

II Transistor characteristics

1. What is transistor
2. Types of transistor (based on charge carriers)
3. Terminals of transistor
4. Configurations of transistor
5. Operating regions of transistor
6. Applications of transistor
7. Why it is called as BJT?
8. Why Common emitter Configuration?
9. What are Semiconductor devices.

2) Static characteristics of Semiconductor diode

- 1) What is diode
- 2) Terminals of diode
- 3) What is bias
- 4) Types of biasing
- 5) What is knee Voltage
- 6) ~~Practical~~ Applications of diode
- 7) Value of the potential barrier for Si & Ge
minimum V_{fb} required by a diode to conduct.
- 8) Why we use thin Conductors while rigging up diode, transistor, ...

3) Verification of KCL & KVL for PC Circuits

- 1) State KVL, KCL, Ohm's law
- 2) Define Voltage, current
- 3) Which law is called Conservation of energy
- 4) Which law is called conservation of charge.
- 5) Why we use thin conductors while rigging up the circuit.
- 6) What is junction in circuit
- 7) What is loop

4) Two way and three way Control of lamp

- 1) What is Switch
2. What is SPST switch
3. What is 2 way and 3 way control of lamp
4. Applications of 2 way and 3 way switching circuit
- 5) What do you mean by fuse, MCB, Relay.

5) Measurement of resistance

- 1) What is Resistance.
- 2) State Ohm's law
- 3) What are active elements and passive elements
- 4) What do you mean by cut-out and cut-in positions of rheostat.
- 5) What is Req for resistors connected in series
- 6) What is the value of Req for resistors connected in parallel

7) In what is the circuit symbol and unit of resistance?

8) Measurement of Resistance and Inductance of a choke coil using 3 Voltmeter method.

9) What is Resistance, circuit symbol, unit.

10) What is Inductance, circuit symbol, unit

11) What is Self inductance

12) What is Mutual inductance

13) What is Power factor.

14) What is Choke coil

15) In what do you mean inductive reactance, capacitive reactance, impedance.

$V_s \rightarrow$ Supply voltage

$V_L \rightarrow$ Voltage across choke coil

$V_R \rightarrow$ Voltage across Resistive load.

7) Measurement of current, power, & power factor of fluorescent lamp (with & without capacitor).

1) What is current and its unit

2) What is power and its unit

3) What is power factor

4) What is Real power

5) What is Reactive power

6) What is Apparent power and

- 7) What is power factor
 - 8) How to calculate wattmeter constant
 - 9) Terminals of wattmeter, its symbol
 - 10) Symbol of wattmeter and identify the current coil and potential coil
 - 11) What is function of choke in fluorescent lamp
↳ and starter, filament
 - 12) What is capacitor and its unit & symbol.
 - 13) What happens to PT when Capacitor is included.
- 8] Magnetization characteristics of DC shunt generator
- 1) What is motor
 - 2) What is Generator
 - 3) What do you mean by shunt motor & shunt generator
 - 4) What do you mean by RPM
 - 5) Working principle of motor and Generator.
 - 6) What do you mean magnetization characteristics of DC Shunt generator.
 - 7) What is O.C.C
 - 8) What do you mean by 3 point starter, why we use that.
 - 9) What do you mean by Residual Voltage
 - 10) What is Critical field resistance.

- 1) What do you mean by Back emf
- 2) What do you mean cut-out and cut-in of rheostat
- 3) What is Residual Voltage

Torque - speed characteristics of D.C shunt motor

- 1) What do you mean Torque and its units
- 2) What do you mean by BHP
- 3) What is RPM
- 4) What is back emf
- 5) 1HP is equals to how many watts.
- 6) What do you mean by cut-out & cut-in position of rheostat.
- 7) Applications of DC shunt motor & Generator

Torque slip characteristics of 3 ϕ induction motor

- 1) What do you mean by induction motor
- 2) What is Generator and Types of Generators based on excitation
- 3) What is slip and formula to calculate it
- 4) What is Synchronous speed
- 5) What do you mean Rotor frequency, how to calculate it.

No-load & short circuit test on 1 ϕ Xmer & pre-determine the efficiency.

- 1) What is transformer
- 2) Why transformers are ~~rated~~ in kVA
- 3) Working principle of transformer
- 4) What are the losses occurs in Xmer
- 5) By conducting O.C test which loss can be determined
- 6) By conducting S.C test which loss can be determined

- 7) Why does L.Pt Wattmeter is used in O.C test
and U.Pt wattmeter in S.C test.
- 8) What is auto transformer.

Transistor Characteristics

1) What is transistor

The transistor is a Semiconductor device which transfers a weak signal from low resistance circuit to high resistance circuit.
[Transfer of resistance]

2) Types of transistor [based on charge carriers]

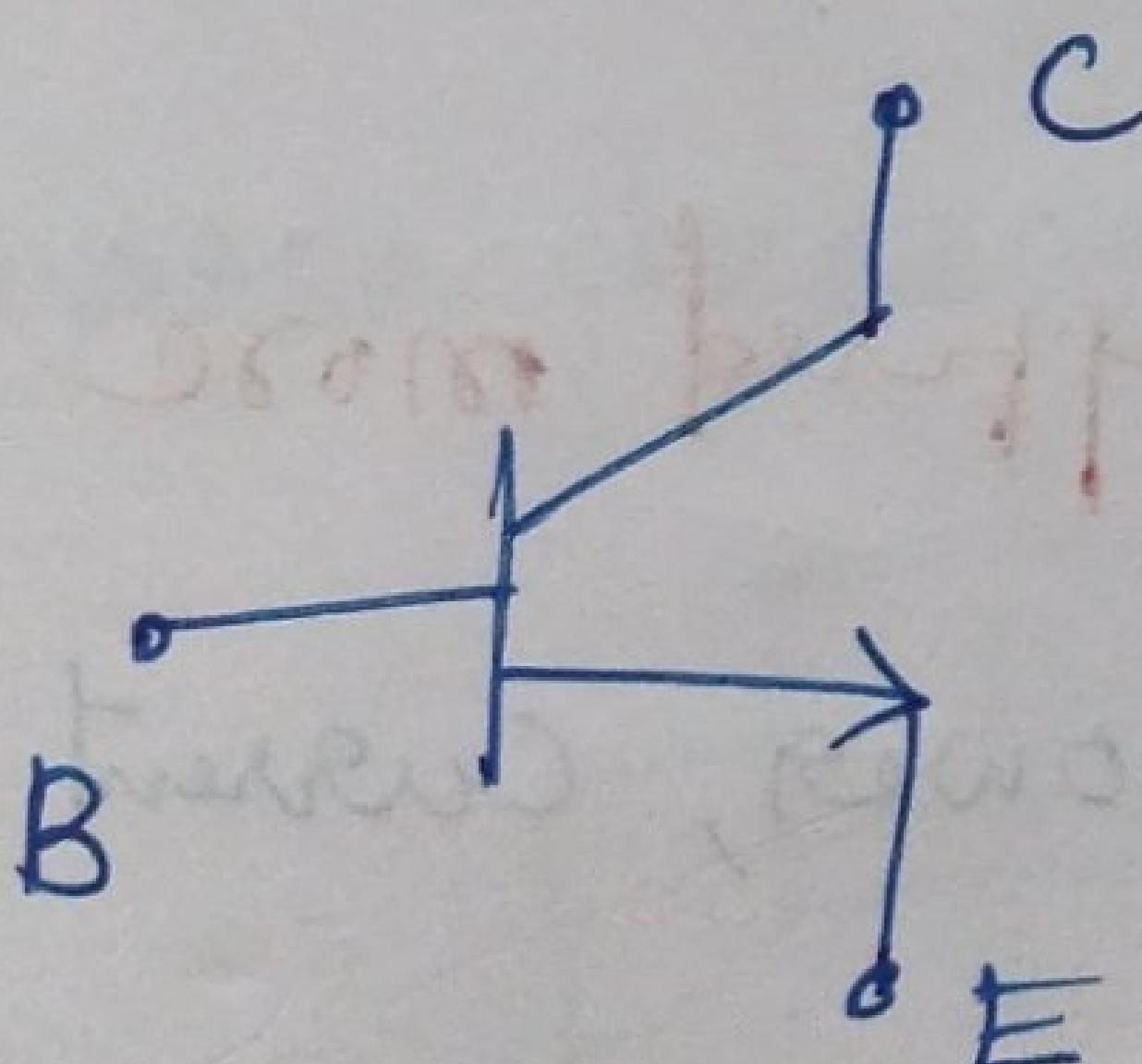
- 1) NPN transistor
- 2) PNP transistor

Note

p-type → Holes are ^{the} majority charge carriers
 $n \neq p$ Electrons are the minority charge carriers

n-type → Electrons are majority charge carriers
Holes are the minority charge carriers

3) Terminals of transistor and its symbol



- a) Base
- b) Emitter
- c) Collector

4) Configurations of transistor

- a) Common Emitter Configuration
- b) Common Collector Configuration
- c) Common Base Configuration.

5) Operating regions of transistor

- a) Active region [transistor acts as amplifier]
- b) Cutoff region [it will be in "OFF" state]
- c) Saturation region [it will be in "ON" state]

Note

Amplifier:- An electronic device which increase the amplitude and hence the output power of a signal.

6] Application of transistors

- i) amplification
- ii) switching
- iii) Why it is called BJT

Because its operation involves two kinds of charge carriers, which are holes & electrons.

BJT → Bipolar junction transistor.

7) Why CE Configuration is preferred more

Because, In CE configuration, Power, current voltage gain are high.

8) What are Semiconductor devices

Semiconductors are materials which have conductivity between conductors and insulators.

Static characteristics of Diode:

1) What is Diode

Diode is a two terminal electronic component that conducts current in one direction.

2) Terminals of Diode

a) Anode (+ve)

b) Cathode (-ve)

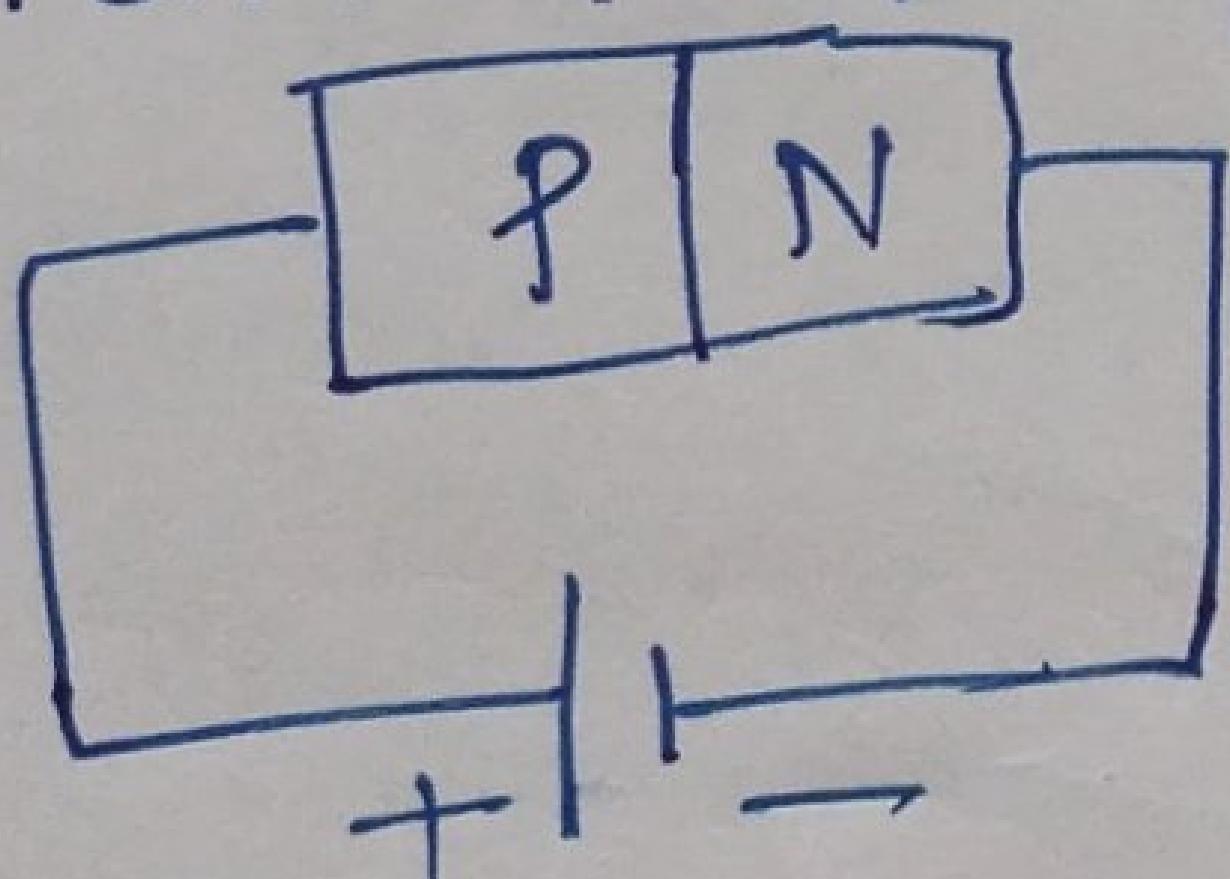
3) What is bias

process of providing DC Voltage

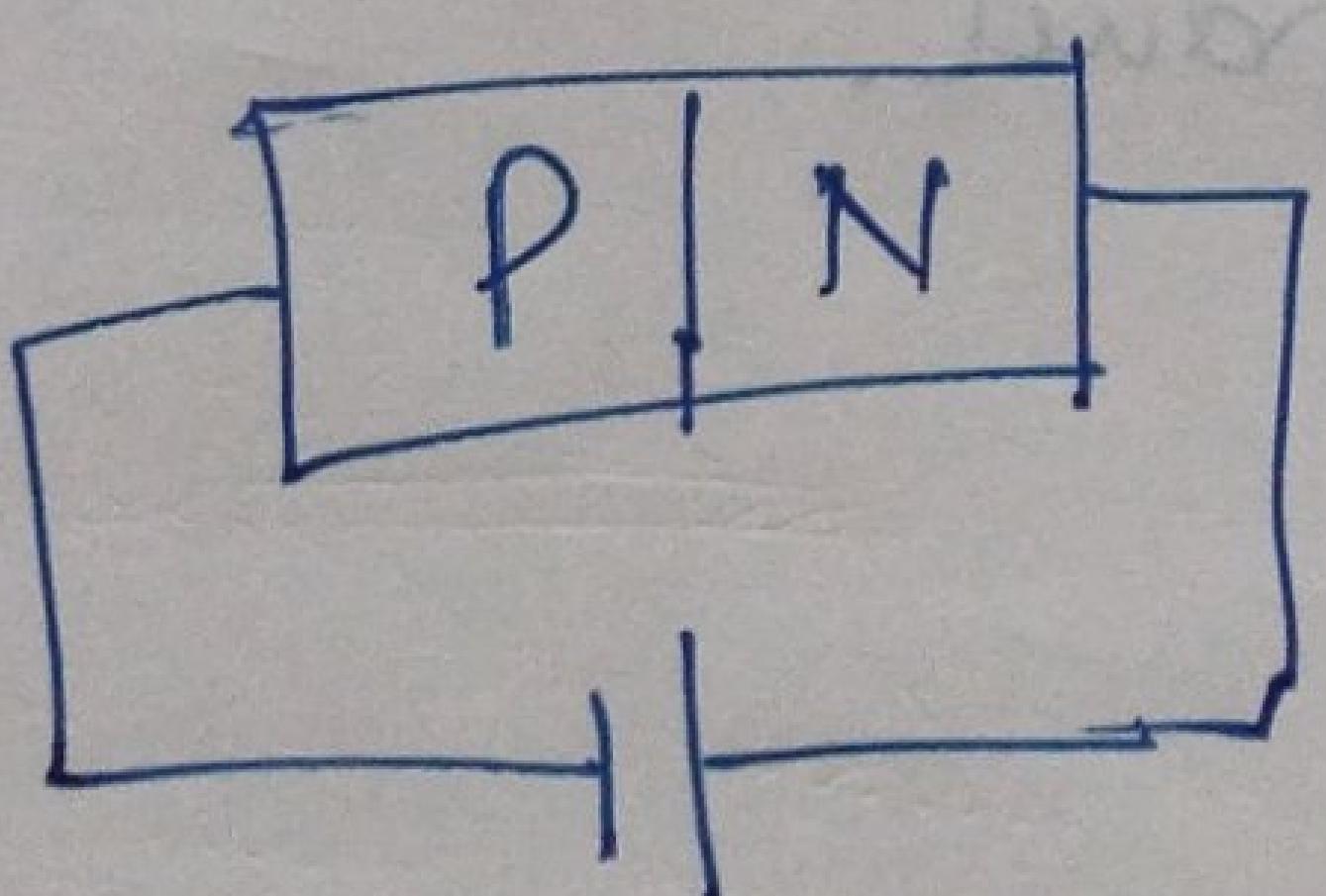
4) Types of biasing

a) Forward bias

→ +ve terminal of supply to p-type of Semiconductor
-ve terminal of supply to N-type of Semiconductor device



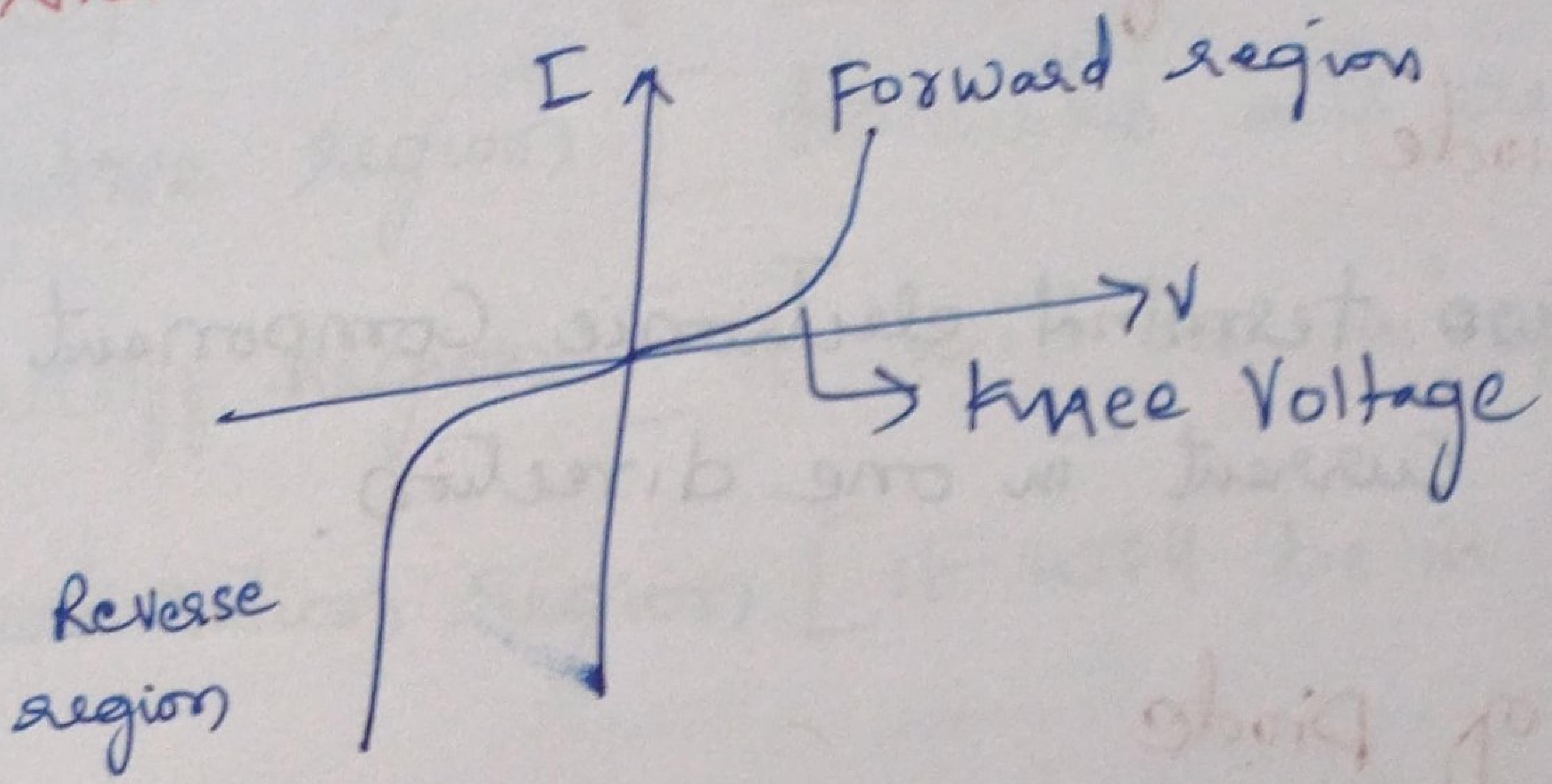
b) Reverse bias



p-type to → -ve supply
terminal

n-type → +ve terminal of Supply.

5) What is knee Voltage



In forward region, the Voltage at which the current starts increasing rapidly is called "knee Voltage"

6) Applications of Diode

- 1) Rectifying circuits
- 2) clippers
- 3) Clampers

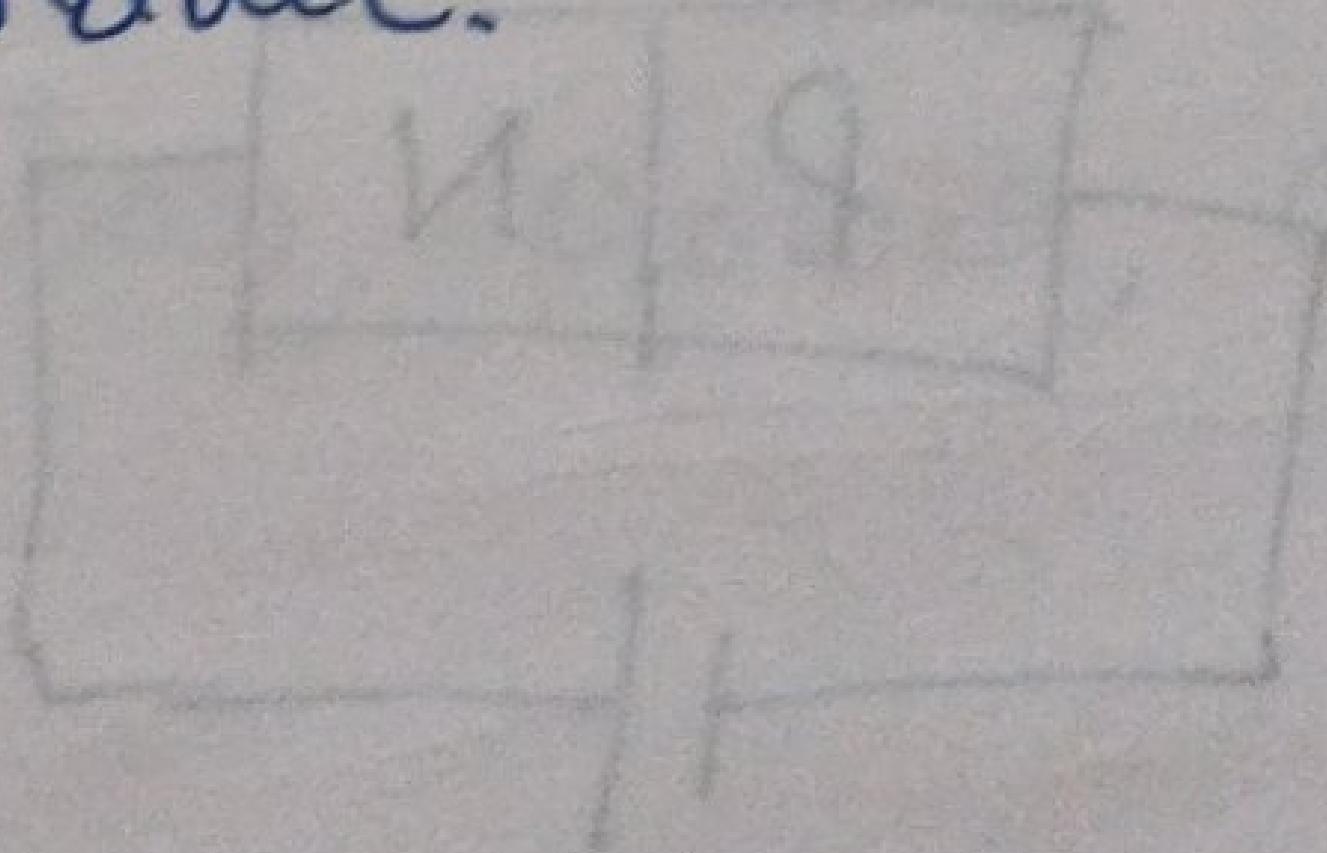
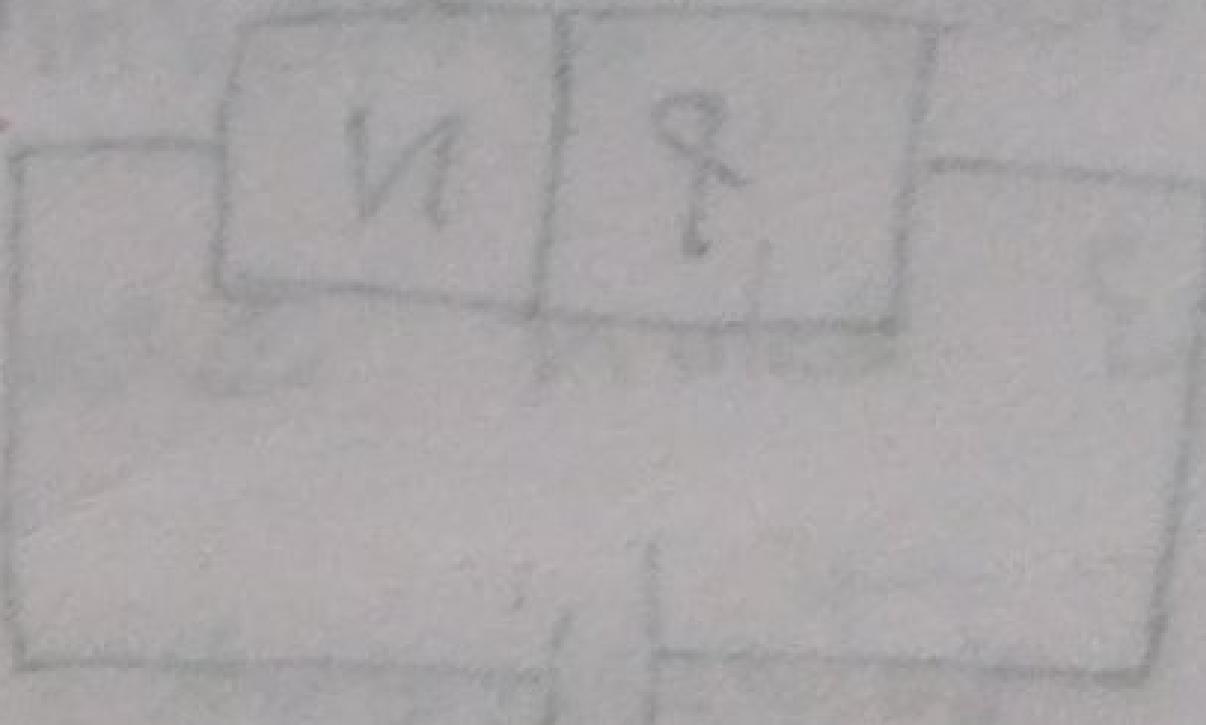
7) Value of potential barrier for Si and Ge

For Silicon $\rightarrow 0.7\text{V}$

For Germanium $\rightarrow 0.3\text{V}$

Note

Potential barrier: the minimum voltage required for diode to conduct.



Verification of KCL & KVL in DC circuits.

1) State KVL, KCL, Ohms law.

KVL: Kirchhoff's Voltage law

It states that the algebraic sum of all voltages around a closed loop is zero.

2) KCL: Kirchhoff's Current law

It states that the algebraic sum of all the currents entering the node and leaving the node must be equal to zero.

Ohms law: It states that the voltage across a conductor is directly proportional to the current flowing through it, providing all physical conditions & temperature remain constant.

2) Which law is called Conservation of energy

KVL

3) Which law is called Conservation of charge

KCL

4) Define Voltage, current:

Voltage:- Voltage is total work required to move a unit of charge b/w two points.

Current:— The flow of free electrons in a definite direction is called current.