**Field Effect Transistors**

**1. Write down the differences between JFET and BJT.**

Differences between JFET and BJT:

- JFET is a voltage-controlled device, while BJT is a current-controlled device.

- JFET has a higher input impedance than BJT, making it more suitable for high-impedance circuits.

- BJT has a higher gain than JFET, making it more suitable for amplification applications.

- JFET has a negative temperature coefficient, while BJT has a positive temperature coefficient.

- JFET is a unipolar device, while BJT is a bipolar device.

**2. Discuss the similarities and dissimilarities between FET and BJT.**

Similarities and dissimilarities between FET and BJT:

- Similarities: Both are used as amplifiers and switches in electronic circuits.

- Dissimilarities: FET is a voltage-controlled device while BJT is a current-controlled device. FET has a higher input impedance than BJT. FET is a unipolar device while BJT is a bipolar device.

**3. Why is BJT called bipolar device but FET called unipolar device?**

BJT is called a bipolar device because it uses both electrons and holes as charge carriers, while FET is called a unipolar device because it only uses one type of charge carrier (either electrons or holes).

**4. Write down the families of FET.**

The families of FET are:

- Junction Field Effect Transistor (JFET)

- Metal Oxide Semiconductor FET (MOSFET)

- Insulated Gate Bipolar Transistor (IGBT)

**5. What Is JFET? What are the types of JFET?**

JFET stands for Junction Field Effect Transistor. The types of JFET are:

- n-channel JFET

- p-channel JFET

**6. Explain briefly the working principle of n-channel JFET/ p-channel JFET.**

Working principle of n-channel JFET/ p-channel JFET:

- In an n-channel JFET, when a voltage is applied between the gate and the source, an electric field is created in the channel which controls the flow of current between the drain and source.

- In a p-channel JFET, the direction of current flow is reversed, and the electric field created in the channel is also reversed.

**7. Write down the characteristics and some salient features of JFET.**

Characteristics and salient features of JFET:

- High input impedance & gain

- Low noise & power consumption

- Linear response

- Simple construction

- Limited voltage and power handling capability

**8. Write down the adv. Of using JFET in electronic circuit.**

Advantages of using JFET in electronic circuits:

- High input impedance

- Low noise

- Simple construction

- Linear response

**9. Write down some applications of JFET.**

Applications of JFET:

- Amplifiers

- Switches

- Oscillators

- Voltage regulators

**10. Discuss the parameter: (a) Drain saturation current (IDSS), (b) Pinch of**

**Voltage (Vp), (c) Threshold voltage (Vt /VGS(OFF)).**

- **Drain saturation current (IDSS):** The maximum current that can flow through the drain when the gate is shorted to the source.

- **Pinch-off voltage (Vp):** The voltage at which the channel of the JFET is completely pinched off, resulting in zero current flow.

- **Threshold voltage (Vt /VGS(OFF)):** The voltage at which the channel just starts to conduct when the gate-to-source voltage is zero.