Advanced Electrical Engineering Fundamentals

Electrical Engineering · Practice Test · 20 Questions

1. Which material exhibits a negative temperature coefficient of resistance?

A) Copper
B) Aluminum
C) Carbon
D) Silver

2. In a three-phase power system, what is the phase difference between each of the voltages?

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

3. Which law states that the total current entering a junction or node must equal the current leaving it?

A) Kirchhoff's Current Law
B) Ohm's Law
C) Faraday's Law
D) Lenz's Law

4. What is the unit of measurement for magnetic flux density in the SI system?

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

5. In a bipolar junction transistor (BJT), what does the 'Ebers-Moll' model primarily describe?

A) Thermal noise
B) Carrier concentrations
C) Static DC characteristics
D) High-frequency response

6. What is the primary function of a 'varistor' in an electrical circuit?

A) Voltage stabilization
B) Frequency modulation
C) Current amplification
D) Overvoltage protection

7. Which parameter is defined as the ratio of real power to apparent power in an AC circuit?

A) Impedance
B) Power factor
C) Admittance
D) Susceptance

8. What is the purpose of a 'commutator' in a DC machine?

A) To increase voltage
B) To convert AC to DC
C) To reduce friction
D) To prevent sparking

9. Which configuration of an operational amplifier provides infinite input impedance and zero output impedance in an ideal model?

A) Non-inverting
B) Inverting
C) Integrator
D) Differential

10. What defines the 'skin effect' in electrical conductors?

A) Increased resistance due to heat
B) Concentration of current at the surface
C) Reduced capacitance in cables
D) Magnetic saturation of the core

11. Which material is commonly used as the dielectric in a high-voltage ceramic capacitor?

A) Barium Titanate
B) Polypropylene
C) Tantalum
D) Mica

12. In signal processing, what is the Nyquist rate defined as?

A) Twice the signal bandwidth
B) Equal to the carrier frequency
C) Half the sampling frequency
D) The inverse of the signal period

13. What is the primary advantage of a 'delta-star' transformer connection in power distribution?

A) Eliminating harmonics
B) Providing a neutral point
C) Increasing efficiency
D) Reducing iron loss

14. What phenomenon occurs when a circuit's inductive reactance equals its capacitive reactance?

A) Saturation
B) Resonance
C) Hysteresis
D) Breakdown

15. Which standard specifies the requirements for the 'Ethernet' protocol?

A) IEEE 802.11
B) IEEE 802.3
C) ISO 9001
D) ANSI C63.4

16. What is the SI derived unit of electrical conductance?

A) Ohm
B) Siemens
C) Farad
D) Coulomb

17. In an induction motor, what is 'slip' defined as?

A) The ratio of rotor speed to stator speed
B) The difference between synchronous and rotor speed
C) The magnetic flux leakage
D) The frictional loss in bearings

18. What does the 'Q factor' of a resonant circuit signify?

A) Quality of insulation
B) Ratio of energy stored to energy dissipated
C) Quantity of charge stored
D) Quickness of response

19. Which logic gate implements the Boolean function Y = A XOR B?

A) AND
B) NAND
C) XOR
D) NOR

20. What is the Curie temperature of a ferromagnetic material?

A) The boiling point
B) Temperature where magnetism is lost
C) Melting point of the core
D) The freezing point