रेलवे भर्ती बोर्ड / RAILWAY RECRUITMENT BOARD

सी ई एन नं. - 03/2024 / CEN No. - 03/2024

Test Date	22/04/2025
Test Time	9:00 AM - 11:00 AM
Subject	RRB JE Stage 2 Electrical and Allied Engineering

*** Note**
Correct Answer will carry 1 mark per Question.
Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.
2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : **General Abilities**

Q.1	**Which type of RAM is faster and DOES NOT require refreshing?**
Ans	✔ 1. SRAM
	✘ 2. Flash Memory
	✘ 3. ROM
	✘ 4. DRAM

Q.2	**The kinetic energy of an object is derived using which of the following equations of motion?**
Ans	✘ 1. $s = ut + \frac{1}{2}at^2$
	✘ 2. $a = (v - u) / t$
	✔ 3. $v^2 - u^2 = 2as$
	✘ 4. $v = u + at$

Q.3	**Which of the following was NOT an artisan guild during the Mauryan period?**
Ans	✘ 1. Potters
	✘ 2. Carpenters
	✘ 3. Bankers and Merchants
	✔ 4. Astrologers

Q.4	**Which operating system is known for its open-source nature and community-driven development for desktops and laptops?**
Ans	✘ 1. iOS
	✔ 2. Linux
	✘ 3. Windows
	✘ 4. macOS

Q.5	**The main reason for which we are dependent on air is our _____.**
Ans	✔ 1. respiration
	✘ 2. excretion
	✘ 3. digestion
	✘ 4. osmoregulation

Q.6	Which of the following elements has an atomic number of 8?
Ans	✗ 1. Nitrogen
	✓ 2. Oxygen
	✗ 3. Carbon
	✗ 4. Hydrogen

Q.7	What does LAN stand for?
Ans	✓ 1. Local Area Network
	✗ 2. Limited Access Node
	✗ 3. Linked Access Network
	✗ 4. Large Area Network

Q.8	A sound wave with a low frequency will have _____.
Ans	✓ 1. a low pitch
	✗ 2. a high pitch
	✗ 3. a short wavelength
	✗ 4. a low amplitude

Q.9	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?
Ans	✗ 1. Schneider Kreuznach
	✗ 2. Leica
	✗ 3. Jenoptik
	✓ 4. Carl Zeiss AG

Q.10	Who among the following developed the notation system for Hindustani classical music?
Ans	✓ 1. Pandit Vishnu Narayan Bhatkhande
	✗ 2. Ustad Amjad Ali Khan
	✗ 3. Ustad Bismillah Khan
	✗ 4. Pandit Ravi Shankar

Q.11	Who among the following Indian female cricketers won the Best International Cricketer Award (Women) at the BCCI Naman Awards 2025?
Ans	✗ 1. Mithali Raj
	✓ 2. Smriti Mandhana
	✗ 3. Harmanpreet Kaur
	✗ 4. Jhulan Goswami

Q.12	A ball of mass 50 grams is moving with a velocity of 15 m/s. What is its kinetic energy?
Ans	✓ 1. 5.625 J
	✗ 2. 3.750 J
	✗ 3. 1.875 J
	✗ 4. 7.500 J

Q.13	In an aquatic ecosystem, the phenomenon of biomagnification can best be studied in the case of _____.
Ans	✗ 1. chlorine
	✗ 2. phosphates
	✗ 3. organochlorine
	✓ 4. DDT

Q.14	An object is placed 15 cm in front of a convex lens of focal length 25 cm. The image distance will be _____.
Ans	✗ 1. 17.5 cm
	✗ 2. −9.37 cm
	✗ 3. −10.0 cm
	✓ 4. −37.5 cm

Q.15	Which function key is used to move text or graphics in a document?
Ans	✗ 1. F1
	✗ 2. F5
	✓ 3. F2
	✗ 4. F12

Q.16	Which formula should be entered in cell C2 to multiply the values of cells A2 and B2 in Excel?
Ans	✗ 1. =A2+B2
	✓ 2. =A2*B2
	✗ 3. =MULTIPLY(A2,B2)
	✗ 4. =A2-B2

Q.17	The atomic mass of sulphur is 32 u, and sulphur exists as S_8 molecules. What is the molecular mass of sulphur?
Ans	✓ 1. 256 u
	✗ 2. 64 u
	✗ 3. 32 u
	✗ 4. 128 u

Q.18	Where can one find the option to change a PowerPoint template?
Ans	✓ 1. Design → Themes
	✗ 2. Home → Layout
	✗ 3. View → Slide Master
	✗ 4. Insert → Themes

Q.19	What happens to the pH of pure water when a few drops of lemon juice are added?
Ans	✗ 1. The pH remains the same
	✗ 2. The pH becomes neutral
	✓ 3. The pH decreases
	✗ 4. The pH increases

Q.20	Which of the following is NOT a source of collection of municipal solid waste?
Ans	✗ 1. Waste from hospitals
	✗ 2. Waste from schools
	✓ 3. Radioactive waste
	✗ 4. Waste from homes

Q.21	What is the primary function of a computer firewall?
Ans	✗ 1. To store user passwords securely
	✓ 2. To prevent unauthorised access to a private network
	✗ 3. To speed up internet connectivity
	✗ 4. To detect and remove computer viruses

Q.22	Who among the following referred to the Directive Principles as the 'life-giving provisions' of the Constitution of India?
Ans	✗ 1. Ivor Jennings
	✓ 2. LM Singhvi
	✗ 3. BR Ambedkar
	✗ 4. HM Seervai

Q.23	The people of _____ were famously involved in execution of the Chipko movement.
Ans	✓ 1. Garhwal Himalayas
	✗ 2. Assam
	✗ 3. Gujarat
	✗ 4. Delhi

Q.24	Which of the following bridges is constructed over the Brahmaputra River in India?
Ans	✓ 1. Dhola-Sadiya Bridge
	✗ 2. Howrah Bridge
	✗ 3. Pamban Bridge
	✗ 4. Mahatma Gandhi Setu

Q.25 Which of the following correctly differentiates mixtures and compounds?

Feature	Mixture	Compound
A) Separation	Can be separated by physical methods	Requires chemical me
B) Composition	Fixed ratio	Variable ratio
C) Properties	Always the same as constituents	Different from consti
D) Formation	By chemical reaction	By simple mixing

Ans	✗ 1. Option B (Composition) is correct
	✓ 2. Option A (Separation) is correct
	✗ 3. Option D (Formation) is correct
	✗ 4. Option C (Properties) is correct

Q.26	A car moving at a constant speed of 123 km/hr along a straight road is an example of _____.
Ans	✗ 1. random motion
	✗ 2. rotational motion
	✗ 3. non-uniform motion
	✓ 4. uniform motion

Q.27	The President has the power to dissolve which house of Parliament?
Ans	✓ 1. Lok Sabha only
	✗ 2. Legislative Assembly
	✗ 3. Both Rajya Sabha and Lok Sabha
	✗ 4. Rajya Sabha only

Q.28	Electricity production is categorised under which of the following economic sectors?
Ans	✗ 1. Quaternary sector
	✓ 2. Secondary sector
	✗ 3. Primary sector
	✗ 4. Tertiary sector

Q.29	Which country proposed the idea of holding a United Nations conference on human interactions with the environment in 1968?
Ans	✔ 1. Sweden
	✘ 2. Canada
	✘ 3. United States
	✘ 4. France

Q.30	A metal wire is stretched, but it does not break easily. This property is known as:
Ans	✘ 1. brittleness
	✘ 2. malleability
	✘ 3. hardness
	✔ 4. ductility

Q.31	The wavelength of ultraviolet radiations which is most powerful and causes damage to the DNA is _____.
Ans	✔ 1. UV-B
	✘ 2. UV-A
	✘ 3. UV-D
	✘ 4. UV-C

Q.32	Which of the following will increase the heat produced by a heating element?
Ans	✔ 1. Increasing the current flowing through the wire
	✘ 2. Using a material with high conductivity
	✘ 3. Using a wire of lower resistance
	✘ 4. Decreasing the applied voltage

Q.33	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?
Ans	✘ 1. 20%
	✔ 2. 16.67%
	✘ 3. 45%
	✘ 4. 25%

Q.34	The power to issue an ordinance when Parliament is NOT in session is given to the President under which Article?
Ans	✘ 1. Article 356
	✔ 2. Article 123
	✘ 3. Article 110
	✘ 4. Article 72

Q.35	What is the primary function of a firewall tool in a computer network?
Ans	✘ 1. To speed up internet connections
	✘ 2. To store data securely
	✘ 3. To detect and remove viruses
	✔ 4. To monitor and control incoming and outgoing network traffic

Q.36	Radiations that are emitted from nuclear wastes are known to cause _____ at a high rate.
Ans	✔ 1. mutations
	✘ 2. emotional defects
	✘ 3. syndromes
	✘ 4. diseases

Q.37	Which of the following options is NOT a greenhouse gas?
Ans	✘ 1. Carbon dioxide
	✘ 2. Nitrous oxide
	✘ 3. Methane
	✔ 4. Carbon tetrachloride

Q.38	A concave lens has a focal length of −2 cm. What is its power?
Ans	✘ 1. 25 D
	✘ 2. 0.5 D
	✔ 3. −50 D
	✘ 4. −0.5 D

Q.39	For the protection and improvement of the environmental quality, the Environment Protection Act came into force in the year _____.
Ans	✔ 1. 1986
	✘ 2. 1992
	✘ 3. 1972
	✘ 4. 1984

Q.40	In which of the following events did Deepthi Jeevanji set a world record at the 2024 World Para Athletics Championships?
Ans	✘ 1. 600 metres T20
	✘ 2. 200 metres T20
	✘ 3. 100 metres T20
	✔ 4. 400 metres T20

Q.41	Which of the following is NOT toxic to non-target organisms in the soil?
Ans	✘ 1. Fungicides
	✔ 2. Organic fertilisers
	✘ 3. Pesticides
	✘ 4. Herbicides

Q.42	What happens when you click on the 'Forward' button in an email?
Ans	✘ 1. The email is automatically sent to all contacts.
	✘ 2. A blank email opens.
	✘ 3. The email is permanently deleted.
	✔ 4. The original message is copied into a new email draft.

Q.43	Which of the following MS Excel functions is used to convert a numeric value into a text with a specific format?
Ans	✘ 1. VALUE()
	✘ 2. NUMBERTOTEXT()
	✘ 3. FORMAT()
	✔ 4. TEXT()

Q.44	Who is known as the leader of the Green Revolution in India?
Ans	✗ 1. C Subramaniam
	✓ 2. Prof. MS Swaminathan
	✗ 3. Tribhuvandas Kishibhai Patel
	✗ 4. Dr. Rajendra Prasad

Q.45	An alloy is considered a homogeneous mixture because:
Ans	✓ 1. it exhibits uniform composition throughout
	✗ 2. its components are chemically combined in fixed proportions
	✗ 3. its components can be separated by filtration
	✗ 4. it contains two or more phases

Q.46	Due to global warming, the temperature of the earth has increased by _____
Ans	✗ 1. 0.8°C
	✓ 2. 0.6°C
	✗ 3. 0.5°C
	✗ 4. 0.7°C

Q.47	What is the general orientation of the Himalayan ranges in the northwestern part of India?
Ans	✗ 1. East-South
	✓ 2. Northwest to Southeast
	✗ 3. Northeast to Southwest
	✗ 4. South-North

Q.48	Who among the following established the Bengal Chemical Swadeshi Stores?
Ans	✗ 1. Surendranath Banerjee
	✓ 2. Acharya PC Ray
	✗ 3. BG Tilak
	✗ 4. Dadabhai Naoroji

Q.49	Why do covalent compounds generally have low melting and boiling points?
Ans	✗ 1. They have a rigid lattice structure.
	✓ 2. They have weak intermolecular forces.
	✗ 3. They have strong electrostatic forces.
	✗ 4. They contain metallic bonds.

Q.50	In January 2025, India launched the NVS-02 satellite to strengthen which of the following navigation systems?
Ans	✗ 1. Global Positioning System (GPS)
	✗ 2. Global Navigation Satellite System (GLONASS)
	✓ 3. Navigation with Indian Constellation (NavIC)
	✗ 4. Galileo

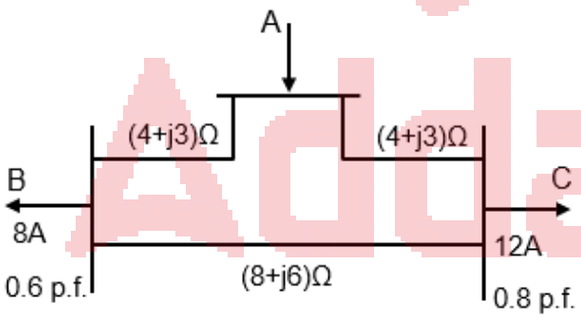
Section : **Technical Abilities**

Q.1	**In Shunt Zener diode voltage regulator circuit, the purpose of the resistor (R) connected in series with the input voltage is:**
Ans	✗ 1. to filter out noise and ripples in the output voltage
	✗ 2. to amplify the input voltage
	✓ 3. to limit the current through the Zener diode
	✗ 4. to add the input voltage and voltage drop across the resistor R and provide it to the Zener diode

Q.2	**In arc heating, the arc is sustained by:**
Ans	✗ 1. dielectric strength of air
	✗ 2. magnetic field
	✓ 3. ionisation of air
	✗ 4. heat conduction

Q.3	**The difference between Capacity Factor and Load Factor represents _____.**
Ans	✗ 1. the total energy consumed by the plant
	✗ 2. the plant's efficiency in converting fuel to electricity
	✗ 3. the maximum demand of the plant
	✓ 4. the plant's reserve capacity for future load growth

Q.4	**Which of the following is characteristic of soft magnetic materials?**
Ans	✗ 1. Large hysteresis loss
	✓ 2. Low coercivity
	✗ 3. Low relative permeability
	✗ 4. Low absolute permeability

Q.5	**Find the total current fed at the sending end A, in the given ring distributor ABC_____.** 
Ans	✗ 1. (13.6 + j14.4) A
	✗ 2. (12 + j8)
	✓ 3. (14.4 + j13.6) A
	✗ 4. (8 + j6) A

Q.6	**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.**
Ans	✗ 1. A is false, but R is true
	✓ 2. Both A and R are true, but R is not the correct explanation of A.
	✗ 3. A is true, but R is false.
	✗ 4. Both A and R are true, and R is the correct explanation of A.

Q.7	With reference to energy band diagram of the NPN BJT, there exist _____ space charge regions and maximum band bending at _____ junction.
Ans	✗ 1. three; base collector
	✓ 2. two; base emitter
	✗ 3. three; base emitter
	✗ 4. two; base collector

Q.8	The 'π (Pi) Model' or the 'T Model' is commonly used to represent which type of transmission line?
Ans	✓ 1. Medium transmission line (80 km to 160 km)
	✗ 2. Long transmission line (more than 160 km)
	✗ 3. Ultra-high voltage transmission line (above 1000 km)
	✗ 4. Short transmission line (less than 80 km)

Q.9	Why are short-pitch windings preferred in alternators despite their lower induced EMF per coil?
Ans	✗ 1. They eliminate the need for insulation.
	✗ 2. They increase the length of end connections.
	✗ 3. They allow for higher voltage ratings.
	✓ 4. They increase the overall efficiency.

Q.10	In a Star-Delta Starter used for induction motors, the starting torque is reduced to approximately:
Ans	✓ 1. 33% of full-load torque
	✗ 2. 66% of full-load torque
	✗ 3. 50% of full-load torque
	✗ 4. 75% of full-load torque

Q.11	Microwave heating is based on the principle of:
Ans	✗ 1. conduction heating
	✓ 2. dielectric heating
	✗ 3. induction heating
	✗ 4. arc heating

Q.12	Which of the following is a key characteristic of a slip ring induction motor?
Ans	✗ 1. High efficiency at all loads
	✗ 2. Low starting torque and high starting current
	✗ 3. Operates only at synchronous speed
	✓ 4. High starting torque and low starting current

Q.13	What is the primary purpose of estimation and costing in unit earthing for commercial installations?
Ans	✗ 1. To eliminate the need for earthing in electrical systems
	✓ 2. To determine the materials, labour and costs required for a safe and effective earthing system
	✗ 3. To ensure the earthing system is aesthetically pleasing
	✗ 4. To focus only on the decorative aspects of the installation

Q.14	**Consider a fixed bias circuit using a NPN BJT transistor in CE configuration along with base resistance Rb, collector resistance Rc and supply voltage Vcc. If β is the current gain of the BJT, then the stability factor of the fixed bias circuit is:**
Ans	✗ 1. inversely proportional to β
	✗ 2. independent of β
	✓ 3. directly proportional to β
	✗ 4. inversely proportional to square of β

Q.15	**What is the primary purpose of 'Inter-Turn Fault Protection' in an alternator?**
Ans	✗ 1. To detect faults between the rotor and stator windings
	✗ 2. To monitor the voltage imbalance in the alternator
	✗ 3. To protect against earth faults in the rotor winding
	✓ 4. To detect faults between adjacent turns of the stator winding

Q.16	**The direction of the induced EMF in a coil may be found with the help of:**
Ans	✓ 1. Fleming's right-hand rule
	✗ 2. Fleming's left-hand rule
	✗ 3. Steinmetz's law
	✗ 4. Faraday's law

Q.17	**In a synchronous motor, If the load angle exceeds 90°, then the motor will:**
Ans	✓ 1. lose synchronism and stall
	✗ 2. reduce copper losses
	✗ 3. increase efficiency
	✗ 4. operate at leading power factor

Q.18	**What is the role of heliostats in a power tower system?**
Ans	✗ 1. To store solar energy for later use
	✗ 2. To convert thermal energy into electrical energy
	✓ 3. To track the Sun and direct sunlight to the receiver
	✗ 4. To generate electricity directly

Q.19	**What law explains the induction of eddy currents in the armature core?**
Ans	✗ 1. Lenz's Law
	✓ 2. Faraday's Law
	✗ 3. Ohm's Law
	✗ 4. Ampere's Law

Q.20	**In an auto transformer, if the voltage transformation ratio is 2 : 1, what is the ratio of the primary current to the secondary current?**
Ans	✗ 1. 2 : 1
	✓ 2. 1 : 2
	✗ 3. 1 : 1
	✗ 4. 2 : 3

Q.21	**What is the purpose of '100% Stator Earth Fault Protection' in an alternator?**
Ans	✗ 1. To monitor the voltage regulation of the alternator
	✓ 2. To detect and protect against earth faults occurring anywhere in the stator winding
	✗ 3. To detect and protect against phase-to-phase faults in the stator winding
	✗ 4. To protect the rotor winding from overheating

Q.22	**Which of the following statements is NOT correct regarding the errors in a Potential Transformer?**
Ans	✗ 1. Both Power angle error and Ratio error influence Power measurement.
	✗ 2. Both Power angle error and Ratio error are important for measuring Voltage.
	✓ 3. Power angle error alone affects Voltage measurement in a Potential Transformer.
	✗ 4. Voltage measurement in a Potential Transformer depends primarily on Ratio error.

Q.23	**In the torque-load characteristic curve of a DC series motor, what happens as the load increases?**
Ans	✗ 1. The torque becomes constant.
	✗ 2. The torque decreases proportionally.
	✓ 3. The torque increases proportionally to the square of the armature current.
	✗ 4. The armature current decreases.

Q.24	**Fleming's Right-Hand Rule is used to determine the direction of:**
Ans	✗ 1. magnetic field around a conductor
	✓ 2. the induced electromotive force
	✗ 3. force on a charged particle
	✗ 4. current flowing through a conductor

Q.25	**In j-notation, used in phasor representation, the imaginary unit j^2 represents ____.**
Ans	✓ 1. -1
	✗ 2. $\sqrt{-1}$
	✗ 3. 1
	✗ 4. 0

Q.26	**A power system with a high reactive power demand will result in _____.**
Ans	✗ 1. high power factor
	✗ 2. no change in power factor
	✗ 3. unity power factor
	✓ 4. low power factor

Q.27	**Which factor does NOT affect the starting torque of an induction start synchronous motor?**
Ans	✓ 1. Field excitation during startup
	✗ 2. Rotor reactance
	✗ 3. Rotor resistance
	✗ 4. Supply voltage

Q.28	**In a power triangle, what is the relationship between active power (P), reactive power (Q) and apparent power (S)?**
Ans	✗ 1. $Q^2 = S^2 + P^2$
	✗ 2. $P^2 = S^2 + Q^2$
	✗ 3. $S = P + Q$
	✓ 4. $S^2 = P^2 + Q^2$

Q.29	**In a series RLC circuit, the total impedance is minimum when _____.**
Ans	✗ 1. $X_L < X_c$
	✗ 2. $X_L > X_c$
	✗ 3. the resistance is zero
	✓ 4. $X_L = X_C$

Q.30	**What is the main drawback of using an induction generator in a grid-connected wind turbine?**
Ans	✗ 1. It is not suitable for wind energy applications.
	✗ 2. It cannot generate active power.
	✓ 3. It requires external reactive power from the grid.
	✗ 4. It cannot operate at high speeds.

Q.31	In a three – phase induction motor which component represents mechanical load in the equivalent circuit?
Ans	✗ 1. $R_2(1-s)$
	✓ 2. $\frac{R_2(1-s)}{s}$
	✗ 3. $\frac{sR_2(1-s)}{s}$
	✗ 4. $\frac{R_2}{s}$

Q.32	**In a three-phase star-connected system with a neutral shift, how can the problem be corrected?**
Ans	✗ 1. By increasing the phase voltage
	✗ 2. By increasing the neutral wire resistance
	✗ 3. By disconnecting the neutral wire
	✓ 4. By balancing the load among the three phases

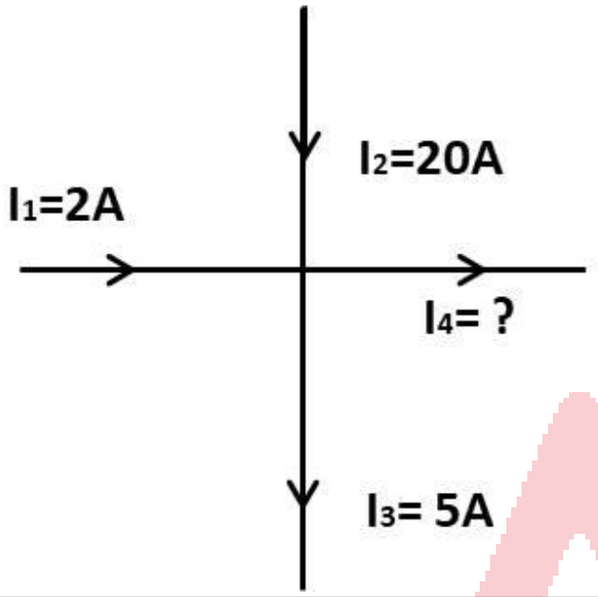
Q.33	**Read the given Assertion (A) and Reason (R) carefully and select the correct option.** **(A): The burden of an instrument transformer is usually expressed in volt-amperes (VA).** **(R): Burden is the total impedance of the connected devices, including meters, relays, and wiring.**
Ans	✓ 1. Both A and R are true and R is the not the correct explanation of A.
	✗ 2. A is false, but R is true.
	✗ 3. A is true, but R is false.
	✗ 4. Both A and R are true and R is the correct explanation of A.

Q.34	**What is the first step in the design procedure for electrical installations in commercial buildings?**
Ans	✓ 1. Conducting a load analysis to determine power requirements
	✗ 2. Installing protective devices without planning
	✗ 3. Selecting decorative lighting fixtures
	✗ 4. Ignoring safety standards to reduce costs

Q.35	**Which connection method is correct when using a CT and PT with a wattmeter?**
Ans	✓ 1. CT is connected in series with the wattmeter current coil, and PT is connected in parallel with the voltage coil.
	✗ 2. CT is connected in parallel with the wattmeter current coil, and PT is connected in series with the voltage coil.
	✗ 3. Both CT and PT are connected in series with the wattmeter.
	✗ 4. Both CT and PT are connected in parallel with the wattmeter.

Q.36	When armature conductors carry a lower load current, the armature's MMF (magnetomotive force) causes:
Ans	✗ 1. no effect on the main field flux
	✗ 2. the main field flux to strengthen
	✗ 3. an increase in the induced emf
	✓ 4. a cross-magnetising effect

Q.37	Find the current I_4 flowing in the circuit shown below.



Ans	✗ 1. 13 A
	✗ 2. 23 A
	✓ 3. 17 A
	✗ 4. 27 A

Q.38	Winding in wire wound resistor is made up of _____.
Ans	✗ 1. Carbon
	✗ 2. Chromium cobalt
	✗ 3. Nickel
	✓ 4. Nickel-chromium alloy

Q.39	The luminous intensity of a source emitting light uniformly in all directions of 10 lumens per steradian is:
Ans	✗ 1. 1 candela
	✗ 2. 5 candela
	✓ 3. 10 candela
	✗ 4. 20 candela

Q.40	Shaded pole motors are ideal for _____.
Ans	✓ 1. low-power, continuous-duty applications
	✗ 2. intermittent heavy-load tasks
	✗ 3. high-vibration environments
	✗ 4. precision speed control

Q.41	For a P-N junction diode, as the temperature increases the forward knee voltage of the diode _____ and the reverse saturation current _____.
Ans	✗ 1. decreases; decreases
	✗ 2. increases; decreases
	✗ 3. increases; increases
	✓ 4. decreases; increases

Q.42	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:
Ans	✗ 1. 1 A
	✓ 2. 0.5 A
	✗ 3. zero
	✗ 4. 2 A

Q.43	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
Ans	✓ 1. $\frac{M}{\sqrt{L_1L_2}}$
	✗ 2. $\frac{\sqrt{L_1L_2}}{M}$
	✗ 3. $M\sqrt{L_1L_2}$
	✗ 4. $L_1.L_2.M$

Q.44	Which of the following components is responsible for atomising the fuel in a diesel engine?
Ans	✗ 1. Turbocharger
	✗ 2. Carburetor
	✗ 3. Fuel pump
	✓ 4. Injector

Q.45	Identify the correct statement related to switching speed of the BJT.
Ans	✗ 1. Switching speed of BJT is greater than switching speed on a MOSFET.
	✗ 2. Switching speed of BJT is equal to switching speed on a MOSFET.
	✓ 3. Switching speed of BJT is less compared to switching speed on a MOSFET.
	✗ 4. BJT is an amplifying device and hence cannot work as a switch. Therefore, switching speed parameter does not exist for a BJT.

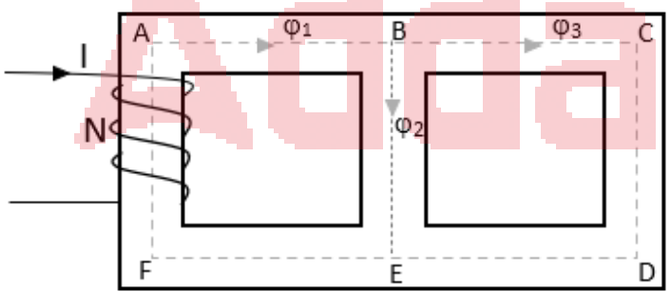
Q.46	The eddy current loss in a transformer is caused by:
Ans	✗ 1. resistance of the primary winding
	✗ 2. voltage drop across the windings
	✗ 3. saturation of the core material
	✓ 4. circulating currents within the core due to changing magnetic flux

Q.47	**A 0.5Ω shunt resistor is used to measure current with a CRO. If the measured voltage drop is 5V, what is the current?**
Ans	✗ 1. 2.5 A
	✓ 2. 10 A
	✗ 3. 5 A
	✗ 4. 20 A

Q.48	**Electric Arc Welding is a type of:**
Ans	✗ 1. resistance welding
	✓ 2. fusion welding
	✗ 3. solid-state welding
	✗ 4. pressure welding

Q.49	**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?**
Ans	✗ 1. 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.
	✗ 2. Cogeneration and tariff systems are unrelated concepts, and neither contributes to energy conservation or cost reduction.
	✗ 3. Cogeneration increases energy consumption by producing excess electricity, and tariff systems are used to penalize high energy users without reducing bills.
	✓ 4. 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.

Q.50	**Which of the following materials should NOT be placed in a microwave oven?**
Ans	✗ 1. Paper
	✓ 2. Aluminium foil
	✗ 3. Glass
	✗ 4. Plastic

Q.51	**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:** 
Ans	✗ 1. inverse of Ampere Turn required for BE
	✓ 2. ampere Turn required for any one of the paths
	✗ 3. square of Ampere Turn required for any one of the paths
	✗ 4. sum of Ampere Turn required for BE and BCDE

Q.52	**Which of the following is a common internal fault in transformers?**
Ans	✗ 1. High power factor leading to overheating
	✗ 2. Excessive cooling system efficiency
	✗ 3. Overvoltage due to lightning strikes
	✓ 4. Winding inter-turn short circuits

Q.53	**Which of the following statements regarding active power in AC circuits is INCORRECT?**
Ans	✗ 1. Active power increases with an increase in power factor.
	✗ 2. Active power is the real power consumed by the circuit.
	✓ 3. Active power is given by P=VIsinϕ in an AC circuit.
	✗ 4. The unit of active power is Watt (W).

Q.54	**Which type of transformer is best suited for applications that require a low leakage reactance?**
Ans	✗ 1. Ring type transformer
	✗ 2. Core type transformer
	✓ 3. Shell type transformer
	✗ 4. Laminated type transformer

Q.55	**For simple fixed bias BJT in common emitter configuration using NPN transistor, base resistance Rb, collector resistance Rc and supply voltage Vcc, the base current _____ with increase in Rb and the emitter current _____.**
Ans	✗ 1. decreases; increases
	✗ 2. increases; increases
	✓ 3. decreases; decreases
	✗ 4. increases; decreases

Q.56	**Which of the following is the commonly used generator in a DC welding machine?**
Ans	✗ 1. Shunt generator
	✗ 2. Permanent magnet generator
	✓ 3. Compound generator
	✗ 4. Series generator

Q.57	**The relation between absolute permeability, μ and relative permeability μ_r of a material is given by:** **(Given μ_o is absolute permeability of air)**
Ans	✗ 1. $\mu_o = \frac{\mu_r}{\mu}$
	✓ 2. $\mu_r = \frac{\mu}{\mu_o}$
	✗ 3. $\mu = \frac{\mu_o}{\mu_r}$
	✗ 4. $\mu = \mu_r$

Q.58	**If the quality factor (Q) of a resonant series circuit increases, then what happens to the voltage magnification?**
Ans	✗ 1. It remains the same because supply voltage is constant.
	✓ 2. It increases because energy losses decrease.
	✗ 3. It becomes zero because resonance cancels the reactance.
	✗ 4. It decreases because resistance increases.

Q.59	**Universal motors exhibit high starting torque due to _____.**
Ans	✓ 1. series connection of stator and rotor windings
	✗ 2. permanent magnet stators
	✗ 3. shunt winding configuration
	✗ 4. use of squirrel-cage rotors

Q.60	How does the starting torque of a split-phase motor compare with that of a shaded-pole motor?
Ans	✗ 1. Both have similar starting torque.
	✓ 2. Split-phase motors have higher starting torque.
	✗ 3. Split-phase motors have no starting torque.
	✗ 4. Shaded-pole motors have higher starting torque.

Q.61	In a biomass power plant, what is the main purpose of the combustion/gasification chamber?
Ans	✗ 1. To cool down the system after power generation
	✗ 2. To store biomass for future use
	✓ 3. To burn biomass or convert it into syngas for energy generation
	✗ 4. To distribute electricity to the grid

Q.62	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:
Ans	✓ 1. the sum of individual reluctances.
	✗ 2. thrice the reluctance of material 1
	✗ 3. the product of individual reluctances
	✗ 4. inverse of the sum of individual reluctances

Q.63	Why is an electrodynamometer-type wattmeter used as a standard instrument in laboratories?
Ans	✗ 1. It works only for low-power circuits.
	✓ 2. It has high accuracy and precision.
	✗ 3. It is cheaper than other wattmeters.
	✗ 4. It requires no external power supply.

Q.64	Why does Kelvin's Law give different conductor sizes for two identical systems?
Ans	✗ 1. Because the electrical load is different in both systems
	✓ 2. Due to variations in interest rates, depreciation, and energy costs
	✗ 3. Because one system uses overhead lines and the other uses underground cables
	✗ 4. Because the resistance of conductors is always changing

Q.65	Magnetic fringing can be minimised by:
Ans	✗ 1. scattering the magnetic flux
	✗ 2. decreasing the temperature
	✗ 3. using low quality magnetic material
	✓ 4. reducing the air gap

Q.66	Calculate the potential difference of an energy source that provides 6.8 J for every milli-coulomb of charge that it delivers.
Ans	✗ 1. 6.8 mV
	✓ 2. 6.8 kV
	✗ 3. 6.8 V
	✗ 4. 0.68 V

Q.67	Which of the following is NOT a condition for the parallel operation of transformers?
Ans	✗ 1. Same per unit impedance
	✗ 2. Same voltage ratio
	✓ 3. Same core material
	✗ 4. Same polarity

Q.68	The total collector current for a BJT operating in the active region is given by the relation _____ and the leakage current component is _____.
Ans	✗ 1. Ic = Ico(minority); majority carrier component
	✗ 2. Ic = Ic(majority) + Ico(minority); majority carrier component
	✗ 3. Ic = Ic(majority); minority carrier component
	✓ 4. Ic = Ic(majority) + Ico(minority); minority carrier component

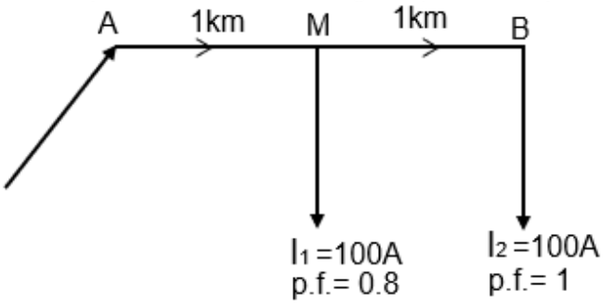
Q.69	What is a key factor in the installation and costing of electrical systems for commercial buildings?
Ans	✗ 1. Ignoring safety standards to reduce costs
	✓ 2. Ensuring compliance with electrical codes and standards while estimating materials and labour costs
	✗ 3. Focusing only on decorative lighting and aesthetics
	✗ 4. Eliminating the use of protective devices

Q.70	Which of the following is a commonly used light source in modern street light installations?
Ans	✗ 1. Fluorescent tubes
	✗ 2. Candles
	✗ 3. Incandescent bulbs
	✓ 4. High-Pressure Sodium (HPS) lamps

Q.71	Which of the following is NOT an advantage of a PMMC instrument?
Ans	✓ 1. Suitable for AC and DC measurements
	✗ 2. Linear scale
	✗ 3. High accuracy
	✗ 4. Low power consumption

Q.72	Stray load losses in synchronous motors are caused by _____.
Ans	✗ 1. poor lubrication in bearings
	✗ 2. excessive field excitation
	✓ 3. leakage fluxes and harmonic effects
	✗ 4. high rotor inertia

Q.73	In Lambert's Cosine Law, the angle θ is measured between:
Ans	✗ 1. reflected light and normal
	✗ 2. source and observer
	✓ 3. incident light and normal
	✗ 4. horizontal and vertical plane

Q.74	A single-phase distributor, 2 km long, has a line impedance of (0.2 + 0.3j) Ω/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. 
Ans	✗ 1. 120 + j15
	✗ 2. 110 + j15
	✗ 3. 210 + j15
	✓ 4. 120 + j30

Q.75	What is the purpose of a closed feeder ring in an interconnected system?
Ans	✗ 1. To reduce voltage stability
	✗ 2. To prevent power distribution
	✗ 3. To disconnect substations from each other
	✓ 4. To create a looped power supply network

Q.76	The collector to bias circuit in BJT has better stability than fixed bias circuit as _____.
Ans	✗ 1. it can operate on higher supply voltages than that of fixed bias circuit
	✗ 2. it can operate on higher power than fixed bias circuit
	✓ 3. its stability factor is lower than that of fixed bias
	✗ 4. its stability factor is higher than that of fixed bias

Q.77	Which underground cable laying method requires re-excavation for load expansion, making modifications costly?
Ans	✗ 1. Draw-in System
	✗ 2. Overhead System
	✓ 3. Trough Laying
	✗ 4. Direct Laying

Q.78	Power of an electrical system is measured in _____.
Ans	✗ 1. watt-sec
	✗ 2. newton-metre
	✗ 3. joule
	✓ 4. watt

Q.79	If the frequency of a series R-C circuit is increased, what happens to the capacitive reactance XC?
Ans	✓ 1. It decreases
	✗ 2. It remains constant
	✗ 3. It increases
	✗ 4. It becomes infinite

Q.80	**Which of the following statements is NOT correct regarding the vector method in AC circuit analysis?**
Ans	✗ 1. The vector method is used to represent sinusoidal AC quantities.
	✗ 2. The vector method helps in determining the phase difference between voltage and current.
	✓ 3. Phasors in the vector method rotate in a clockwise direction in the complex plane.
	✗ 4. Phasor diagrams are used to solve AC circuit problems involving impedance.

Q.81	**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?**
Ans	✗ 1. 10^{10}
	✓ 2. 10^{21}
	✗ 3. 10^{11}
	✗ 4. 10^{19}

Q.82	**In relay terminology, what does the term 'pickup value' refer to?**
Ans	✗ 1. The time delay before the relay operates after detecting a fault
	✓ 2. The minimum value of the operating quantity (current, voltage, etc.) required to activate the relay
	✗ 3. The voltage level at which the relay resets after a fault is cleared
	✗ 4. The maximum current a relay can withstand without damage

Q.83	**The luminous intensity of a light source is defined as the luminous flux per unit:**
Ans	✗ 1. volume
	✗ 2. length
	✗ 3. area
	✓ 4. solid angle

Q.84	**Which control method enables four-quadrant operation of induction motors?**
Ans	✓ 1. Variable Frequency Drive (VFD)
	✗ 2. Rotor resistance control
	✗ 3. Stator voltage control
	✗ 4. Direct On-Line (DOL) starting

Q.85	**The EMF equation of a transformer is given by:**
Ans	✓ 1. $E = 4.44fN\phi$
	✗ 2. $E = 4.44fNA\phi$
	✗ 3. $E = 4.44NA\phi$
	✗ 4. $E = 4.44f^2\phi N$

Q.86	**Which of the following is an example of a constant load application for a DC shunt generator?**
Ans	✓ 1. Centrifugal pump
	✗ 2. DC arc welding
	✗ 3. Induction heating
	✗ 4. Electric motor

Q.87	**In large-scale solar PV plants, why is string inverter technology preferred over central inverters in some cases?**
Ans	✗ 1. It requires fewer connections and is easier to maintain.
	✗ 2. It generates higher voltage DC output.
	✓ 3. It reduces power losses due to shading and mismatch.
	✗ 4. It eliminates the need for AC cabling.

Q.88	**How many types of heating elements are commonly used in electric irons?**
Ans	✗ 1. Four
	✓ 2. Two
	✗ 3. One
	✗ 4. Three

Q.89	**What is the bias stability factor (S) for a fixed bias circuit?**
Ans	✗ 1. $S = (1 + \beta) / (1 + \beta + \beta^2)$
	✓ 2. $S = (1 + \beta)$
	✗ 3. $S = \beta / (1 + \beta)$
	✗ 4. $S = 1 / (1 + \beta)$

Q.90	**During the no-load test of a transformer, the secondary winding is:**
Ans	✗ 1. connected to a load
	✗ 2. connected in parallel with the primary winding
	✗ 3. short-circuited
	✓ 4. open-circuited

Q.91	**The capacitance of a parallel plate capacitor depends upon:**
Ans	✗ 1. potential difference between plates
	✗ 2. thickness of plates
	✓ 3. separation between plates
	✗ 4. type of metal used

Q.92	**In Norton's Theorem, the equivalent circuit consists of _____.**
Ans	✗ 1. a voltage source in parallel with a resistor
	✗ 2. a current source in series with a resistor
	✓ 3. a current source in parallel with a resistor
	✗ 4. a voltage source in series with a resistor

Q.93	**Which of the following is a critical factor in the installation and estimation of agricultural pumps and flourmills?**
Ans	✗ 1. Ignoring the load characteristics to simplify the design
	✗ 2. Focusing only on the mechanical components of the system
	✗ 3. Ensuring the system operates without any protective devices
	✓ 4. Calculating the power requirements and selecting appropriate protective devices

Q.94	If the impedance of a parallel circuit is given by Z = 5 − j4, then the admittance is given by_____.
Ans	✗ 1. 5 + j4
	✗ 2. 5 − j4
	✗ 3. 9
	✓ 4. $\frac{5 + j4}{41}$

Q.95	Why is voltage drop analysis important in an AC distribution system?
Ans	✗ 1. To increase power losses
	✗ 2. To reduce the system frequency
	✗ 3. To increase resistance in the conductors
	✓ 4. To ensure voltage levels remain within acceptable limits

Q.96	In a transformer, if the frequency of the supply voltage is increased, what happens to the induced voltage?
Ans	✗ 1. It becomes zero
	✗ 2. It remains the same
	✗ 3. It decreases
	✓ 4. It increases

Q.97	In a transformer, the efficiency can be calculated with reasonable accuracy by knowing:
Ans	✓ 1. the losses (core and copper losses)
	✗ 2. the input and output voltage
	✗ 3. the short-circuit current
	✗ 4. the rated power

Q.98	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?
Ans	✓ 1. 8 kW
	✗ 2. 10 kW
	✗ 3. 12 kW
	✗ 4. 6 kW

Q.99	How can polarity in transformers be verified?
Ans	✗ 1. By conducting a short circuit test
	✗ 2. By measuring the input current
	✗ 3. By checking the voltage across the secondary winding
	✓ 4. By using a voltmeter to measure the voltage difference

Q.100	What will be the voltage relationship of frequency domain relation for inductor having time domain v(t) = Ldi/dt?
Ans	✓ 1. V(s) = LsI(s) − Li(0)
	✗ 2. V(s) = LI(s)
	✗ 3. V(s) = LsI(s)
	✗ 4. V(s) = LI(s) − Li(0)