

Advanced Electrical Engineering Fundamentals

Electrical Engineering · Practice Test · 10 Questions

1. Which specific law of electromagnetic induction states that the direction of the induced electromotive force is such that it opposes the change in magnetic flux that produced it?

- A) Faraday's Law
- B) Lenz's Law
- C) Ampere's Law
- D) Gauss's Law

2. In a three-phase induction motor, what is the term for the difference between the synchronous speed and the actual rotor speed, expressed as a fraction of the synchronous speed?

- A) Commutation factor
- B) Slip
- C) Reactance ratio
- D) Torque constant

3. What is the primary function of a Buchholz relay in a power transformer?

- A) Protection against voltage surges
- B) Prevention of overheating
- C) Detection of incipient faults through gas accumulation
- D) Measurement of reactive power

4. In the context of power systems, what is the definition of the 'skin effect' in a conductor?

- A) Increased resistance due to surface oxidation
- B) Tendency of AC to flow mostly near the outer surface
- C) The heating of insulation due to high current
- D) The loss of magnetism at high temperatures

5. Which semiconductor device is characterized by a four-layer p-n-p-n structure and is primarily used for high-power switching applications?

- A) MOSFET
- B) IGBT
- C) Thyristor (SCR)
- D) Zener Diode

6. What is the unit of magnetic flux density in the International System of Units (SI)?

- A) Weber
- B) Tesla
- C) Henry
- D) Gauss

7. In signal processing, what is the name of the theorem that specifies the minimum sampling rate required to avoid aliasing?

- A) Nyquist-Shannon sampling theorem
- B) Parseval's theorem
- C) Thevenin's theorem
- D) Norton's theorem

8. Which parameter of a transmission line is calculated as the square root of the ratio of the series impedance to the shunt admittance?

- A) Propagation constant
- B) Characteristic impedance
- C) Reflection coefficient
- D) Attenuation constant

9. In an operational amplifier, what term describes the ability of the device to reject common-mode signals at both inputs?

- A) Slew rate
- B) Open-loop gain
- C) Common-mode rejection ratio (CMRR)
- D) Input bias current

10. Which of the following materials is classified as a ferrimagnetic material commonly used for high-frequency transformer cores?

- A) Aluminum
- B) Copper
- C) Ferrite
- D) Brass