UNIT 1: ELECTRICAL CIRCUITS & MEASUREMENTS

1. **What does Ohm's Law state?**
   a) Voltage is proportional to current
   b) Current is proportional to resistance
   c) Voltage is proportional to resistance
   d) Voltage is equal to current times resistance

2. **Which of the following is the unit of resistance?**
   a) Ampere
   b) Volt
   c) Ohm
   d) Watt

3. **What is the formula for calculating the total resistance in a series circuit?**
   a) R_total = R1 + R2
   b) R_total = R1 - R2
   c) R_total = 1 / (R1 + R2)
   d) R_total = (R1 * R2) / (R1 + R2)

4. **What does the RMS value of an AC voltage represent?**
   a) Peak voltage
   b) Average voltage
   c) Equivalent DC voltage
   d) Instantaneous voltage

5. **In AC circuits, power factor is defined as the ratio of:**
   a) Active power to reactive power
   b) Apparent power to reactive power
   c) Active power to apparent power
   d) Reactive power to apparent power

6. **Which type of instrument is used for measuring very high voltages?**
   a) Moving iron voltmeter
   b) Moving coil voltmeter
   c) Induction wattmeter
   d) Digital voltmeter

7. **The back EMF in a DC motor depends on:**
   a) Speed of the motor
   b) Resistance of the armature

c) Magnetic flux
d) All of the above

8. **Which of the following is the principle of operation of a moving coil ammeter?**
   a) Electromagnetic induction
   b) Electrostatic force
   c) Magnetic torque
   d) Thermoelectric effect

9. **The power factor in an AC circuit is zero when the load is:**
   a) Resistive
   b) Capacitive
   c) Inductive
   d) Reactive

10. **What is the unit of electric power?**
    a) Ampere
    b) Volt
    c) Watt
    d) Ohm

11. **Which of the following laws applies to current distribution in a parallel circuit?**
    a) Ohm's Law
    b) Kirchhoff's Current Law
    c) Kirchhoff's Voltage Law
    d) Faraday's Law

12. **Which type of wattmeter is used for measuring power in a three-phase system?**
    a) Induction wattmeter
    b) Dynamometer wattmeter
    c) Digital wattmeter
    d) Moving coil wattmeter

13. **What is the total impedance of a series R-L circuit where R = 5 Ω and L = 0.1 H at a frequency of 50 Hz?**
    a) 10 Ω
    b) 15 Ω
    c) 5.5 Ω
    d) 6.5 Ω

14. **A 100 V RMS sinusoidal AC voltage produces a current of 5 A. The average power delivered to the load is:**

a) 500 W
b) 700 W
c) 450 W
d) 250 W

15. **Which of the following instruments measures both AC and DC voltage?**
    a) Moving coil voltmeter
    b) Digital voltmeter
    c) Moving iron voltmeter
    d) Galvanometer

16. **The average value of a sinusoidal current is:**
    a) 0.637 times the peak value
    b) 0.707 times the peak value
    c) 0.9 times the RMS value
    d) Zero

17. **What is the principle of operation of a dynamometer-type wattmeter?**
    a) Electromagnetic induction
    b) Magnetic coupling
    c) Electrostatic force
    d) Electric torque

18. **In a power measurement system, if the power factor is less than 1, it indicates:**
    a) A purely resistive load
    b) A purely capacitive load
    c) A reactive load
    d) No power loss

19. **Which of the following devices is used to measure the energy consumption in an electrical circuit?**
    a) Ammeter
    b) Voltmeter
    c) Energy meter
    d) Wattmeter

20. **The total current in a parallel circuit is the sum of the currents through each branch. This statement is related to:**
    a) Ohm's Law
    b) Kirchhoff's Current Law

c) Kirchhoff’s Voltage Law
d) Faraday’s Law