UNIT IV: ANALOG ELECTRONICS

Two-mark Questions:

1. **What is a diode?**
    - **Answer:** A diode is a semiconductor device that allows current to flow in one direction only, blocking current in the reverse direction.
2. **Define the working principle of a Zener diode.**
    - **Answer:** A Zener diode operates in reverse bias and allows current to flow when the reverse voltage exceeds a certain value, called the Zener breakdown voltage, making it useful for voltage regulation.
3. **What are the three regions of operation of a BJT (Bipolar Junction Transistor)?**
    - **Answer:** The three regions of operation are the active region, saturation region, and cutoff region.
4. **Explain the function of a MOSFET.**
    - **Answer:** A MOSFET (Metal-Oxide-Semiconductor Field-Effect Transistor) is a voltage-controlled device used to amplify or switch electronic signals.
5. **What is the purpose of a voltage regulator?**
    - **Answer:** A voltage regulator maintains a constant output voltage despite variations in input voltage or load conditions.
6. **Describe the working of a half-wave rectifier.**
    - **Answer:** A half-wave rectifier allows only one half-cycle of the AC input voltage to pass through, converting it to a pulsating DC voltage.
7. **What is the function of an uninterruptible power supply (UPS)?**
    - **Answer:** A UPS provides backup power and protects electronic equipment from power interruptions and voltage fluctuations.
8. **Explain the VI characteristics of a diode.**
    - **Answer:** The VI characteristics of a diode show the relationship between the voltage across the diode and the current through it, indicating forward bias (low resistance) and reverse bias (high resistance) behaviors.
9. **What is the function of a full-wave rectifier?**
    - **Answer:** A full-wave rectifier converts both halves of the AC input signal into a pulsating DC output, providing higher efficiency than a half-wave rectifier.
10. **Define the term 'cutoff region' for a BJT.**
    - **Answer:** The cutoff region is where the BJT is fully off, with no current flowing through the collector-emitter junction, as the base-emitter voltage is below the threshold.
11. **What is the difference between a BJT and a MOSFET?**

- **Answer:** A BJT is a current-controlled device, while a MOSFET is a voltage-controlled device. BJTs are used for amplification, and MOSFETs are used for switching.

12. **Describe the role of a UPS in maintaining power stability.**
    - **Answer:** A UPS provides continuous power during outages and stabilizes voltage levels, protecting sensitive electronic equipment from damage due to power fluctuations.
13. **What are the key characteristics of a Zener diode?**
    - **Answer:** Key characteristics include a well-defined reverse breakdown voltage, ability to conduct in reverse bias, and use in voltage regulation and reference circuits.
14. **Explain the importance of VI characteristics in the selection of diodes for specific applications.**
    - **Answer:** VI characteristics help determine the suitability of diodes for specific applications by showing their performance under different voltage and current conditions.
15. **What is the primary function of a voltage regulator in power supplies?**
    - **Answer:** The primary function is to maintain a stable output voltage regardless of variations in input voltage or load conditions, ensuring the proper operation of