UNIT 1: ELECTRICAL CIRCUITS & MEASUREMENTS

Two-Mark Questions:

1. **What is Ohm's Law?**

2. **State Kirchhoff's Current Law (KCL).**

3. **State Kirchhoff's Voltage Law (KVL).**

4. **Explain the difference between RMS value and peak value in AC circuits.**

5. **What is power factor in an AC circuit?**

6. **Explain the principle of a moving coil ammeter.**

7. **What are the limitations of a moving iron instrument?**

8. **Describe the operation of a dynamometer type wattmeter.**

9. **What is the function of an energy meter?**

10. **Derive the expression for the RMS value of a sinusoidal voltage.**

11. **What is the significance of the power factor in AC circuits?**

12. **What is the difference between active power and apparent power?**

13. **State the working principle of a moving iron voltmeter.**

14. **How does an ammeter measure current?**

15. **What are the main components of an energy meter?**

16. **Explain how a wattmeter measures power in AC circuits.**

17. **Explain the principle of operation of a dynamometer type wattmeter.**

18. **Calculate the power consumed by a resistive load of 10 Ω in an AC circuit with a voltage of 230 V and power factor 1.**

19. **What is the role of a capacitor in an AC circuit?**

20. **What is the significance of the voltage-current characteristics of a diode?**

21. **How is power calculated in an AC circuit with a given current and voltage?**

22. **What is meant by the energy consumed by a system?**

23. **What is a phase shift in an AC circuit, and how is it measured?**

24. **Calculate the apparent power in an AC circuit where the active power is 300 W and the power factor is 0.8.**

25. **What is the difference between direct current (DC) and alternating current (AC)?**

Problems:

1. **Problem 1:**
   A 10 Ω resistor is connected across a 100 V DC supply. Calculate the current flowing through the resistor using Ohm's Law.

2. **Problem 2:**
   In a series AC circuit, the resistance is 10 Ω and the reactance is 20 Ω. Calculate the total impedance and current if the applied voltage is 100 V.

3. **Problem 3:**
   Calculate the RMS value of a sinusoidal current of peak value 5 A.

4. **Problem 4:**
   A coil has a resistance of 10 Ω and an inductance of 0.2 H. If the frequency of the AC source is 50 Hz, calculate the impedance of the coil.

5. **Problem 5:**
   A 10 W light bulb is connected to an AC circuit with a voltage of 110 V and a power factor of 0.9. Calculate the current flowing through the circuit.