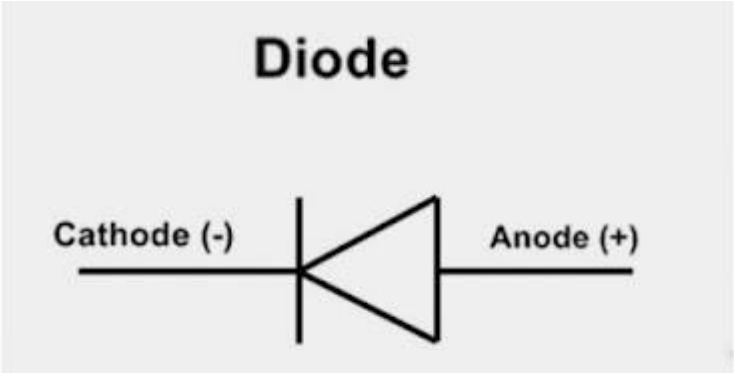
UNIT-4

1: What is a PN junction diode?

Answer: PN junction diode is a two terminal unidirectional conduction device. It consists of a p-type and n-type semiconductor material joined together to form a junction.

2: Draw the symbol for a PN junction diode.

Answer:



3: Define the PIV of a PN junction diode.

Answer: PIV – Peak Inverse Voltage

PIV is defined as the maximum voltage that a diode can withstand under reverse biased condition.

4: What are the applications of PN junction diode?

Answer: The applications of a PN junction diode are,

1.As a switch,

2.In rectifier circuits,

3.In clipper and clamper (wave shaping) circuits,

4.In power supplies.

5. Why MOSFET is called IGFET?

The construction of a MOSFET is a bit similar to the FET.An oxide layer is deposited on the substrate to which the gate terminal is connected. This oxide layer acts as an insulator (sio2 insulates from the substrate), and hence the MOSFET has another name as Insulated Gate Field Effect Transistor(IGFET).

6. What is thermal runaway?

The continuous increase in collector current due to poor biasing causes the temperature at collector terminal to increase. If no stabilization is done, the

collector leakage current also increases. This further increases the temperature. This action becomes cumulative and ultimately the transistor burns out. The self destruction of an un stabilized transistor is known as thermal runaway.

7. What is a Zener diode used for?

Zener diodes are widely used as voltage references and as shunt regulators to regulate the voltage across small circuits.

8. Define the different operating region of transistor.

Active region: The collector junction is reverse biased and emitter junction is forward biased.

9. **List out the different types of biasing**.

a. Voltage divider bias.
b. Base bias
c. Emitter feedback bias
d. Collector feedback bias.

10. Why is the transistor called a current controlled device?

The output characteristics of the transistor depend on the input current. So transistoris called a current controlled device.

11. Define current amplification factor.

It is defined as the ratio of change in output current to the change in input current atconstant other side voltage.

12. What are the requirements for biasing circuits?

a. The q point must be taken at the Centre of the active region of the outputcharacteristics.
b. Stabilize the collector current against the temperature variations.
c. Make the q point independent of the transistor parameters.
d. When the transistor is replaced, it must be of same type.

13. When does a transistor act as a switch?

The transistor acts as a switch when it is operated at either cutoff region or saturation region.

14. Recall the term pinch off voltage of MOSFET.

The drain voltage becomes large enough that the gate to substrate potential at the drain is smaller than threshold. Therefore the channel thickness at this end goes to zero. We call this pinch of

15. Compare JFET and MOSFET.

JFET	MOSFET
FET(Junction Gate Field-Effect Transistor) is a three-terminal semiconductor device.	MOSFET(Metal–Oxide–Semiconductor Field-Effect Transistor) is a four-terminal semiconductor device.
can only operates in the depletion mode.	operates in both depletion mode and enhancement mode.
has high input impedance on the order of 1010 ohms, therefore they are more sensitive towards input voltage signals.	offers even higher input impedance than the JFETs, theredore they are more resistive.
allows the gate leakage current on the order of 10^-9 A	While the gate leakage current for MOSFETs will be of the order of 10^-12 A.
is relatively cheaper than MOSFETs	is expensive one.
hese are ideal for low noise applications.	hese are mainly used for high noise applications.
hese are less susceptible to damage because of the high input capacitance.	hese are more susceptible to damage because of the metal oxide insulator.
Manufacturing process of JFETs is simple.	Manufacturing process of MOSFETs is complex.
FET(Junction Gate Field-Effect Transistor) is a three-terminal semiconductor device.	MOSFET(Metal–Oxide–Semiconductor Field-Effect Transistor) is a four-terminal semiconductor device.

16. Recall the application of TRIAC

The TRIAC (Triode for AC) is a semiconductor device that is commonly used in power regulation and switching applications. It is used in switching, phase control, chopper designs, brilliance control in lights, speed control in fans and motors, and so on.

17. What is a FET?

A field effect (FET) is a three terminal semiconductor device in which current conduction takes place by one type of carriers (either holes or electron) and is controlled byan electric field.

17.Why FET is called an unipolar device?

The operation of FET depends upon the flow of majority carriers only (either holes orelectrons) the FET is said to be unipolar device.

18.What is meant by gate source threshold voltage of a FET?

The voltage at which the channel is completely cur off and the drain current becomes zero is called as gate source threshold voltage.

19.Why N channel FET's are preferred over P channel FET's?

In N channel FET the charge carriers are the electrons which have a mobility of about1300 cm2/ VS, whereas in P channel FET's the charge carriers are the holes which have a mobility of about 500 cm2 /VS. the current in a semiconductor is directly proportional to mobility. Therefore the current in N channel FET is more than that of P channel FET.

20.What is JFET? And What are the terminals and types in JFET?

JFET- Junction Field Effect Transistor. And the terminals are Gate, Drain and Source and the types are N- Channel JFET and P- Channel JFET.

21.What are all the types of MOSFET?

i) Enhancement type ii) Depletion type

22.Differentiate Enhancement and Depletion MOSFET.

Enhancement MOSFET	**Depletion MOSFET**
Positive voltage at the gate	Negative voltage at the gate
Inversion layer is made	Depletion of majority carriers happens
Negative charges are formed	Positive charges are formed

23. What is the function of LCD?

LCDs are commonly used for portable electronic games, as viewfinders for digital cameras and camcorders, in video projection systems, for electronic billboards, as monitors for computers, and in flat-panel televisions.

24. What are the features of LCD?

It is lighter, thinner and flexible. LCD provides excellent resolution, brightness, and contrast so the picture quality is crystal clear. LCDs can be suitable with CMOS integrated circuits so making an LCD is very easy. It gives perfect sharpness at the native resolution.

25. Difference between LED and LCD:

S.NO	**LED**	**LCD**
1.	LED has a better response time than LCD.	LCD is slower than LED in terms of response time.

S.NO	LED	LCD
2.	LED consumes more power in comparison to LCD.	Whereas it consumes less power in comparison to LED.
3.	LED delivers good picture quality in comparison to the LCD display.	LCD also delivers good picture quality but less than LED.
4.	LED is costlier than LCD.	While it is less costly than LED.
5.	LED has a better black level and contrast in comparison to LCD.	While it has not good black level and contrast as LED.
6.	LED delivers better color accuracy in comparison to the LCD.	While it also delivers good color accuracy, we can notice the difference if we compare these two.
7.	LED has a wider viewing angle than the LCD.	While in LCD, the wide-angle decreases with 30 degrees from the center in the image then the contrast ratio.
8.	LED TVs can be up to 90 inches and they are much similar to LCD TVs.	LCD Screen size comes in the range of 13-57 inches.
9.	LEDs use no mercury and are therefore environmentally friendly.	LCDs require mercury for their products causing harm to the environment.
10.	LED uses gallium arsenide phosphide.	LCD uses liquid crystals and glass electrodes.

26.What are QLED vs OLED disadvantages?

On the other hand, QLED televisions boast excellent brightness levels and deliver accurate colours while being less prone to issues like image retention or degradation in panel quality. The downside here is that this display is unable to produce deep blacks and has an inferior contrast ratio than OLED