UNIT II: ELECTRICAL MACHINES

Two-mark Questions:

1. **What is the principle of operation of a DC generator?**
    - **Answer:** A DC generator operates on the principle of electromagnetic induction, where a conductor moving through a magnetic field induces an electromotive force (EMF) in the conductor.
2. **Define back EMF in a DC motor.**
    - **Answer:** Back EMF is the voltage generated by the rotating armature of a DC motor that opposes the applied voltage and reduces the current flowing through the motor.
3. **What are the main parts of a single-phase transformer?**
    - **Answer:** The main parts of a single-phase transformer are the core, primary winding, secondary winding, and insulation.
4. **What is the purpose of a commutator in a DC machine?**
    - **Answer:** The commutator in a DC machine converts the alternating current induced in the armature windings into direct current for external circuits.
5. **Explain the working principle of a three-phase induction motor.**
    - **Answer:** A three-phase induction motor works on the principle of electromagnetic induction, where a rotating magnetic field created by the stator induces currents in the rotor, causing it to rotate.
6. **What is slip in an induction motor?**
    - **Answer:** Slip is the difference between the synchronous speed and the actual speed of the rotor, expressed as a percentage of the synchronous speed.
7. **Define the term 'armature reaction' in a DC machine.**
    - **Answer:** Armature reaction refers to the effect of the magnetic field produced by the armature current on the distribution of the main magnetic field in a DC machine.
8. **What are the applications of a DC motor?**
    - **Answer:** DC motors are commonly used in applications requiring variable speed and high starting torque, such as electric vehicles, conveyors, and elevators.
9. **Explain the significance of transformer efficiency.**
    - **Answer:** Transformer efficiency is the ratio of the output power to the input power. High efficiency indicates that less energy is lost as heat and other losses.
10. **What is the function of laminations in a transformer core?**
    - **Answer:** Laminations in a transformer core reduce eddy current losses, which improves the efficiency of the transformer.
11. **Describe the concept of voltage regulation in transformers.**

- **Answer:** Voltage regulation is the measure of the change in secondary voltage from no-load to full-load conditions, expressed as a percentage of the no-load voltage.

12. **What is the importance of grounding the neutral point in electrical machines?**
    - **Answer:** Grounding the neutral point in electrical machines provides a reference point for the system voltage, improves safety, and helps in the protection of the system during faults.
13. **Define synchronous speed in an induction motor.**
    - **Answer:** Synchronous speed is the speed at which the magnetic field rotates in the stator of an induction motor. It is given by Ns=120fPN_s = \frac{120f}{P}Ns=P120f, where fff is the frequency and PPP is the number of poles.
14. **What is the function of brushes in a DC motor?**
    - **Answer:** Brushes in a DC motor conduct current between the stationary wires and the rotating armature, allowing the motor to function.
15. **Explain the term 'mutual induction' in the context of transformers.**
    - **Answer:** Mutual induction is the process by which a change in current in one coil induces a voltage in another coil that is magnetically linked to the first coil.