

Electrical Engineering Fundamentals

Electrical Engineering · Answer Key · 15 Questions

1. In a three-phase electrical system, what is the phase difference between each of the three voltage waveforms?

- A) 45 degrees
- B) 90 degrees
- C) 120 degrees**
- D) 180 degrees

2. What is the unit of magnetic flux density?

- A) Weber
- B) Tesla**
- C) Henry
- D) Ampere-turn

3. According to Lenz's Law, the direction of an induced electromotive force is such that it opposes what?

- A) The applied voltage
- B) The change in magnetic flux**
- C) The flow of electrons
- D) The electrical resistance

4. In a semiconductor, what is the 'band gap' energy primarily responsible for defining?

- A) Thermal conductivity
- B) Electrical conductivity**
- C) Dielectric constant
- D) Magnetic permeability

5. Which component is specifically designed to store energy in an electric field?

- A) Inductor
- B) Resistor
- C) Capacitor**
- D) Transistor

6. What does the 'skin effect' in AC transmission lines describe?

- A) Increased resistance at the surface of a conductor
- B) Increased magnetic field at the center of a conductor
- C) Decreased current density at the center of a conductor**
- D) Thermal insulation of cable jackets

7. What is the primary function of a transformer core made of laminated steel sheets?

- A) To increase voltage
- B) To minimize eddy current losses**
- C) To improve tensile strength
- D) To facilitate cooling

8. In power systems, what does a Power Factor of 1.0 indicate?

- A) A purely inductive load
- B) A purely capacitive load
- C) A purely resistive load**
- D) A short circuit

9. What type of feedback is required for an electronic circuit to function as an oscillator?

- A) Negative feedback
- B) Positive feedback**
- C) No feedback
- D) Differential feedback

10. Which fundamental law states that the sum of currents entering a junction equals the sum of currents leaving it?

- A) Ohm's Law
- B) Kirchhoff's Current Law**
- C) Faraday's Law
- D) Ampere's Law

11. What is the effect of increasing the frequency on the inductive reactance of a circuit?

- A) It remains constant
- B) It decreases linearly
- C) It increases linearly**
- D) It decreases exponentially

12. Which material is commonly used as the dielectric in high-voltage capacitors due to its high dielectric strength?

- A) Copper
- B) Aluminum
- C) Mica**
- D) Rubber

13. In an ideal operational amplifier, what is the input impedance?

- A) Zero
- B) Finite
- C) Infinite**
- D) Negative

14. Which condition must be met for maximum power transfer from a source to a load in a DC circuit?

- A) Source voltage must equal load voltage
- B) Source resistance must equal load resistance**
- C) Source current must equal load current
- D) Source resistance must be zero

15. What is the primary purpose of a 'bleeder resistor' in a high-voltage power supply?

- A) To reduce output voltage
- B) To dissipate energy for safety when turned off**
- C) To increase current capacity
- D) To provide surge protection