रेलवे भर्ती बोर्ड / RAILWAY RECRUITMENT BOARD

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

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| 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**

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

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| **Q.2** | **The kinetic energy of an object is derived using which of the following equations of motion?** |
| **Ans** | ✘ 1. $s = ut + ½ at^2$ |
| | ✘ 2. $a = (v – u) / t$ |
| | ✔ 3. $v^2 – u^2 = 2as$ |
| | ✘ 4. $v = u + at$ |

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| **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 |

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| **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 |

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

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

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

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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% |

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| 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 |

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| 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 |

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| 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 |

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

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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. |

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| 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() |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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. |

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| 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**

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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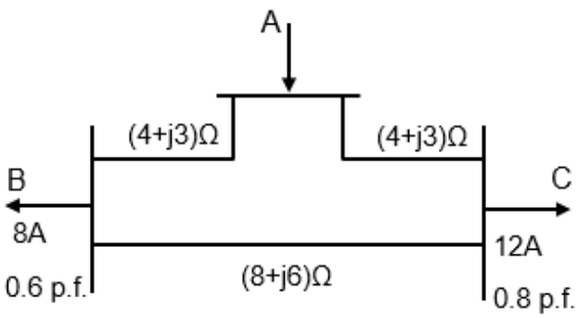
| Q.5 | **Find the total current fed at the sending end A, in the given ring distributor ABC_____.**   |
| Ans | ✗ 1. (13.6 + j14.4) A |
| | ✗ 2. (12 + j8) |
| | ✓ 3. (14.4 + j13.6) A |
| | ✗ 4. (8 + j6) A |

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| Q.6 | **Read the given Assertion (A) and Reason (R) carefully and select the correct option.**<br><br>**(A): Weakening of springs in PMMC is due to aging and temperature.**<br>**(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. |

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| 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 |

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| 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) |

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| 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. |

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| 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 |

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

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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. |

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| 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. |

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| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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. $S^2 = P^2 + Q^2$ |

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| 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. $X_L = X_C$ |

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

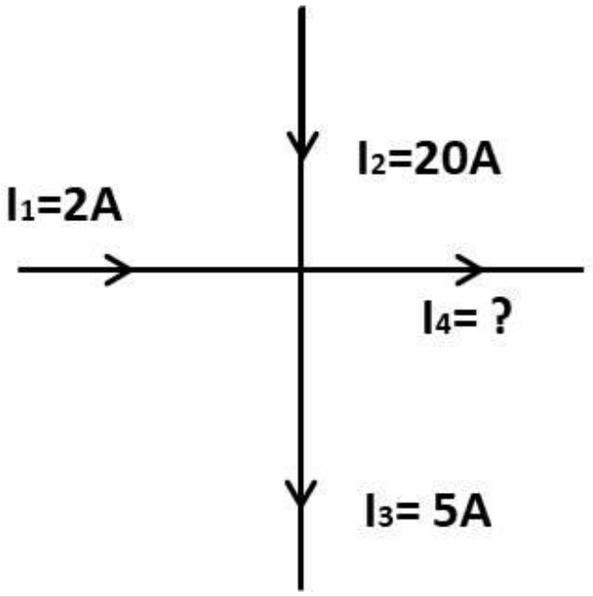
| | |
|---|---|
| Q.32 | **In a three-phase star-connected system with a neutral shift, how can the problem be corrected?** |
| Ans | ✗ 1. By increasing the phase voltage |
| | ✗ 2. By increasing the neutral wire resistance |
| | ✗ 3. By disconnecting the neutral wire |
| | ✓ 4. By balancing the load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

| | |
|---|---|
| Q.33 | **Read the given Assertion (A) and Reason (R) carefully and select the correct option.**<br><br>**(A): The burden of an instrument transformer is usually expressed in volt-amperes (VA).**<br>**(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. $\frac{M}{\sqrt{L_1 L_2}}$ |
| | ✗ 2. $\frac{\sqrt{L_1 L_2}}{M}$ |
| | ✗ 3. $M\sqrt{L_1 L_2}$ |
| | ✗ 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. |

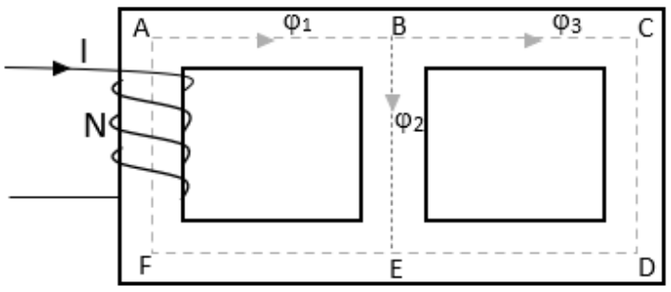
| | |
|---|---|
| Q.46 | The eddy current loss in a transformer is caused by: |
| Ans | ✗ 1. resistance of the primary winding |
| | ✗ 2. voltage drop across the windings |
| | ✗ 3. saturation of the core material |
| | ✓ 4. circulating currents within the core due to changing magnetic flux |

| | |
|---|---|
| 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 $\mu_r$ of a material is given by:**<br>**(Given $\mu_o$ 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 |

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|---|---|
| **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 |

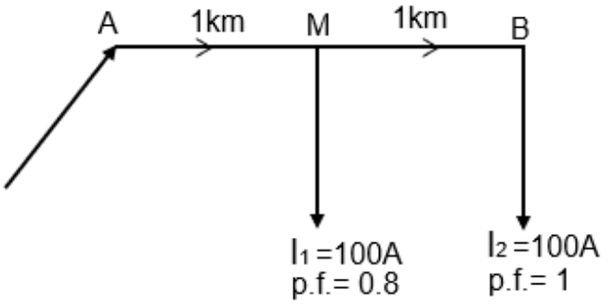
| | |
|---|---|
| Q.69 | **What is a key factor in the installation and costing of electrical systems for commercial buildings?** |
| Ans | ✗ 1. Ignoring safety standards to reduce costs |
| | ✓ 2. Ensuring compliance with electrical codes and standards while estimating materials and labour costs |
| | ✗ 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 |

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|---|---|
| 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 $3.2\times10^{10}$ 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 + β) / (1 + β + β^2) |
| | ✓ 2. S = (1 + β) |
| | ✗ 3. S = β / (1 + β) |
| | ✗ 4. S = 1 / (1 + β) |

| | |
|---|---|
| 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) |