



ETO MODEL TEST PAPER

Q1. Why is the voltage level increased to 132 kV, 220 kV, or more during primary transmission?

- A) To reduce the power losses due to resistance in the transmission lines.
- B) To decrease the reactive power requirements of the transmission system.
- C) To ensure better reliability in secondary distribution.
- D) To ensure better reliability in secondary distribution.

Q2. What is the main difference between primary distribution and secondary distribution?

- A) Primary distribution involves step-up transformers, while secondary distribution involves step-down transformers.
- B) Primary distribution operates at higher voltages (6.6 kV–11 kV), whereas secondary distribution delivers low-voltage power (400 V or 230 V) to consumers.
- C) Primary distribution is for small-scale consumers, and secondary distribution is for industrial loads.
- D) Primary distribution operates underground, while secondary distribution uses overhead lines.

Q3. In amplitude modulation (AM), the bandwidth of the transmitted signal is determined by:

- A) The carrier frequency only.
- B) The modulation frequency only.
- C) Twice the highest frequency of the modulating signal.
- D) The difference between the carrier and modulation frequencies.

Q4. In a DC generator, the process of converting alternating current generated in the armature into unidirectional current in the output is achieved by:

- A) The stator windings.
- B) The commutator and brushes.
- C) The field windings.
- D) The slip rings.

Q5. The average value of a sinusoidal waveform over a complete cycle is:

- A) Equal to its RMS value.
- B) Zero because the positive and negative half-cycles cancel each other out.
- C) Equal to its peak value divided by $2\sqrt{2}$.
- D) Equal to the area under the curve for the positive half-cycle only.

Q6. The form factor of a sinusoidal waveform is defined as:

- A) The ratio of the RMS value to the average value of the waveform.
- B) The ratio of the peak value to the RMS value of the waveform.
- C) The ratio of the RMS value to the peak value of the waveform.
- D) The ratio of the average value to the RMS value of the waveform.

Q7. A phasor represents an alternating quantity by:

- A) Indicating the instantaneous value of the waveform at a given time.
- B) Depicting the magnitude and phase of the sinusoidal waveform as a rotating vector.
- C) Displaying the average value of the alternating quantity over one cycle.
- D) Combining the peak value and RMS value of the waveform.



Q8. In a purely resistive AC circuit, the power factor is:

- A) 0, because current and voltage are out of phase.
- B) 1, because current and voltage are in phase.
- C) Less than 1, because there are no reactive components.
- D) Infinite, because the resistance dissipates all power.

Q9. In an RLC series circuit operating at its resonant frequency:

- A) The impedance is maximum.
- B) The power factor is zero.
- C) The current is maximum, and the impedance is purely resistive.
- D) The voltage across the inductor and capacitor is zero.

Q10. In a three-phase system, the primary advantage of using a delta connection over a star connection is:

- A) Lower line voltage for the same power transfer.
- B) The ability to operate with one phase disconnected.
- C) Higher efficiency for long-distance power transmission.
- D) Lower line currents for the same phase currents.

Q11. If voltage V is applied to a $50 \mu\text{F}$ capacitor. Then what will be the steady state current through the capacitor, if $V = 2 \sin(30t + 20^\circ)$:

- A) $i(t) = 9 \sin(30t + 110^\circ) \text{ mA}$
- B) $i(t) = 9 \cos(30t + 20^\circ) \text{ mA}$
- C) $i(t) = 9 \cos(30t - 70^\circ) \text{ mA}$
- D) $i(t) = 9 \cos(30t + 90^\circ) \text{ mA}$

Q12. Consider the following circuit. If $|I_1| = 10 \text{ A}$ and $|I_2| = 13 \text{ A}$, then the values of I_L and I_R would be

- A) $I_L = -16.24 \text{ A}$, $I_R = 8 \text{ A}$
- B) $I_L = 2 \text{ A}$, $I_R = 4 \text{ A}$
- C) $I_L = 16.24 \text{ A}$, $I_R = 8 \text{ A}$
- D) $I_L = -2 \text{ A}$, $I_R = 4 \text{ A}$

Q13. The voltage V , is applied to a 0.25 H inductor. What will be the steady state current through the inductor, if $V = 10 \cos(50t + 45^\circ)$?

- A) $i(t) = 0.5 \sin(50t + 45^\circ) \text{ A}$
- B) $i(t) = 0.8 \cos(50t + 15^\circ) \text{ A}$
- C) $i(t) = 0.8 \cos(50t - 45^\circ) \text{ A}$
- D) $i(t) = 0.5 \cos(50t + 45^\circ) \text{ A}$

Q14. In a half-wave rectifier, the efficiency is limited because:

- A) Only half of the input waveform contributes to the output.
- B) The output voltage is not a pure DC waveform.
- C) The rectifier diode conducts during both halves of the input cycle.
- D) The peak inverse voltage of the diode is too high.

Q15. A capacitor filter connected to the output of a half-wave rectifier reduces the ripple by:

- A) Increasing the load current during the conduction period.
- B) Smoothing the output waveform by storing charge during peaks.
- C) Increasing the frequency of the ripple components.
- D) Blocking the DC component of the rectified signal.

Q16. In a voltage stabilization circuit using a Zener diode, the Zener diode operates in:

- A) The forward bias region to regulate voltage.
- B) The reverse breakdown region to maintain a constant output voltage.
- C) The reverse saturation region to block current flow.



D) Both forward and reverse bias regions depending on the load resistance.

Q17. Which of the following is a limitation of a Zener diode voltage stabilizer?

- A) It cannot regulate voltage at high input voltages.
- B) It is suitable only for low-load currents and low-power applications.
- C) It requires a complex feedback circuit for proper operation.
- D) It operates only in the forward bias region.

Q18. When a capacitor is added as a filter to a half-wave rectifier, the ripple frequency in the output becomes:

- A) The same as the input frequency.
- B) Twice the input frequency.
- C) Half the input frequency.
- D) Independent of the input frequency.

Q19. The key advantage of using an LC filter over a simple capacitor filter in a rectifier circuit is:

- A) LC filters are smaller and cheaper than capacitor filters.
- B) LC filters provide better voltage regulation and ripple reduction.
- C) LC filters reduce the forward voltage drop across the rectifier diodes.
- D) LC filters increase the output frequency.

Q20. In a lead-acid battery, the primary role of the sulfuric acid electrolyte is to:

- A) Act as a conductor to transport electrons between electrodes.
- B) Provide ions for the chemical reaction and enable charge transfer.
- C) Prevent corrosion of the lead plates during discharge.
- D) Maintain the physical separation of the positive and negative plates.

Q21. In a lead-acid battery, the paste applied to the positive and negative plates differs in composition because:

- A) The positive plate contains active material for oxidation, while the negative plate contains material for reduction.
- B) The positive plate is designed to resist sulfation, while the negative plate is not.
- C) The paste composition is identical, but the plate design differs for functional purposes.
- D) The positive plate requires higher density material than the negative plate for structural reasons.

Q22. If the ampere-hour efficiency of a battery is 95% and the watt-hour efficiency is 90%, which of the following is true?

- A) The battery has a high discharge rate, resulting in increased internal losses.
- B) The voltage during discharge is lower than the voltage during charging.
- C) The battery has a constant voltage profile, resulting in minimal energy losses.
- D) The watt-hour efficiency is dependent solely on the charging duration.

Q23. When measuring resistance using a Wheatstone bridge, the bridge is considered balanced when:

- A) The output voltage across the galvanometer is zero.
- B) The resistance in all arms is equal.
- C) The ratio of resistances in one arm equals the ratio in the opposite arm.
- D) The current through the galvanometer is maximum.

Q24. The power factor of a load can be determined using:

- A) A voltmeter and an ammeter alone.
- B) A wattmeter and a power analyzer.
- C) A wattmeter, a voltmeter, and an ammeter.
- D) A current transformer and a potential transformer.

Q25. A null-type instrument like the potentiometer is preferred for high-precision measurements because:

- A) It does not draw current from the circuit under test.
- B) It can measure both AC and DC quantities.
- C) It eliminates errors due to thermal drift.
- D) It provides faster readings than deflecting instruments.



(Questions 26–29 refer to the following passage.)

Directions: Read the following passage carefully and choose the best answer for the following question.

Passage: The life of a marine officer in India is a challenging yet rewarding journey that requires discipline, resilience, and adaptability. Marine officers serve as the backbone of the maritime industry, ensuring the smooth operation of ships engaged in trade, defence, and exploration. Their responsibilities range from navigating vessels and managing crew members to ensuring compliance with international maritime laws and safety protocols. The career demands long periods away from home, often in unpredictable weather and volatile sea conditions. Despite these challenges, marine officers develop unparalleled skills in leadership, problem-solving, and crisis management. Their work is critical to India's economy, given that over 90% of the country's trade is conducted via sea routes. Marine officers also play a significant role in the Indian Navy, contributing to national security by patrolling maritime borders and participating in rescue missions during natural disasters. The job, however, is not without its hazards, including the risk of piracy, ship accidents, and exposure to extreme environments. To become a marine officer, one must complete rigorous training programs that include both theoretical and practical components. Institutes like the Indian Maritime University and other private academies provide specialized courses in marine engineering, navigation, and maritime law. While the profession is demanding, it offers immense personal satisfaction and financial stability. It fosters a sense of pride and purpose, making it a coveted career for those passionate about the sea and service to the nation.

Q26. Based on the passage, what can be inferred about the role of marine officers in India's global trade?

- A) They are crucial for maintaining international relations through defence collaborations.
- B) They ensure compliance with maritime laws and contribute to uninterrupted trade.
- C) They are involved in disaster relief efforts to protect sea routes.
- D) They assist in monitoring and patrolling foreign merchant vessels.

Q27. How does the profession of marine officers exemplify the balance between personal sacrifice and national service?

- A) By requiring long absences from home to ensure global-sized operations.
- B) By providing financial stability in exchange for personal time.
- C) By contributing to both economic trade and national security despite personal challenges.
- D) By fostering technical skills while neglecting family responsibilities.

Q28. Why can marine officers' training be considered comprehensive and multifaceted?

- A) It combines maritime law, engineering, and leadership skills for varied roles.
- B) It focuses on practical knowledge more than theoretical learning.
- C) It includes physical endurance training to handle extreme conditions.
- D) It prepares individuals for international collaborations in maritime trade.

Q29. What is the significance of resilience in the life of a marine officer, as inferred from the passage?

- A) It allows them to manage financial instability effectively.
- B) It equips them to navigate long-term isolation during sea voyages.
- C) It helps them adapt to unpredictable environments and crises.
- D) It builds tolerance for administrative challenges on board.



(Questions 30–33 refer to the following passage.)

Directions: Read the following passage carefully and choose the best answer for the following question.

Passage: The integration of technology in education has transformed traditional teaching and learning practices, offering numerous benefits while posing unique challenges. Digital tools, such as interactive whiteboards, online learning platforms, and virtual reality simulations, have enhanced engagement by making learning more dynamic and immersive. Moreover, personalized learning, powered by Artificial Intelligence (AI), tailors educational content to individual students' needs, fostering deeper understanding and improved outcomes. Technology also democratizes education by bridging geographical and economic barriers. Online courses and digital resources enable access to quality education for students in remote or underserved regions, narrowing the digital divide. However, this progress comes with challenges. The over-reliance on technology risks reducing human interaction, which is crucial for social and emotional development. Additionally, digital infrastructure gaps and unequal access to devices hinder the widespread implementation of technology in education, especially in developing countries like India. Teachers play a pivotal role in this ecosystem. While technology provides tools, it is the educators who guide their effective use. Training and upskilling teachers to adapt to technological innovations remain critical for its success. Furthermore, the ethical implications of data collection in personalized learning systems necessitate stringent privacy policies. Ultimately, while technology in education holds immense potential, its success lies in striking a balance between innovation and inclusivity. Education systems must address the challenges of equity, infrastructure, and ethical concerns to ensure that technology empowers learning rather than creating new divides.

Q30. Based on the passage, which statement best reflects the dual nature of technology in education?

- A) Technology democratizes education but makes traditional methods obsolete.
- B) Technology enhances learning outcomes but risks increasing disparities.
- C) Technology fosters innovation but limits creativity in teaching methods.
- D) Technology eliminates barriers but reduces the role of educators.

Q31. How does the passage address the role of teachers in a technology-driven educational system?

- A) Teachers are secondary to technology in ensuring educational success.
- B) Teachers must act as facilitators to maximize the impact of technology.
- C) Teachers are primarily responsible for bridging the digital divide.
- D) Teachers should replace traditional methods with technological tools.

Q32. Which of the following challenges to technology in education is NOT directly discussed in the passage?

- A) Privacy issues in personalized learning.
- B) Unequal access to digital resources.
- C) The high cost of technological tools.
- D) Over-reliance on digital platforms.

Q33. What inference can be drawn about the relationship between technology and inclusivity in education?

- A) Technology inherently creates an inclusive educational environment.
- B) Inclusivity can only be achieved if technological gaps are addressed.
- C) The role of technology in inclusivity is limited to urban areas.
- D) Technology replaces the need for social and emotional interactions in inclusive education.

Q34. Direction: The following sentence contains a word in brackets. Select the option that is nearest in meaning to the word in brackets. The scientist proposed a (novel) hypothesis to explain the phenomenon.

- A) old
- B) unique
- C) rigid
- D) simple



Q35. Direction: The following sentence contains a word in brackets. Select the option that is nearest in meaning to the word in brackets. The politician's (rhetoric) captivated the audience.

- A) sincerity
- B) speech
- C) silence
- D) emotion

Q36. Direction: The following sentence contains a word in brackets. Select the option that is nearest in meaning to the word in brackets. The manager's (brusque) reply left the employees stunned.

- A) polite
- B) abrupt
- C) detailed
- D) enthusiastic

Q37. Direction: The following sentence contains a word in brackets. Select the option that is opposite in meaning to the word in brackets. Her behaviour at the meeting was deemed (impeccable) by her colleagues.

- A) flawed
- B) perfect
- C) admirable
- D) spotless

Q38. Direction: The following sentence contains a word in brackets. Select the option that is opposite in meaning to the word in brackets. The general was known for his (audacious) decisions in battle.

- A) timid
- B) bold
- C) reckless
- D) strategic

Q39. Direction: The following sentence contains a word in brackets. Select the option that is opposite in meaning to the word in brackets. The speaker's arguments were (plausible) and well-constructed.

- A) dubious
- B) convincing
- C) logical
- D) coherent

Q40. Find the correctly spelt word.

- A) Supersede
- B) Supercede
- C) Supirsede
- D) Supirsed

Q41. Find the correctly spelt word.

- A) Indispensible
- B) Indispensable
- C) Indespensable
- D) Indispansable

Q42. Direction: In each question below, a sentence is broken into five or six parts. Join these parts to make a meaningful sentence. The correct order of parts is the answer. 1. to reduce their carbon footprint 2. industries must adopt 3. sustainable practices 4. such as renewable energy 5. and waste management

- A) 21345
- B) 23415
- C) 23145
- D) 21435



Q43. Direction: In each question below, a sentence is broken into five or six parts. Join these parts to make a meaningful sentence. The correct order of parts is the answer. 1. addressing climate change 2. international cooperation 3. through agreements 4. such as the Paris Accord 5. is crucial for

- A) 25134
- B) 21534
- C) 52314
- D) 25143

Q44. Direction: In each question below, a sentence is broken into five or six parts. Join these parts to make a meaningful sentence. The correct order of parts is the answer. 1. for future generations 2. preserving biodiversity 3. and ecological balance 4. plays a vital role in 5. ensuring a sustainable planet

- A) 24153
- B) 24531
- C) 24351
- D) 25431

Q45. Direction: Some proverbs/idioms are given below, together with their meanings. Choose the correct meaning of the proverb/idiom. Keep one's head above water

- A) To manage to survive despite difficulties
- B) To dominate a situation
- C) To avoid taking responsibility
- D) To remain calm under pressure

Q46. Direction: Some proverbs/idioms are given below, together with their meanings. Choose the correct meaning of the proverb/idiom. A blessing in disguise

- A) Something that seems bad at first but turns out to be good
- B) A gift that is hidden from others
- C) A situation that is completely hopeless
- D) A hidden danger

Q47. Direction: Some proverbs/idioms are given below, together with their meanings. Choose the correct meaning of the proverb/idiom. Bite off more than one can chew

- A) To take on more responsibility than one can handle
- B) To eat food without chewing it properly
- C) To speak harshly to someone
- D) To act carelessly in a situation

Q48. Direction: Which of the following words is/are most suitable for completing the sentence? The scientist's ground-breaking discovery is expected to _____ the way we understand quantum physics.

- A) transform
- B) obscure
- C) undermine
- D) complicate

Q49. Direction: Which of the following words is/are most suitable for completing the sentence? The charity event was organized to _____ awareness about the importance of mental health in society.

- A) raise
- B) ignore
- C) reduce
- D) conceal

Q50. Direction: Which of the following words is/are most suitable for completing the sentence? The company's decision to cut costs by reducing staff was met with _____ from employees and unions.

- A) resistance
- B) support
- C) indifference
- D) approval