing the excitation of a synchronous motor affects which of the following?

- I. Power factor
- II. Armature current magnitude
- III. Speed of the motor
- IV. Real power output

A. II and III only

B. I and II only

C. I and IV only

D. III and IV only

Q89 Technical Abilities

Crawling typically causes an induction motor to operate at a speed that is:

A. double the synchronous speed

B. slightly below synchronous speed under full load

C. a fraction (e.g. 1/3) of synchronous speed

D. equal to synchronous speed

Q90 Technical Abilities

If a 6-pole induction motor operates on a 60 Hz supply, its synchronous speed is _____.

A. 3600 rpm

B. 1200 rpm

C. 2400 rpm

D. 7200 rpm

Q91 Technical Abilities

For accurate voltage regulation calculation in a transformer, which of the following must remain constant?

A. Applied (primary) voltage

B. Output (secondary) voltage

C. Core losses

D. Load power factor

Q92 Technical Abilities

M.M.F in a magnetic circuit is abbreviated as:

A. Magnetic Force

B. Magnetic Movement Field

C. Magnetomotive Field

D. Magnetomotive Force

Q93 Technical Abilities

In a three-phase system, the sum of the three phase voltage phasors in a balanced system is _____.

A. equal to the phase voltage

B. zero

C. maximum at resonance

D. equal to the line voltage

Q94 Technical Abilities

A toroidal coil has a magnetic path length of 30 cm and a magnetic field strength of 750 A/m. The coil current is 250 mA. Determine the number of coil turns.

A. 625 turns

B. 750 turns

C. 800 turns

D. 900 turns

Q95 Technical Abilities

Which of the following is a characteristic of a group drive system?

A. Minimal energy loss

B. High maintenance cost

C. Low capital cost

D. High flexibility in operation

Q96 Technical Abilities

The Q-factor of a resonant circuit is 100. If the resonant frequency is 1 MHz, what is the bandwidth?

A. 10 MHz

B. 10 kHz

C. 1 kHz

D. 100 kHz

Q97 Technical Abilities

If the resistance (R) in a parallel RLC circuit increases, the quality factor (Q) will _____.

A. increase

B. remain the same

C. become zero

D. decrease



Q98 Technical Abilities

What is the primary characteristic of a Zener diode that distinguishes it from a regular diode?

- A. High forward current rating
- B. High reverse breakdown voltage
- C. Low forward voltage drop
- D. Sharp breakdown voltage and ability to regulate voltage ✓

Q99 Technical Abilities

An apartment complex consists of 15 apartments, each with a peak demand of 8 kW. The maximum system demand recorded is 60 kW. What is the diversity factor?

- A. 2 ✓
- B. 1.5
- C. 3
- D. 0.5

Q100 Technical Abilities

If the capacitance in a series RLC circuit is increased, the Q-factor will _____.

- A. remain unchanged
- B. increase
- C. depend on frequency
- D. decrease ✓

Q101 Technical Abilities

According to Lenz's law, what does the secondary current in a transformer produce?

- A. A back EMF that resists the load
- B. An EMF to oppose the primary voltage
- C. A magnetizing effect
- D. A demagnetizing effect ✓

Q102 Technical Abilities

The work done on a unit N pole in moving once around any single closed path in a magnetic field is equal to _____.

- A. current in respective path
- B. EMF in respective path
- C. number of turns in respective path
- D. Ampere turns linked with the path ✓

Q103 Technical Abilities

How are the segments of the commutator insulated from each other?

- A. Using thick layers of rubber
- B. Using air gaps
- C. Using thin layers of mica ✓
- D. Using metal sheets

Q104 Technical Abilities

In a ring distribution system, if one section of the ring experiences a fault and is disconnected, how does this affect the voltage drop at the loads connected to the remaining operational sections?

- A. Voltage drops increases because the system now operates like a radial system in that section.
- B. Voltage drop fluctuates randomly due to load redistribution.
- C. Voltage drop remains unchanged since power is still supplied from two directions. ✓
- D. Voltage drops decreases as the fault reduces overall system impedance.

Q105 Technical Abilities

Which of the following modifications increases the ratio of full load torque to maximum torque in an induction motor?

- A. Decreasing rotor resistance
- B. Decreasing supply voltage
- C. Increasing stator resistance
- D. Increasing rotor resistance ✓

Q106 Technical Abilities

If two AC waveforms have a phase difference of 0° , they are said to be _____.

- A. out of phase
- B. in phase ✓
- C. lagging
- D. leading

Q107 Technical Abilities

The material commonly used as resistance wire in heating elements is:

- A. silver
- B. copper
- C. nichrome ✓
- D. aluminium



Q108 Technical Abilities

A sinusoidal voltage is given by $v(t) = 100 \sin(\omega t + 30^\circ)$. What is the corresponding phasor representation?

- A. $100 \angle -30^\circ$
- B. $100 \angle 90^\circ$
- C. $100 \angle 0^\circ$
- D. $100 \angle 30^\circ$ ✓

Q109 Technical Abilities

Which type of transformer is used for stepping down current for measurement purposes?

- A. Voltage transformer
- B. Power transformer
- C. Current transformer ✓
- D. Auto transformer

Q110 Technical Abilities

From the right-hand rule, if we know the direction of magnetic field encircling a conductor or the magnetic polarity of a coil, we can determine the:

- A. direction of EMF
- B. direction of current ✓
- C. direction of MMF
- D. direction of flux

Q111 Technical Abilities

What is the primary function of 'Percentage Differential Protection' in an alternator?

- A. To protect against overloading of the alternator
- B. To detect and protect against internal faults within the alternator windings ✓
- C. To detect and protect against external faults in the connected power system
- D. To monitor the voltage regulation of the alternator

Q112 Technical Abilities

Which transmission voltage level is commonly used for bulk power transmission over medium distances?

- A. Low Voltage (LV)
- B. Ultra-High Voltage (UHV)
- C. High Voltage (HV) ✓
- D. Medium Voltage (MV)

Q113 Technical Abilities

Identify the correct statement related to the P-N junction diode.

- A. The forward current of the diode is equal to reverse saturation current of the diode.
- B. The forward current of the diode is less than the reverse saturation current of the diode.
- C. The reverse saturation current of the diode is always zero.
- D. The forward current of the diode is greater than reverse saturation current of the diode. ✓

Q114 Technical Abilities

The same polarity condition is essential in parallel operation because:

- A. it reduces the transformer losses
- B. it increases the transformer efficiency
- C. it ensures that the transformers are not damaged due to reverse currents ✓
- D. it helps with voltage regulation

Q115 Technical Abilities

Which gas is used to aid the starting process in Metal Halide Lamps?

- A. Neon
- B. Nitrogen
- C. Argon ✓
- D. Carbon dioxide

Q116 Technical Abilities

In distribution transformers, the explosion vent is designed to:

- A. improve the cooling system
- B. control oil pressure
- C. release pressure in case of excessive buildup ✓
- D. monitor transformer oil quality



Q117 Technical Abilities

Which statements about voltage drop in an alternator are correct?

- I. The voltage drop due to armature resistance ($I_a R_a$) is in phase with the armature current (I_a).
- II. At unity power factor, the voltage drop $I_a R_a$ directly subtracts from the generated EMF (E).
- III. For a leading power factor load, $I_a R_a$ contributes to an increase in terminal voltage (V).
- IV. Armature resistance has no effect on voltage regulation.

- A. Statements II and III only are correct.
- B. Statements I and IV only are correct.
- C. Statements III and IV only are correct.
- D. Statements I and II only are correct. ✓

Q118 Technical Abilities

If the frequency of an AC source connected to a pure capacitor is doubled, the capacitive reactance will _____.

- A. increase four times
- B. decrease by half ✓
- C. remain unchanged
- D. double

Q119 Technical Abilities

What is a key consideration in public lighting installations?

- A. Providing adequate illumination while ensuring energy efficiency and safety ✓
- B. Focusing only on the aesthetic design of the light fixtures
- C. Ensuring the lighting system operates without any protective devices
- D. Ignoring maintenance requirements to reduce costs

Q120 Technical Abilities

Maxwell's Inductance-Capacitance Bridge uses a standard capacitor to measure which of the following?

- A. Inductance ✓
- B. High resistance
- C. Capacitance
- D. Low resistance

Q121 Technical Abilities

What does the flux created by the load current in the primary winding, which links only with the primary winding, represent?

- A. Magnetic flux
- B. Induced flux
- C. Mutual flux
- D. Leakage flux ✓

Q122 Technical Abilities

Why is a radial layout with high voltage drop unsuitable for industrial loads?

- A. It helps maintain constant power factor.
- B. Industrial loads require stable voltage level. ✓
- C. Voltage drop increases system reliability.
- D. It reduces voltage fluctuation.

Q123 Technical Abilities

Which of the following is a major disadvantage of the De Sauty Bridge?

- A. It cannot be used to measure very small capacitances.
- B. It requires an AC power source.
- C. It does not consider the dielectric losses in capacitors. ✓
- D. It requires both resistors and inductors for balance.

Q124 Technical Abilities

Which of the following types of engines is most commonly adapted to run on liquid biomass fuels?

- A. Internal combustion engine ✓
- B. Stirling engine
- C. Jet engine
- D. Fuel cell engine

Q125 Technical Abilities

Which of the following is NOT correct when high-voltage leads are eliminated in potential transformer (PT) bushings?

- A. Increases the risk of short circuits ✓
- B. Reduces overall cost of the transformer
- C. Measures line-to-ground voltages in a three-phase system
- D. Decreases size and weight of the PT



Q126 Technical Abilities

Why is the simple brake test generally used for small motors only?

- A. Small motors do not require cooling.
- B. The simple brake test does not work with large motors.
- C. Large motors have lower efficiency.
- D. Large motors produce excessive heat that is difficult to dissipate. ✓

Q127 Technical Abilities

The Buchholz relay is connected between which two parts of the transformer?

- A. Magnetic core and armature
- B. Transformer oil tank and conservator tank ✓
- C. Primary winding and secondary winding
- D. Primary terminal and secondary terminal

Q128 Technical Abilities

Compared to the MMF method, the EMF method is _____.

- A. more accurate due to accounting for saturation
- B. independent of load power factor
- C. only used for DC generators
- D. less accurate due to assuming constant Z_s ✓

Q129 Technical Abilities

Why do modern steam power plants use a regenerative feedwater heating system?

- A. It helps keep turbine blades cooler.
- B. It helps improve efficiency by reusing heat, so less fuel is needed. ✓
- C. It is mainly used to produce high-pressure steam.
- D. It makes the combustion process more effective.

Q130 Technical Abilities

What does the 'Rate of Rise of Restriking Voltage (RRRV)' in circuit breakers refer to?

- A. The speed at which the circuit breaker operates during a fault
- B. The rate at which the fault current increases in the system
- C. The rate at which the breaker contacts close during normal operation
- D. The rate at which the voltage across the breaker contacts rises after current interruption ✓

Q131 Technical Abilities

What is the relationship between back EMF and the supply voltage in a DC motor?

- A. Back EMF is directly proportional to the supply voltage.
- B. Back EMF is independent of the supply voltage.
- C. Back EMF opposes the supply voltage. ✓
- D. Back EMF is equal to the supply voltage.

Q132 Technical Abilities

Which type of electrode is used in Carbon Arc Welding (CAW)?

- A. Graphite electrode ✓
- B. Copper coated electrode
- C. Tungsten electrode
- D. Aluminum coated electrode

Q133 Technical Abilities

If the number of parallel paths (A) in a DC generator is increased, the generated EMF will:

- A. remain the same ✓
- B. become zero
- C. decrease
- D. increase

Q134 Technical Abilities

What is the angle that is formed between the incident ray and the normal line called?

- A. Angle of refraction
- B. Angle of incidence ✓
- C. Angle of deviation
- D. Angle of reflection

Q135 Technical Abilities

A diode rectifier circuit has an AC input voltage of 230 Vrms and a load resistance of 1 k Ω . If the diode is ideal and the circuit is a half-wave rectifier, what is the Peak Inverse Voltage (PIV) across the diode?

- A. 650 V
- B. 460 V
- C. 230 V
- D. 325 V ✓



Q136 Technical Abilities

Which application is a common use of synchronous motors?

A. Power factor correction ✓

B. Electric cranes

C. Portable drills

D. Household fans

Q137 Technical Abilities

In a parallel RLC circuit, if the inductive current I_L is greater than the capacitive current I_C , then _____.

A. $X_C = X_L$

B. circuit is at resonance

C. $X_C < X_L$ ✓

D. $X_C > X_L$

Q138 Technical Abilities

In a transistor amplifier, the composition of the current in any branch during operation is:

A. AC only

B. DC only

C. the multiplication of AC and DC

D. the sum of AC and DC ✓

Q139 Technical Abilities

How are outdoor streetlight installations typically classified?

A. Based on the type of light source, mounting height, and application (e.g., residential, highway, or industrial areas) ✓

B. Based on the aesthetic design of the poles

C. Based on the cost of the light fixtures only

D. Based on the colour of the light fixtures

Q144 Technical Abilities

Current $I(s)$ in RL circuit is given as $I(s) = \frac{1.5}{s+4}$. Obtain $i(t)$ for $t > 0$.

A. $1.5e^{4t}$

B. $1.5e^t$

C. $1.5t$

D. $1.5e^{-4t}$ ✓

Q140 Technical Abilities

A 3-phase, 10 kV distribution line delivers power to a load at a 0.8 power factor lagging. If the current is 50 A, and the load resistance and reactance per km are 0.15Ω and 0.2Ω , respectively, for a 400 m line, what is the approximate voltage drop per phase (in V/phase)?

A. $4.8 + j1.4$ ✓

B. $1 + j5$

C. $1 + j10$

D. $0 + j10$

Q141 Technical Abilities

What is the primary purpose of 'Thermal Overheating Protection' in a transformer?

A. To protect against overvoltage conditions in the power system

B. To detect faults in the transformer cooling system

C. To detect and protect against short circuits in the transformer windings

D. To monitor and prevent excessive temperature rise in the transformer ✓

Q142 Technical Abilities

In an alternator, if the load power factor changes from lagging to leading, the armature reaction effect shifts from:

A. demagnetising to magnetising ✓

B. demagnetising to cross-magnetising

C. cross-magnetising to demagnetising

D. magnetising to cross-magnetising

Q143 Technical Abilities

Which type of transformer is used for stepping down current for measurement purposes?

A. Power transformer

B. Voltage transformer

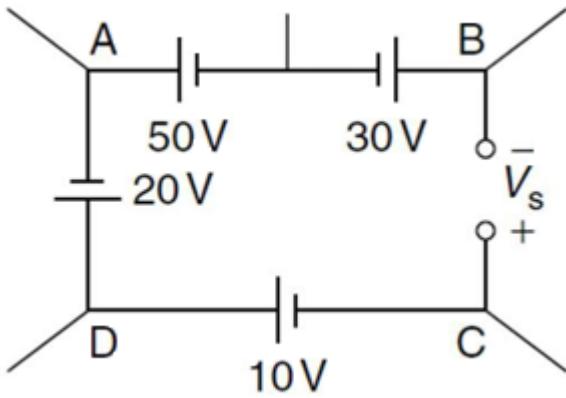
C. Current transformer ✓

D. Auto transformer



Q145 Technical Abilities

Find the voltage V_s in the circuit by using Kirchoff's Voltage Law.



- A. 10 V
- B. 20 V
- C. 50 V
- D. 30 V

**Q146** Technical Abilities

If the peak voltage of a full-wave rectifier is 20 V, what is the average output voltage?

- A. $\frac{20}{\pi}$ V
- B. $\frac{\pi}{20}$ V
- C. $\frac{40}{\pi}$ V
- D. $\frac{\pi}{40}$ V

**Q147** Technical Abilities

A parallel RLC circuit has an inductance of 1 H and a capacitance of $1 \mu\text{F}$. What is the resonant frequency (f_0)?

- A. $\frac{1}{\pi}$ Hz
- B. $\frac{1}{\pi \times 10^{-3}}$ Hz
- C. $\frac{1}{2\pi \times 10^{-3}}$ Hz
- D. $\frac{1}{2\pi}$ Hz



Q148 Technical Abilities

Energy stored in an inductor is given by: (Given L is inductance, I is current, N is number of turns of coil, A is area of cross section, μ is permeability of flux and Φ is flux)

A. $\frac{N\Phi}{I}$

B. $\frac{1}{2}LI^2$ ✓

C. $\frac{\mu N^2 A}{L}$

D. $L \frac{di}{dt}$

Q149 Technical Abilities

The RMS value of voltage (V_{rms}) in a purely resistive AC circuit is related to peak voltage (V_m) by ____.

A. $V_{rms} = \sqrt{2} V_m$

B. $V_{rms} = \frac{V_m}{\sqrt{2}}$ ✓

C. $V_{rms} = \frac{\sqrt{2}}{V_m}$

D. $V_{rms} = V_m$

Q150 Technical Abilities

What will be the current relationship in time domain for a capacitive circuit?

A. $i(t) = C \int_0^t v(t)$

B. $C \frac{d^2 v}{dt^2}$

C. $i(t) = C \frac{dv}{dt}$ ✓

D. $i(t) = C \int_0^t v(t) + i(0)$



General Abilities

47 Questions · Answer Key

Q1 General Abilities

Which property of solids allows them to be compressed the least compared to liquids and gases?

- A. Strong intermolecular forces and close packing of particles ✓
- B. High kinetic energy of particles
- C. The ability to diffuse into other solids
- D. High intermolecular spaces

Q2 General Abilities

What are the sand dunes commonly found in the Indian Desert called?

- A. Loess
- B. Moraines
- C. Cirques
- D. Barchans ✓

Q3 General Abilities

Which of the following is a string instrument?

- A. Flute
- B. Sitar ✓
- C. Shehnai
- D. Tabla

Q4 General Abilities

Who among the following is NOT appointed by the President of India?

- A. Chief Election Commissioner
- B. Governors of States
- C. Vice President ✓
- D. Comptroller and Auditor General

Q5 General Abilities

Which of the following is NOT an example of an agrochemical?

- A. Pesticides
- B. Herbicides
- C. Fungicides
- D. Biogas ✓

Q6 General Abilities

Which of the following is an example of database management software?

- A. Microsoft Access ✓
- B. Notepad
- C. MS Paint
- D. PowerPoint

Q7 General Abilities

The area termed as the ozone hole is known to mainly develop over ____.

- A. India
- B. Africa
- C. America
- D. Antartica ✓

Q8 General Abilities

As per Article 78, it is the duty of the Prime Minister to communicate all decisions of the Council of Ministers to whom?

- A. Vice President
- B. President ✓
- C. Speaker of Lok Sabha
- D. Chief Justice of India

Q9 General Abilities

Which of the following is a zero waste procedure?

- A. Integrated organic farming ✓
- B. Organic farming
- C. Pest management
- D. Inorganic farming

Q10 General Abilities

According to the Tendulkar methodology, what was the estimated national poverty line for rural areas in 2011-12?

- A. ₹816 per month ✓
- B. ₹1,200 per month
- C. ₹1,000 per month
- D. ₹512 per month



Q11 General Abilities

If the area of contact increases while keeping the thrust constant, the pressure will _____.

- A. remain the same
- B. increase
- C. first increase, then decrease
- D. decrease

**Q12 General Abilities**

When were the 38th National Games held in Uttarakhand?

- A. January 28 - February 14, 2025
- B. February 10 - 25, 2025
- C. January 15 - 30, 2025
- D. February 1 - 20, 2025

**Q13 General Abilities**

What happens when you use the 'Sort A to Z' option on a column containing text?

- A. The text is sorted alphabetically from A to Z.
- B. The text remains unchanged.
- C. The text is sorted from Z to A.
- D. The text is converted into numbers.

**Q14 General Abilities**

In September 2024, which of the following Indian institutions was designated as the Thematic Hub for Quantum Computing under the National Quantum Mission?

- A. Indian Institute of Science Bengaluru
- B. Indian Institute of Technology Madras
- C. Indian Institute of Technology Gandhinagar
- D. Indian Institute of Technology Kanpur

**Q15 General Abilities**

Under the Delhi Sultanate what was the name of the state laws that grew under the monarchy, even if they violated the Shari'at?

- A. Zawabit
- B. Fatwas
- C. Iqta
- D. Farman

**Q16 General Abilities**

In December 2024, Jasprit Bumrah became the fastest Indian bowler to reach 200 Test wickets during which of the following series/tournament?

- A. India vs England Test Series
- B. India vs New Zealand Test Series
- C. Asia Cup
- D. Border-Gavaskar Trophy

**Q17 General Abilities**

Which of the following is an effective way to prevent rancidity in packaged food?

- A. Storing in a warm place
- B. Increasing moisture content
- C. Keeping it in direct sunlight
- D. Adding antioxidants

**Q18 General Abilities**

The effect of particulate matter which is a common air pollutant is maximally seen on the _____.

- A. liver
- B. kidneys
- C. intestines
- D. lungs

**Q19 General Abilities**

Which of the following best describes a heterogeneous mixture?

- A. The composition varies throughout the mixture.
- B. It contains only one phase.
- C. The components cannot be separated.
- D. It has a uniform composition.

**Q20 General Abilities**

What is the purpose of the 'BCC' field in an email?

- A. It allows recipients to see each others' addresses.
- B. It hides recipients from each other.
- C. It deletes an email after it is read.
- D. It marks an email as urgent.



Q21 General Abilities

The melting of snow and ice caps from the polar regions is responsible for _____.

- A. the decline in sea levels
- B. condensation
- C. rainfall
- D. the rise in sea levels

**Q22 General Abilities**

The Montreal Protocol came into force in the year _____.

- A. 1990
- B. 1992
- C. 1986
- D. 1989

**Q23 General Abilities**

An object is placed 25 cm in front of a convex lens with a focal length of 15 cm. What is the magnification produced by the lens?

- A. $M = -2.5$
- B. $M = 1.5$
- C. $M = 2.5$
- D. $M = -1.5$

**Q24 General Abilities**

Which of the following is NOT an example of system software?

- A. Windows 10
- B. macOS
- C. Linux
- D. Microsoft Word

**Q25 General Abilities**

If three resistors of $15\ \Omega$, $35\ \Omega$ and $50\ \Omega$ are connected in series to a 25-V battery, what is the current flowing in the circuit?

- A. 0.25 A
- B. 2.88 A
- C. 1.5 A
- D. 4 A

**Q26 General Abilities**

The Railways Employment of Members of the Armed Forces Act was passed in which of the following years?

- A. 1965
- B. 1957
- C. 1951
- D. 1962

**Q27 General Abilities**

What is the primary goal of application security?

- A. To enhance the graphical user interface of applications
- B. To reduce the size of application files
- C. To protect applications from security threats by identifying and fixing vulnerabilities
- D. To increase the execution speed of applications

**Q28 General Abilities**

The Punjab Plain is formed by which river system?

- A. Indus and its tributaries
- B. Brahmaputra and its tributaries
- C. Ganga and its tributaries
- D. Narmada and its tributaries

**Q29 General Abilities**

_____ is the most efficient method used for the disposal of hospital-generated waste.

- A. Incinerator
- B. Furnace
- C. Sanitary landfills
- D. Open dumps

**Q30 General Abilities**

Which of the following economic estimators provided estimates of India's national and per capita income during the colonial period?

- A. John Maynard Keynes
- B. VKRV Rao
- C. Adam Smith
- D. Karl Marx



Q31 General Abilities

The speed of a wave is given by which of the following formulas?

- A. Speed = Frequency $\times$ Amplitude
- B. Speed = Frequency $\times$ Wavelength ✓
- C. Speed = Time $\times$ Frequency
- D. Speed = Amplitude $\times$ Wavelength

Q32 General Abilities

In an experiment, 25 g of reactant A reacts with 35 g of reactant B to form 50 g of product C and some amount of product D. What is the mass of product D?

- A. 10 g ✓
- B. 25 g
- C. 35 g
- D. 60 g

Q33 General Abilities

Which of the following is an example of a WAN?

- A. A university campus network
- B. A Bluetooth connection between a phone and a laptop
- C. A home Wi-Fi network
- D. The internet ✓

Q34 General Abilities

Where is the magnetic field strength maximum around a magnet?

- A. At the poles of the magnet ✓
- B. Equidistant from the poles
- C. At the centre of the magnet
- D. At infinity

Q35 General Abilities

A student calculates the formula unit mass of calcium fluoride (CaF_2). If the atomic masses of Ca and F are 40 u and 19 u, respectively, what is the correct formula unit mass?

- A. 100 u
- B. 78 u ✓
- C. 97 u
- D. 59 u

Q36 General Abilities

Which of the following is an example of a chemical change?

- A. Tearing of paper
- B. Freezing of water
- C. Curdling of milk ✓
- D. Dissolution of sugar in water

Q37 General Abilities

What is the function of the Linux Shell?

- A. To store user data
- B. To directly manage hardware resources
- C. To create and delete partitions
- D. To execute user commands and act as an interface between the user and the kernel ✓

Q38 General Abilities

Two objects of masses 80 kg and 250 kg are placed 200 m apart. What is the gravitational force between them? ($G = 6.7 \times 10^{-11} \text{ N}\cdot\text{m}^2/\text{kg}^2$)

- A. $6.35 \times 10^{-11} \text{ N}$
- B. $4.50 \times 10^{-11} \text{ N}$
- C. $5.75 \times 10^{-11} \text{ N}$
- D. $3.35 \times 10^{-11} \text{ N}$ ✓

Q39 General Abilities

Which statement correctly explains why liquids can flow?

- A. Liquids do not have kinetic energy.
- B. Liquids have loosely packed molecules that slide past each other. ✓
- C. Liquids have no intermolecular forces.
- D. Liquid molecules move randomly without any restriction.

Q40 General Abilities

If the mass of an object is 74.5 kg, what is its approximate weight on Earth? (Take $g = 9.8 \text{ m/s}^2$)

- A. 74.5 N
- B. 447 N
- C. 7.6 N
- D. 730 N ✓



Q41 General Abilities

The greenhouse gas that is known to contribute the least amount to global warming is _____.

A. nitrous oxide



B. CFCs

C. carbon dioxide

D. methane

Q42 General Abilities

Which of the following is NOT a file management task?

A. Creating files

B. Deleting files

C. Renaming files

D. Browsing the internet

**Q43 General Abilities**

Who among the following won the gold medal in the women's high jump event at the National Games in February 2025?

A. Vithya Ramraj

B. Abhinaya Shetty

C. Swapna Barman

D. Pooja Singh

**Q44 General Abilities**

The method of storage of nuclear wastes is to be done in _____.

A. bottles

B. dustbins

C. open containers

D. shielded containers

**Q45 General Abilities**

The Indian Desert lies towards the western margins of which mountain range?

A. Aravali Hills



B. Satpura Hills

C. Vindhya Hills

D. Western Ghats

Q46 General Abilities

Which dynasty was overthrown by Chandragupta Maurya to establish the Mauryan Empire?

A. Nanda Dynasty



B. Shunga Dynasty

C. Kushan Dynasty

D. Gupta Dynasty

Q47 General Abilities

Which mouse pointer appears when adjusting column width / cell width in a table?

A. ↔ (Horizontal double-headed arrow)



B. I-beam (Text cursor)

C. Hand cursor

D. ↑↓ (Vertical double-headed arrow)

Technical Abilities

97 Questions • Answer Key

Q48 Technical Abilities

In a balanced beam type relay, what happens under normal working conditions?

A. The beam oscillates between horizontal and tilted positions.

B. The beam is held in a horizontal position by the spring.



C. The spring compresses completely to maintain stability.

D. The current through the coil causes the beam to tilt downward.

Q49 Technical Abilities

What is a critical factor in the selection of cables for outdoor public lighting installations?

A. Selecting the cheapest cable available.

B. The colour of the cable insulation.

C. The cable's ability to withstand environmental conditions and carry the required current safely.



D. Ignoring voltage drop calculations to reduce costs.



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Q50 Technical Abilities

The parameters which can be obtained from output characteristics curves of common emitter BJT NPN transistor is/are:

- A. forward current amplification factor and output resistance of CE configuration** ✓
- B. output resistance of CE configuration only
- C. forward current amplification factor and input resistance of CE configuration
- D. input resistance of CE configuration only

Q51 Technical Abilities

For a BJT, determine the emitter current if the collector current is 1 mA and the common base short circuit amplification factor is unity.

- A. 1 mA** ✓
- B. 0.5 mA
- C. 1.5 mA
- D. 2 mA

Q52 Technical Abilities

If a straight long conductor is carrying current, the magnetic lines of force will be:

- A. concentric circles clockwise/anticlockwise around the conductor** ✓
- B. in straight line across the conductor
- C. only anticlockwise around the conductor
- D. only clockwise around the conductor

Q53 Technical Abilities

The maximum fault current reached before a fuse melts is called:

- A. holding current
- B. peak current
- C. rupturing current
- D. cut-off current** ✓

Q54 Technical Abilities

What is a key advantage of voltage drop in a radial power distribution system?

- A. It limits excessive current flow, aiding in overcurrent protection.** ✓
- B. It increases power dissipation in the form of heat.
- C. It eliminates the need for voltage regulators.
- D. It ensures voltage remains constant throughout the network.

Q55 Technical Abilities

What is the primary cause of junction capacitance in a p-n diode?

- A. Variation in majority carrier concentration with applied voltage
- B. Change in depletion region width with applied voltage** ✓
- C. Thermal generation of carriers in the depletion region
- D. Variation in minority carrier concentration with applied voltage

Q56 Technical Abilities

For a voltage divider bias circuit in CE configuration using NPN BJT transistor, $V_{cc} = 10\text{ V}$ and the resistance at collector and emitter is $R_c = 2\text{ k}\Omega$ and $R_E = 500\text{ }\Omega$, respectively. (Assume DC current gain Beta of transistor as very high)

Determine the approximate maximum value of collector current for the voltage divider bias circuit.

- A. 2.5 mA
- B. 4 mA** ✓
- C. 5 mA
- D. 20 mA

Q57 Technical Abilities

Assertion (A): Switched Reluctance Motors (SRMs) exhibit high torque ripple.

Reason (R): SRMs operate based on constant and steady excitation of stator phases.

Which of the following is correct?

- A. Both A and R are true, but R is not the correct explanation of A.
- B. A is true, but R is false.** ✓
- C. A is false, but R is true.
- D. Both A and R are true, and R is the correct explanation of A.

Q58 Technical Abilities

Torque in reluctance motors is produced primarily due to?

- A. Magnetic saliency** ✓
- B. Permanent magnet alignment
- C. Induction principles
- D. Eddy current generation



Q59 Technical Abilities

How does a servo motor control its shaft position?

- A. By changing stator winding resistance
- B. Using pulse-width modulation (PWM) signals ✓
- C. By adjusting the frequency of the AC supply
- D. By varying input voltage

Q60 Technical Abilities

If the reactive power of a three-phase system is 12 kVAR and the active power is 16 kW, then what is the apparent power?

- A. 4 kVA
- B. 10 kVA
- C. 20 kVA ✓
- D. 28 kVA

Q61 Technical Abilities

If wind speed doubles, the Wind Power Density increases by a factor of _____.

- A. 4
- B. 8 ✓
- C. 2
- D. 6

Q62 Technical Abilities

What is the induced EMF called in a DC motor, which opposes the flow of current in the armature conductors?

- A. Induced voltage
- B. Supply EMF
- C. Back EMF ✓
- D. Field EMF

Q63 Technical Abilities

The important property of magnetic lines of force is that:

- A. magnetic lines of force never flows in closed loop.
- B. magnetic lines of force intersect within the magnet
- C. no two magnetic lines of force intersect each other ✓
- D. magnetic lines of force intersect each other at infinity

Q64 Technical Abilities

Which of the following is NOT an advantage of the underground system over the overhead system?

- A. Tapping for loads and service mains is easier ✓
- B. Lower chances of power failures
- C. Reduced voltage drops
- D. Better aesthetics and safety

Q65 Technical Abilities

What does the use of a single winding in an auto transformer result in?

- A. Increased size and weight
- B. Lower voltage regulation
- C. Higher losses
- D. Reduced copper consumption ✓

Q66 Technical Abilities

Assertion (A): Detent torque is present in permanent magnet stepper motors even when unpowered.
Reason (R): Detent torque arises from the interaction between the rotor magnets and stator teeth.
Which of the following option is correct?

- A. Both A and R are false.
- B. Both A and R are true, and R explains A. ✓
- C. A is false, but R is true.
- D. Both A and R are true, but R does not explain A.

Q67 Technical Abilities

A power plant has a rated capacity of 200 MW and operates for 10 hours per day throughout the year, generating 365,000 MWh. What is the Plant Use Factor?

- A. 70%
- B. 90%
- C. 50% ✓
- D. 85%

Q68 Technical Abilities

What is a critical consideration in the design and estimation of street lighting costs?

- A. Calculating the number of light fixtures, cable requirements, and energy consumption to determine overall costs ✓
- B. Focusing only on the aesthetic design of the streetlights
- C. Ignoring energy efficiency to reduce initial costs
- D. Eliminating the use of protective devices in the system



Q69 Technical Abilities

What is the primary purpose of preparing a material schedule and detailed estimation for an industrial installation?

- A. To eliminate the need for protective devices in the system
- B. To provide a comprehensive list of materials and costs for accurate project planning and execution ✓
- C. To ensure the project is completed without any documentation
- D. To focus only on the aesthetic aspects of the installation

Q70 Technical Abilities

Which system is responsible for delivering electricity from local transformers to end-users?

- A. Primary distribution system
- B. Secondary distribution system ✓
- C. Transmission system
- D. Generation system

Q71 Technical Abilities

Which of the following statements regarding phase sequence is INCORRECT?

- A. If two phases are interchanged, the phase sequence remains the same. ✓
- B. Phase sequence can be changed by interchanging two phases.
- C. The phase sequence in a three-phase system determines the direction of motor rotation.
- D. An incorrect phase sequence can cause a motor to run in reverse.

Q72 Technical Abilities

How does a ring main system improve reliability?

- A. It reduces voltage drop in the system.
- B. It reduces the number of distributors.
- C. It eliminates the need for a transformer.
- D. It allows power to be supplied from two directions. ✓

Q73 Technical Abilities

In an induction type directional overcurrent relay, what is the net torque at the balance point when the relay is on the verge of operating?

- A. Equal to zero ✓
- B. Equal to K_2
- C. Equal to $V I \cos(\theta - \alpha)$
- D. Equal to the pick-up torque of the relay

Q74 Technical Abilities

What is a key consideration when designing an electrical installation scheme for a factory?

- A. Providing adequate protection against overloads, short circuits, and earth faults ✓
- B. Ensuring the system is aesthetically pleasing
- C. Focusing only on lighting and ventilation systems
- D. Minimising the use of protective devices to reduce costs

Q75 Technical Abilities

What is the significance of the Quiescent point (Q-point) in a transistor amplifier circuit?

- A. It represents the minimum current gain of the transistor.
- B. It is the operating point where the transistor operates without an input signal. ✓
- C. It represents the maximum power output of the amplifier.
- D. It is the point where the transistor is cut off.

Q76 Technical Abilities

Core losses in a transformer are proportional to:

- A. the square of the voltage ✓
- B. the square of the load current
- C. the square of the frequency
- D. the square of the stator current

Q77 Technical Abilities

In a Francis turbine, which of the following components dynamically adjust(s) to regulate the flow rate and optimise power output under varying load conditions?

- A. Draft tube
- B. Spiral casing
- C. Runner blades
- D. Guide vanes ✓



Q78 Technical Abilities

When the armature and field of a DC motor are supplied with current, what does the armature experience?

- A. No force at all
- B. A force that tries to rotate it in an appropriate direction ✓
- C. An unstable force that tries to halt rotation
- D. A force that resists rotation

Q79 Technical Abilities

Determine the peak value of the output signal of the half wave rectifier or a series clipper realised using a single diode having forward voltage of 0.6 V, if the input applied the circuit is periodic sinusoidal signal of 10 V peak to peak voltage.

- A. 10 V
- B. 9.4 V
- C. 5 V
- D. 4.4 V ✓

Q80 Technical Abilities

What is the primary mechanism of current conduction in a Bipolar Junction Transistor (BJT)?

- A. Majority carrier conduction
- B. Electromagnetic induction
- C. Electrostatic induction
- D. Minority carrier conduction ✓

Q81 Technical Abilities

In a parallel resistance (R) and capacitor (C) circuit, if resistance R increases, the phase angle ϕ _____.

- A. becomes zero
- B. increases ✓
- C. remains the same
- D. decreases

Q82 Technical Abilities

The load on a power plant on a typical day is as given in the following table.

Time

- | |
|----------|
| A. 80% |
| B. 60% ✓ |
| C. 50% |
| D. 40% |

Q83 Technical Abilities

Calculate the ripple factor (in percentage) if the dc and ac voltmeter used to measure the output signal from a rectifier circuit gives the readings of 25 V dc and 1.5 V rms.

- A. 17%
- B. 25%
- C. 6% ✓
- D. 34%

Q84 Technical Abilities

What is the primary cause of the built-in potential at a p-n junction?

- A. Difference in electron affinity between p-type and n-type materials
- B. Diffusion of electrons from n-type to p-type material, resulting in a potential barrier ✓
- C. Difference in bandgap energy between p-type and n-type materials
- D. Drift of holes from p-type to n-type material, resulting in a potential barrier

Q85 Technical Abilities

In a three-phase balanced system, if the phase voltage is represented as $V_A = 230\angle 0^\circ$, then the voltage for phase B will be _____.

- A. $V_B = 230\angle 90^\circ$
- B. $V_B = 230\angle 120^\circ$
- C. $V_B = 230\angle -120^\circ$ ✓
- D. $V_B = 230\angle 100^\circ$

Q86 Technical Abilities

Laplace transform is applicable to _____ signals.

- A. non linear
- B. continuous time domain ✓
- C. integral time
- D. digital

Q87 Technical Abilities

The S.I. unit of work is _____ and energy is _____.

- A. Joule; Joule ✓
- B. Joule; Newton
- C. Watt; Joule
- D. Newton; Newton



Q88 Technical Abilities

The unit of reluctance is _____.

A. Ampere-turn/Weber



B. Ampere/Weber

C. Weber

D. Henry

Q89 Technical Abilities

The EMF generated in a rotating coil within a uniform magnetic field is maximum when _____.

A. the current is maximum

B. the rate of change of flux is minimum

C. the coil is parallel to the magnetic field

D. the coil is perpendicular to the magnetic field

**Q90 Technical Abilities**

One big CHALLENGE with Solar Panels (PV) compared to Concentrating Solar Power (CSP) is:

A. they completely stop working on cloudy days

B. they need high-tech factories to be made

C. they have lots of moving parts, making maintenance costly

D. they need costly batteries to store power for nighttime use

**Q91 Technical Abilities**

Which of the following statements is NOT correct regarding resonance in a series circuit?

A. The phase angle of the circuit is 90° .



B. The voltage across the capacitor and inductor is equal and opposite.

C. The net reactance of the circuit is zero.

D. The circuit behaves as a purely resistive circuit.

Q92 Technical Abilities

At the point of saturation in a DC series motor, the torque becomes proportional to:

A. field flux only

B. both armature current and field flux

C. armature current only



D. the square of the armature current

Q93 Technical Abilities

The phasor representation of current and voltage in a pure inductive circuit shows that _____.

A. voltage leads current by 90°



B. current and voltage are in phase

C. current leads voltage by 90°

D. voltage leads current by 180°

Q94 Technical Abilities

Select the correct advantage of a full-wave rectifier over a half-wave rectifier.

A. Higher efficiency and utilisation of both half-cycles of the AC input



B. Lower output voltage

C. Lower cost

D. Lower efficiency and utilisation of only one half-cycle of the AC input

Q95 Technical Abilities

If the capacitance C in a parallel RLC circuit decreases, what happens to resonant frequency f_0 ?

A. Decreases

B. Becomes zero

C. Increases



D. Remains constant

Q96 Technical Abilities

Two capacitors A and B are connected in series across a 200 V DC supply. The PD across A is 60 V. This PD is increased to 80 V when a $3\ \mu\text{F}$ capacitor is connected in parallel with B. Calculate the capacitance of B.

A. $2.7\ \mu\text{F}$

B. $3.5\ \mu\text{F}$

C. $5.4\ \mu\text{F}$



D. $7.8\ \mu\text{F}$



Q97 Technical Abilities

Which of the following statements describe applications of three-phase squirrel cage induction motors?

- I. Driving escalators and elevators.
- II. Powering household refrigerators.
- III. Operating centrifugal pumps in industrial plants.
- IV. Used in electric vehicles for propulsion.

- A. I and IV only correct
- B. I, II, and III only correct
- C. II, and IV only correct
- D. I and III only correct

Q98 Technical Abilities

Why do inverted V-curves have an inverted "V" shape ?

- A. Armature current peaks at unity power factor
- B. Power factor peaks at optimal excitation (unity PF)
- C. Stator resistance varies non-linearly with excitation
- D. Mechanical load affects excitation linearly

Q99 Technical Abilities

Inductance of a coil _____ when we place an iron bar inside it.

- A. increases
- B. decreases
- C. reduces to zero
- D. remains unchanged

Q100 Technical Abilities

Applications of synchronous reluctance motors include:
I. Industrial compressors for improved energy efficiency.
II. Electric trains for high starting torque capabilities.
III. Solar-powered water pumps for reliability.
IV. Consumer drones for compact size.

- A. Statement II and III only correct.
- B. Statement II and IV only correct.
- C. Statement I and IV only correct.
- D. Statement I and III only correct.

Q101 Technical Abilities

The material used in the armature core of a DC generator is typically:

- A. aluminium
- B. copper
- C. silicon steel
- D. plastic

Q102 Technical Abilities

For a Zener diode working in reverse bias condition, the Zener current is _____ for supply voltage _____ the Reverse Zener breakdown voltage.

- A. close to zero; greater than
- B. close to infinity; less than
- C. close to zero; less than
- D. close to infinity; greater than

Q103 Technical Abilities

For a P-N junction diode, thermal equilibrium occurs when _____.

- A. force produced by the electric field is less than the 'force' produced by the density gradient
- B. force produced by the electric field is always zero
- C. 'force' produced by the electric field and the 'force' produced by the density gradient exactly balance
- D. force produced by the electric field is greater than the 'force' produced by the density gradient

Q104 Technical Abilities

What happens to the Fermi level in a p-n junction at equilibrium?

- A. It disappears at the junction.
- B. It falls in the p-side and rises in the n-side.
- C. It rises in the p-side and falls in the n-side.
- D. It remains constant throughout the junction.

Q105 Technical Abilities

Which of the following statements best describes the benefit of a Power Factor Tariff in energy conservation?

- A. It has no impact on energy conservation or system efficiency.
- B. It encourages consumers to maintain a high power factor, reducing losses and improving system efficiency.
- C. It only applies to residential consumers and does not affect industrial or commercial users.
- D. It increases the overall electricity cost regardless of power factor improvement.



Q106 Technical Abilities

Which of the following statements is/are correct?

Statement 1: A single large generating unit requires periodic maintenance, which may lead to a complete shutdown of power supply.

Statement 2: In a multi-unit system, maintenance can be scheduled without completely interrupting power generation.

A. Both Statement 1 and Statement 2



B. Only Statement 2

C. Neither Statement 1 nor Statement 2

D. Only Statement 1

Q107 Technical Abilities

Which of the following is NOT an example of solid biomass?

A. Firewood

B. Sugarcane bagasse

C. Natural gas



D. Wood pellets

Q108 Technical Abilities

In an SF₆ (Sulphur Hexafluoride) circuit breaker, the fixed contact is:

A. a hollow cylinder contact with an arc horn



B. a spherical contact with an insulating shield

C. a flat plate contact with thermal insulation

D. a solid cylindrical contact with no additional fittings

Q109 Technical Abilities

Which of the following statements is/are true?

Statement (I): High voltage drop in residential areas can cause lights to dim or flicker.

Statement (II): Voltage drop occurs due to excessive power consumption in a household.

A. Both Statement (I) and Statement (II) are true.



B. Only Statement (II) is true.

C. Only Statement (I) is true.

D. Neither Statement (I) nor Statement (II) is true.

Q110 Technical Abilities

Whenever a P-N junction diode is forward biased, the width of the space charge region _____ and the forward current _____ for rise in supply voltage.

A. becomes zero; decreases

B. becomes zero; increases

C. increases; decreases

D. decreases; increases

**Q111 Technical Abilities**

Which of the following is a significant feature of Scott connection transformers?

A. They provide high voltage output.

B. They provide a 2-phase output from a 3-phase input.



C. They are used for stepping down voltage only.

D. They convert 1-phase power into 3-phase.

Q112 Technical Abilities

A hydro power plant with an installed capacity of 10 MW falls under which of the following categories?

A. Mini hydro

B. Medium hydro

C. Large hydro

D. Small hydro

**Q113 Technical Abilities**

Which of the following factors most significantly affects the efficiency of a Fresnel reflector in a solar concentrator system?

A. The temperature of the environment

B. The wavelength of incident light

C. The number of mirror strips and their alignment accuracy



D. The colour of the reflector material

Q114 Technical Abilities

A diode rectifier circuit has an AC input voltage of 230 Vrms and a load resistance of 1 kΩ with a capacitor. The primary function of the capacitor is to:

A. decrease the output voltage

B. filter out the AC ripples and smooth the output voltage



C. regulate the output voltage

D. increase the output voltage



Q115 Technical Abilities

In a Synchronous reluctance motor, flux barriers are typically filled with _____

- A. Copper
- B. Ferrite
- C. Laminated steel
- D. Air or non-magnetic material ✓

Q116 Technical Abilities

The back-EMF waveform of a BLDC motor is typically _____

- A. Triangular
- B. Square
- C. Sinusoidal
- D. Trapezoidal ✓

Q117 Technical Abilities

Why are wind turbine blades made of glass fibre reinforced polyester?

- A. To increase the efficiency of power transmission
- B. To reduce cost
- C. To make them heavier for stability
- D. To provide lightweight strength and durability ✓

Q118 Technical Abilities

For small capacity motors (up to 3 Hp), what voltage can be applied at startup?

- A. Zero voltage
- B. Half the normal voltage
- C. Double the normal voltage
- D. Full normal voltage ✓

Q119 Technical Abilities

Why is WRIG preferred over Squirrel Cage Induction Generator (SCIG) in some wind turbines?

- A. WRIG does not require maintenance due to the absence of slip rings
- B. WRIG works only with constant-speed wind turbines
- C. WRIG has no moving parts, making it more durable
- D. WRIG allows external rotor resistance control, enabling better efficiency and power factor control ✓

Q120 Technical Abilities

Select the option that is correct regarding the following two statements labelled Assertion (A) and Reason (R).

Assertion (A): The neutral wire in a star-connected balanced three-phase system carries no current.

Reason (R): In a balanced system, the sum of the three-phase current phasors is always zero.

- A. Both A and R are true, but R is not the correct explanation of A.
- B. Both A and R are true, and R is the correct explanation of A. ✓
- C. A is true, but R is false.
- D. A is false, but R is true

Q121 Technical Abilities

A hydroelectric power plant has the following parameters:

- Flow rate (Q) = 50 m³/s
- Electrical power output (P_{out}) = 8 MW
- Water density (ρ) = 1000 kg/m³
- Acceleration due to gravity (g) = 10 m/s²

To achieve an overall efficiency of 80%, what should be the required net head (H)?

- A. 18.75 m
- B. 19.50 m
- C. 20 m ✓
- D. 22.15 m

Q122 Technical Abilities

What is the modified starter called when the holding coil circuit is made independent of the field circuit?

- A. 3-point starter
- B. 5-point starter
- C. 4-point starter ✓
- D. 2-point starter

Q123 Technical Abilities

In a transmission line with supports at different heights, the lowest point of the conductor is located:

- A. closer to the higher support
- B. exactly at the midpoint of the span
- C. closer to the lower support ✓
- D. at the higher support



Q124 Technical Abilities

The unit of magnetising force is:

- A. joule/weber
- B. henry/metre
- C. ampere/metre** ✓
- D. weber/metre²

Q125 Technical Abilities

Ohm's law for a magnetic circuit is given by ratio of:

- A. magnetomotive force to magnetic reluctance** ✓
- B. magnetomotive force to permeance
- C. magnetic reluctance to magnetomotive force
- D. magnetic reluctance to magnetic flux

Q126 Technical Abilities

A transmission line has a span length of 300 metres, and the conductor weight is 1.2 N/m. If the tension in the conductor is 6000 N, what is the sag?

- A. 2.25 m** ✓
- B. 1 m
- C. 5 m
- D. 6 m

Q127 Technical Abilities

Which of the following statements are correct for repulsion-induction motors?

- I. They combine features of repulsion and induction motors.
- II. The rotor has both commutator and squirrel-cage windings.
- III. Speed decreases sharply with increasing load.
- IV. They are used in applications requiring constant speed.

- A. Statement I and II only correct** ✓
- B. Statement III and IV only correct
- C. Statement I and IV only correct
- D. Statement II and III only correct

Q128 Technical Abilities

Which of the following options is always true about the demand factor?

- A. It is always equal to the utilisation factor.
- B. It is always less than or equal to 1.** ✓
- C. It is always greater than 1.
- D. It is always equal to the diversity factor.

Q129 Technical Abilities

Copper losses in a transformer are proportional to:

- A. the square of the voltage
- B. the square of the turns ratio
- C. the square of the frequency
- D. the square of the load current** ✓

Q130 Technical Abilities

In a DC series motor, at low or light load, why is the torque low?

- A. Due to the saturation of the field cores
- B. Due to the low armature current and low field flux** ✓
- C. Due to the high armature current
- D. Due to the high field flux

Q131 Technical Abilities

An alternating current is one whose magnitude ____ and direction ____.

- A. changes continuously; remain the same
- B. does not change; changes periodically
- C. does not change; remains the same
- D. changes continuously; changes periodically** ✓

Q132 Technical Abilities

Match the following sources of error in a CT with their corresponding causes.

Error Type	Cause
1. Ratio Error	A. Leakage flux in windings
2. Phase Angle Error	B. Magnetising current requirement
3. Hysteresis Error	C. Non-ideal core material properties
4. Leakage Reactance Error	D. Residual magnetism in the core

- A. 1 → A, 2 → B, 3 → D, 4 → C
- B. 1 → B, 2 → A, 3 → D, 4 → C
- C. 1 → B, 2 → C, 3 → D, 4 → A** ✓
- D. 1 → B, 2 → A, 3 → C, 4 → D



Q133 Technical Abilities

What is the primary purpose of estimation in electrical installations?

- A. To predict the cost, materials and time required for completing an electrical project ✓
- B. To ensure compliance with aesthetic design standards
- C. To replace the need for protective devices in electrical systems
- D. To focus solely on the operation and maintenance of electrical systems

Q134 Technical Abilities

Force acting on two parallel current-carrying conductors is _____, if the current is in the same direction.

- A. attractive ✓
- B. repulsive
- C. zero
- D. infinite

Q135 Technical Abilities

A 10-ohm resistor is connected across a 12-V battery. How much current flows through the resistor?

- A. 2.0 A
- B. 120 A
- C. 1.2 A ✓
- D. 0.8 A

Q136 Technical Abilities

The real part of admittance in phasor form is called _____ and the imaginary part is called _____.

- A. resistance; reactance
- B. impedance; reactance
- C. conductance; susceptance ✓
- D. reactance; conductance

Q141 Technical Abilities

A current impulse signal of $4\delta(t)$ is forced through a capacitor C. The voltage $V_c(t)$ across capacitor is given by:

- A. $\frac{4}{C}t$
- B. $\frac{4 \cdot u(t)}{C}$ ✓
- C. $4 \cdot t$
- D. $4 \cdot u(t) - C$

Q137 Technical Abilities

How can eddy current loss be reduced in the armature core?

- A. By using a high resistance core material
- B. By increasing the core resistance
- C. By laminating the core to reduce the flow of eddy currents ✓
- D. By increasing the motor's speed

Q138 Technical Abilities

Which of the following is a common application of universal motors?

- A. Ceiling fans
- B. Air conditioners
- C. Vacuum cleaners ✓
- D. Refrigerators

Q139 Technical Abilities

What happens to the depletion layer in a P-N junction when it is reverse-biased?

- A. The depletion layer remains unchanged.
- B. The depletion layer widens. ✓
- C. The depletion layer narrows.
- D. The depletion layer disappears.

Q140 Technical Abilities

In which situation will an EMF be induced in a conductor, according to Faraday's Laws?

- A. When the magnetic field is constant
- B. When the temperature of the conductor increases
- C. When there is relative motion between a conductor and a magnetic field ✓
- D. When the conductor is stationary in a magnetic field



Q142 Technical Abilities

If R is the resistance of an R-L series circuit and reactive inductance is X_L , then the power factor of a series R-L circuit is given by _____.

A. $\cos\theta = \frac{R}{X_L}$

B. $\cos\theta = \frac{Z}{R}$

C. $\cos\theta = \frac{R}{Z}$ ✓

D. $\cos\theta = \frac{X_L}{Z}$

Q143 Technical Abilities

In a three-phase system, the active power (P) is given by which of the following formulas?

A. $V_L I_L \cos \emptyset$

B. $V_L I_L$

C. $3V_L I_L \cos \emptyset$

D. $\sqrt{3} V_L I_L \cos \emptyset$ ✓

Q144 Technical Abilities

Consider three doping concentration levels represented by i) n^{++} , ii) p^+ and iii) n . Relate the corresponding doping concentration with emitter, base and collector regions for a NPN transistor.

A. i) n^{++} corresponds to base, ii) p^+ corresponds to emitter and iii) n for collector

B. i) n^{++} corresponds to collector, ii) p^+ corresponds to base and iii) n for emitter

C. i) n^{++} corresponds to base, ii) p^+ corresponds to collector and iii) n for emitter

D. i) n^{++} corresponds to emitter, ii) p^+ corresponds to base and iii) n for collector ✓

