

UNIT-I

1. Define Knee Voltage of a diode

The minimum voltage at which the diode starts conducting and current starts increasing Exponentially is called knee voltage of a diode.

2. What is peak inverse voltage

In reverse biased, opposite polarity voltage appears across diode. The maximum voltage which diode can withstand without breakdown is called peak inverse voltage.

3. Differentiate drift and diffusion current

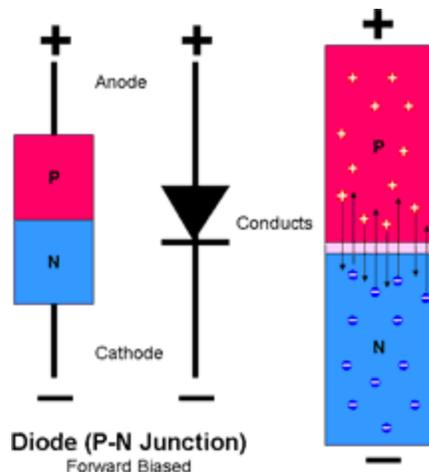
When a voltage is applied to a material, the free electrons move towards the positive of the battery.

While moving they collide with the adjacent atoms and keep changing their directions randomly.

In case of diffusion current, the external voltage is not required.

4. What is a PN Junction diode

There are two electrodes each from p-type and n-type materials and due to these two electrodes; the device is called a diode. It conducts only in one direction.



5. Compare series and shunt regulator

Shunt regulator

1. The control element is in parallel

With the load

2. Only small current passes through

The control element, which is required

To be diverted to keep output constant.

Series regulator

The control element is in series with the load

The entire load current is always passes through

the control element.

6. What are the advantages of bridge rectifier over its centre tapped counterpart?

No centre tap is required in the transformer secondary. Hence, wherever possible a.c Voltage can be directly applied to the bridge.

Due to pure alternating current in secondary of transformer, the transformer gets utilized effectively.

7. What is meant by dynamic resistance of diode

The resistance offered by the p-n junction diode under a.c conditions is called dynamic resistance of diode.

8. Differentiate between zener breakdown and avalanche breakdown.

Zener Breakdown

1. The temperature coefficient is negative

2. This occurs for zener diodes with V_z less

Than 6V

Avalanche Breakdown

The temperature coefficient is Positive

This occurs for zener diodes with

V_z greater than 6V

9. Calculate the speed of electron when it falls by a potential of 300 k volts

$$\text{Speed of electron } V = \sqrt{2QV} \text{ m/s}$$

$Q = \text{charge on electron} = 1.6 \times 10^{-19} \text{ C}$

$M = \text{mass of electron} = 9.107 \times 10^{-31} \text{ kg}$

$V = 2 \times 1.6 \times 10^{-19} \times 30010 = 324.8 \times 10^{-19}$

9.107×10^{-31}

10. What are the advantage and limitations of LCD Displays

-Less power consumption is the advantage of LCD displays.

-Poor reliability is the limitation of LCD Display.

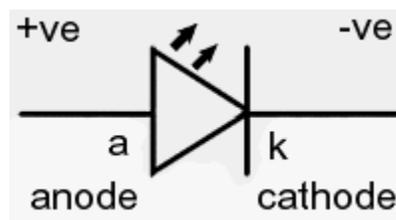
11. Define static and dynamic resistance of a PN diode.

The forward resistance of p-n junction diode when p-n junction is used in d.c. Circuit and the applied forward voltage is d.c. is called static resistance

The resistance offered by the p-n junction diode under a.c. conditions is called dynamic Resistance of diode.

12. What is LED? Draw its symbol

LED is a light emitting diode which emits light when forward biased.



UNIT-II

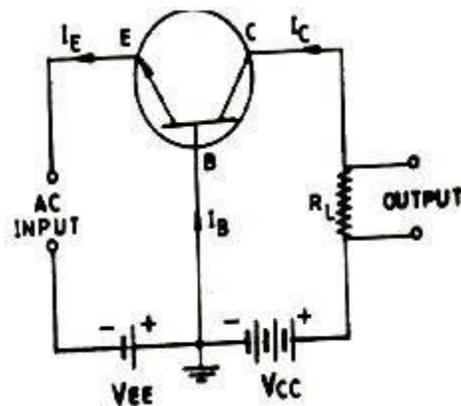
1. Calculate β of a transistor when $\alpha = 0.98$

$$B = \alpha/1-\alpha = 0.98/1-0.98 = 49$$

2. Among CE, CB and CC configurations, which one is the popular? Why?

→ The CE configuration is widely used because it provides both voltage gain as well as current gain greater than unity.

3. Draw the circuit of NPN transistor in CB configuration?



4. What are power transistors? List its applications.

→ Power transistors are designed for power amplification which means that the operating voltage and current must be large.

Applications:

1. They are used in switching power supplies.
2. They are used in audio power amplifiers.

5. What is the relation between I_B , I_E and I_C in CB configuration?

$$\text{Emitter current } I_E = I_B + I_C$$

6. Name the operating modes of a transistor?

1. Cut off
2. Active
3. Saturation

7. What are hybrid parameters

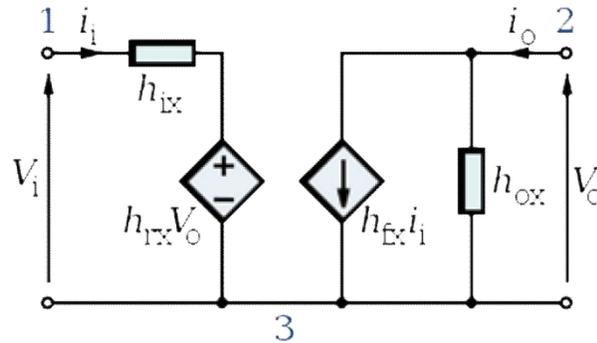
$$h_{11} = V_i/I_i | V_o = 0 \quad h_{21} = I_o/I_i | V_o = 0$$

$$h_{12} = V_i/V_o | I_o = 0 \quad h_{22} = I_o/V_o | I_i = 0$$

8. What is the application of optocoupler?

→ The application of optocoupler is to provide electrical isolation between input and output circuit.

9. Draw the h-parameter equivalent circuit of a CE BJT configuration?



10. Give the h_{ie} and h_{oe} equations of BJT

$$h_{ie} = \Delta V_{BE}/\Delta I_B | V_{CE} \text{ Constant}$$

$$h_{oe} = \Delta I_c/\Delta V_c | I_B \text{ Constant}$$

11. When does a transistor acts as a switch?

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

UNIT-III

1. Mention the disadvantages of FET compared to BJT.

1. FET is a voltage controlled device
2. Less sensitivity to changes in applied voltage

2. Define pinch off voltage of a FET

The substrate is of p-type material on to which an n-type channel is epitaxially grown. A p-type gate is then diffused into the n-type channel.

3. What is MOSFET? Name its types.

- MOSFET is a metal oxide semiconductor field effect transistor
- Its types are depletion and enhancement type
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4. Compare JFET with BJT.

Parameter	BJT	JFET
1. Control element	Current controlled device	Voltage controlled device
2. Configurations	CE, CB and CC	CC,CG, CD

5. Mention the operating modes of MOSFET.

The two operating modes are

- 1) Depletion Mode
- 2) Enhancement Mode

6. Why FET is called as “Voltage operated device”?

- The voltage applied between gate and source (VGS) controls the drain current ID
- Therefore, FET is a voltage controlled device

7. Define : Amplification factor in JFET

$$\text{Amplification factor } \mu = \frac{\Delta V_{DS}}{\Delta V_{QS}} \Bigg|_{I_D \text{ Constant}}$$

$$\mu = r_d \times g_m$$

8. Give any two differences between E-MOSFET and D-MOSFET.

	E-MOSFET	D-MOSFET
1. Channel	Exists Permanently	Channel is physically absent
2. Operation	Can be operated in depletion mode as well as enhance mode	Can only be operated in enhance mode

UNIT-IV

1. List the advantages of crystal oscillator

The advantages of crystal oscillator are

- a) Excellent frequency stability
- b) High frequency of operation
- c) Automatic amplitude control

2. What are the classifications of oscillators?

According to the type of circuit used, sine wave oscillators may be classified as

- 1) RC oscillators
- 2) LC oscillators

3. What is the difference between Amplifier and oscillator?

-> Amplifiers are circuits which transfer an input signal into an output signal.

-> Oscillators produce a steady state signal e.g a square wave signal or a sinusoidal signal.

4. What are the advantages of differential Amplifier?

A differential amplifier helps to increase the CMRR which in turn helps avoid unwanted signals that couple into the input to get propagated. It also helps to increase the signal to noise ratio.

6. State Barkhausen criteria.

The essential conditions for maintaining oscillators are $AB=1$ i.e the magnitude of loop gain must be unity.

1. The total phase shift around the closed loop is zero or 360 degrees.

7. Mention any two high frequency LC oscillators.

1. Hartley oscillator
2. Colpitts oscillator

8. Name the type of feedback amplifiers

1. Voltage series feedback amplifier
2. Voltage series feedback amplifier
3. Voltage series feedback amplifier

4. Voltage series feedback amplifier

9. Why LC oscillators are not preferred to generate low frequency signals even though they have higher frequency stability compared to RC Phase shift oscillator?

→ At the low frequency, the value of L required in the circuit for generating low frequency signals is very large as frequency is inversely proportional to the value of L.

UNIT-V

1. What are the types of Multivibrators

The three types of multivibrators are

1. bistable :It has two stable states.
2. It has one stable state.
3. It has two states both are quasi-stable.

2. What is intrinsic standoff ratio of a UJT

Intrinsic stand-off ratio of UJT indicates that the transistor internally divides the supply voltage and bias the emitter terminal. It is the ratio of the stand off voltage to the power supply voltage.

3. What is a clamper? Name its types?

The circuit which is used to add a d.c level as per the requirements to the a.c output signal is called Clamper circuit. The two types are positive clamper and negative clamper.

4. How is a Schmitt trigger different from a multivibrator?

A Schmitt trigger is a threshold circuit which uses positive feedback with loop gain greater than unity. The Schmitt trigger is a comparator which switches the output positive when the input passes upward.

5. Mention some applications of UJT

1. used in triggering of another devices such as SCR.
2. AS a relaxation oscillator

6. Write the frequency equation of an Astable Multivibrator.

The frequency equation is

$$T=0.69R_1C_1, \text{ and } T_2=0.69R_2C_2$$

While $T=T_1+T_2$

$$F=1/T=1/0.69CR_1C_1+R_2(2)$$

7.What is Schmitt trigger?

A Schmitt trigger is a threshold circuit which Uses positive feedback with loop gain greater than Unity.

8.What is a Multivibrator?

A multivibrator is an electronic circuit using two Amplifying transistor stages each with its output Connected to the input of the other by resistors and capacitors.

9.What is clipper?

The circuit which is used to clip off unwanted Portion of the waveform without distorting the remaining Part of the waveform is called clipper circuit.

10.Under what condition would a Schmitt trigger operate as an amplifier?

The resistance R_{c1} must be enough smaller than R_{c2} So that regeneration can not take place and Schmitt Trigger operates as an amplifier.