# Unit-04

> Transistor Construction
> Transistor Operation
> Transistor Configurations: Common Base and Common emitter Configurations. I/P and O/P characteristics.
> Transistor amplifying action - Frequency Response.

> Enhancement-type and depletion-type MOSFETS: Drain & Transfer characteristics.

* Introduction to Communication Systems: Electronic Communication Systems, Modulation & Demodulation.

* Fundamental Concepts of Cellular Telephone, Frequency Reuse, Co-channel interference, Roaming and hand-offs.

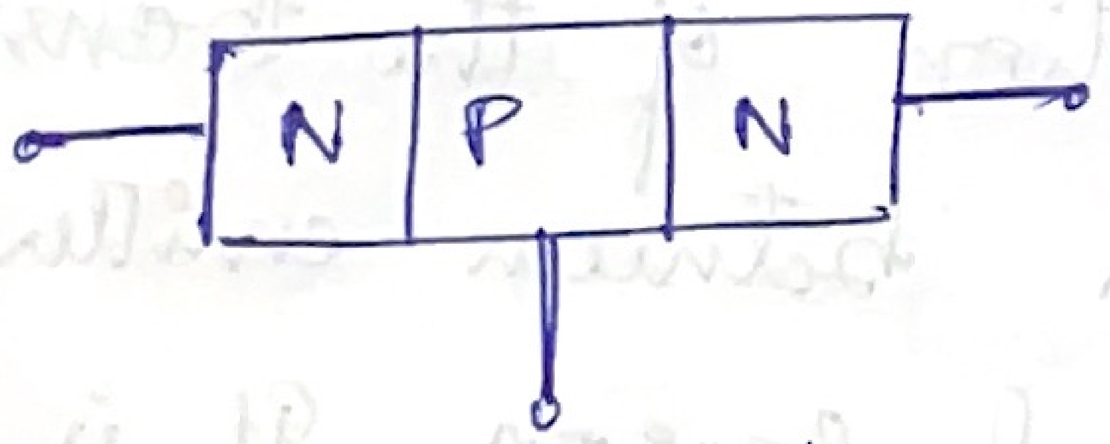
# BJT Transistor

* BJT stands for Bipolar Junction Transistor

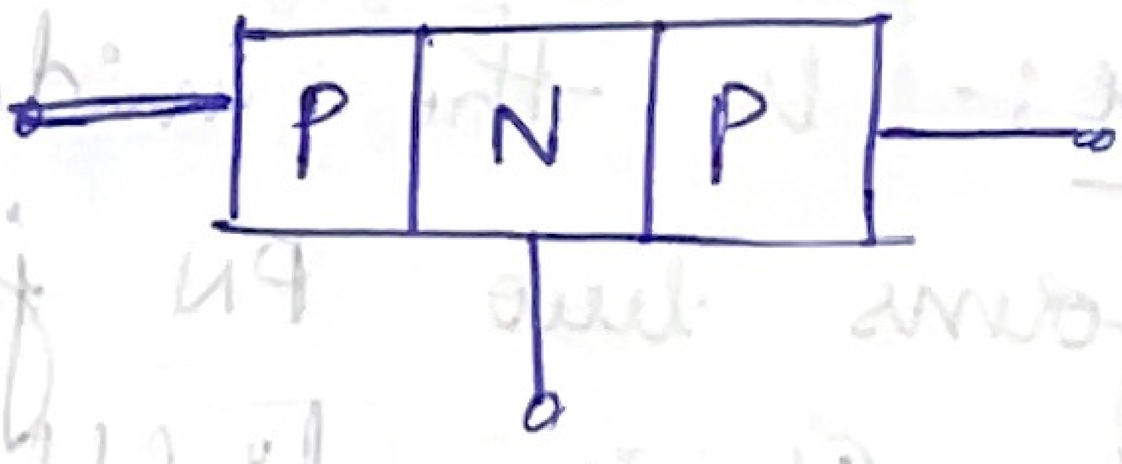
* A BJT is a three terminal device consist of either P-type Semiconductor or n-type Semiconductor sandwiched between opposite types.

* In BJT both majority and minority charge carriers actively participate in its operation. Hence the name "Bipolar" is given.

* TRANSISTOR stands for Transfer + resistor as the current transferred from a low to high resistance circuit.

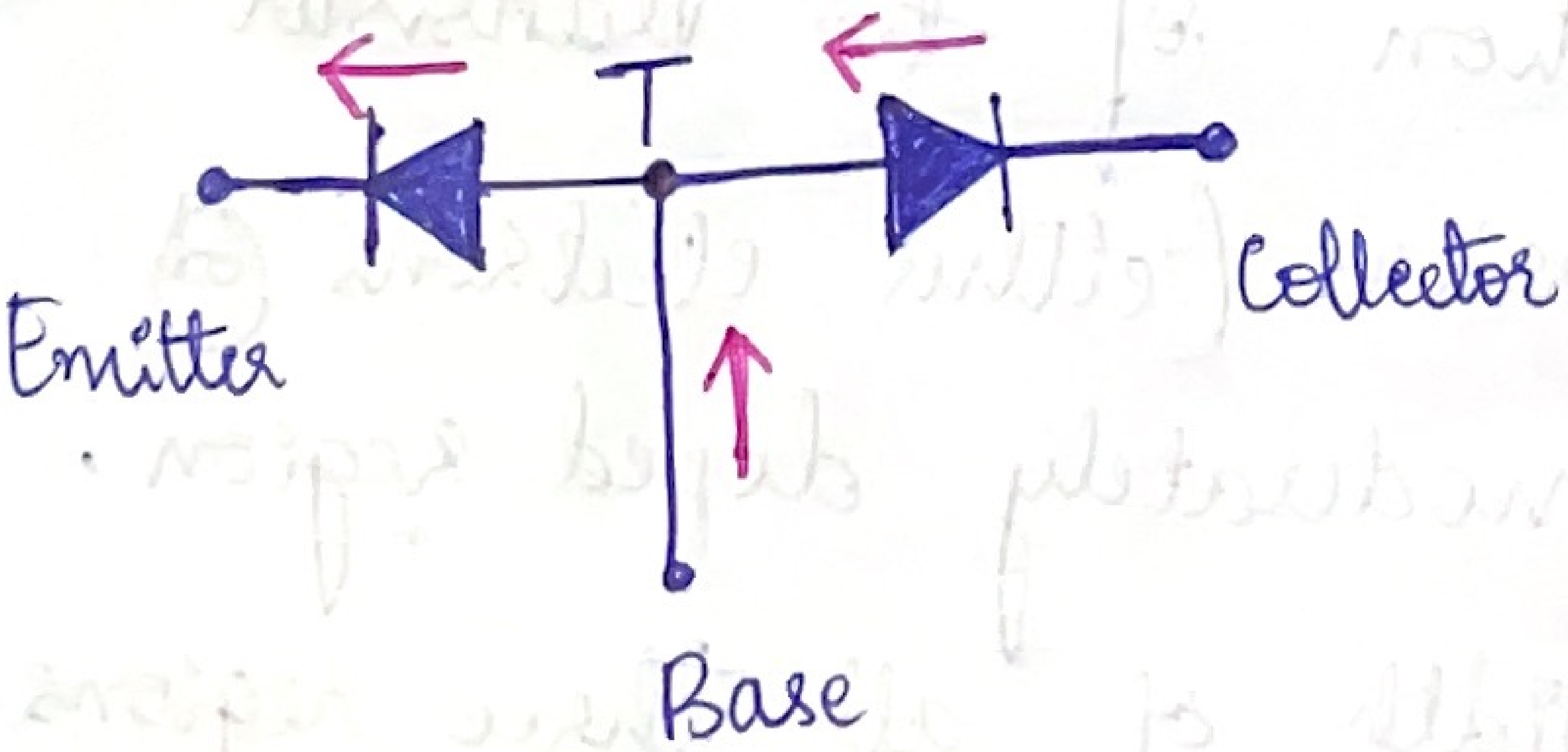



npn transistor

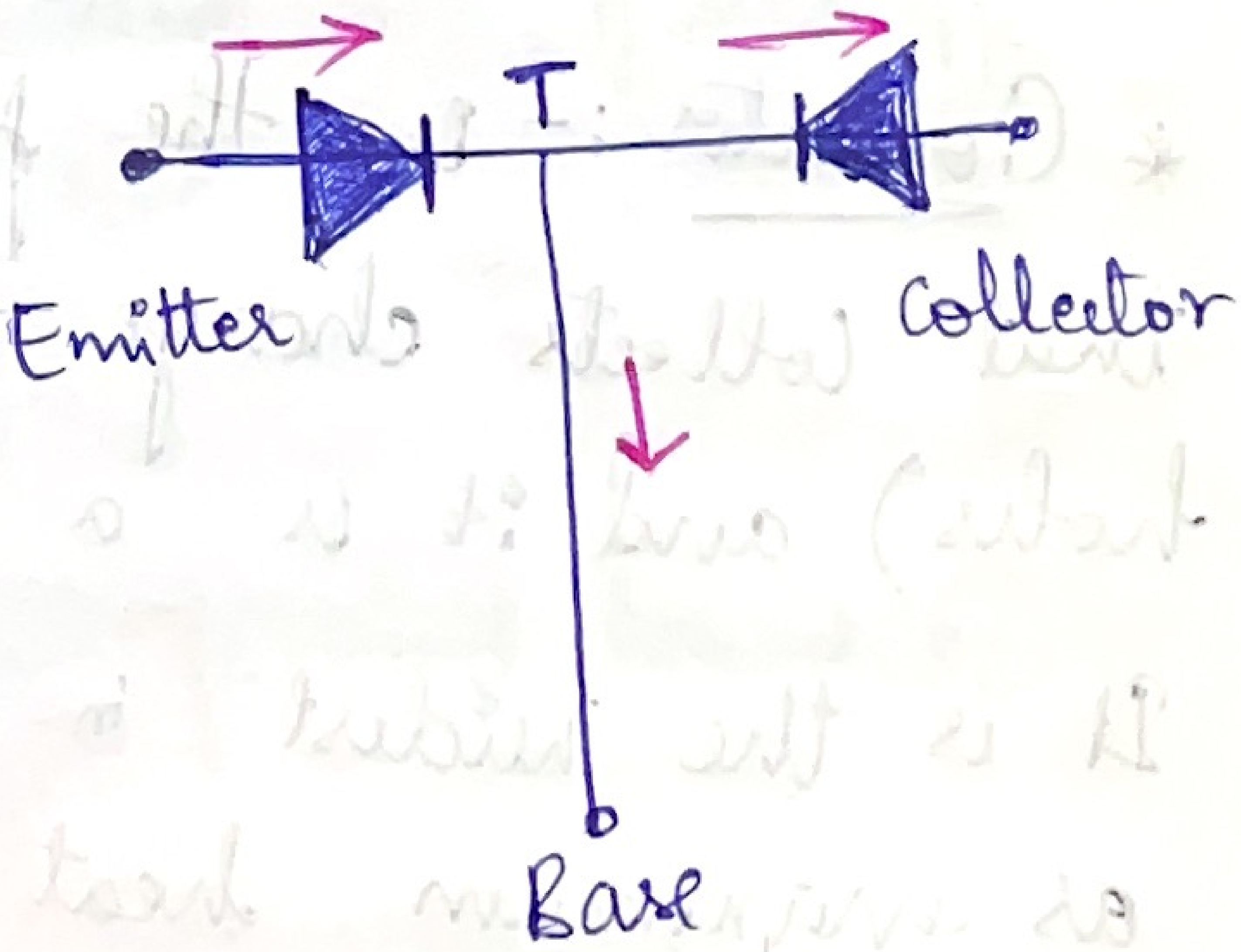



pnp transistor

* The three terminals of Bipolar junction transistor are Emitter, Base & collector.




n-p-n




p-n-p

at Node T

$$-I_E + I_C + I_B = 0$$

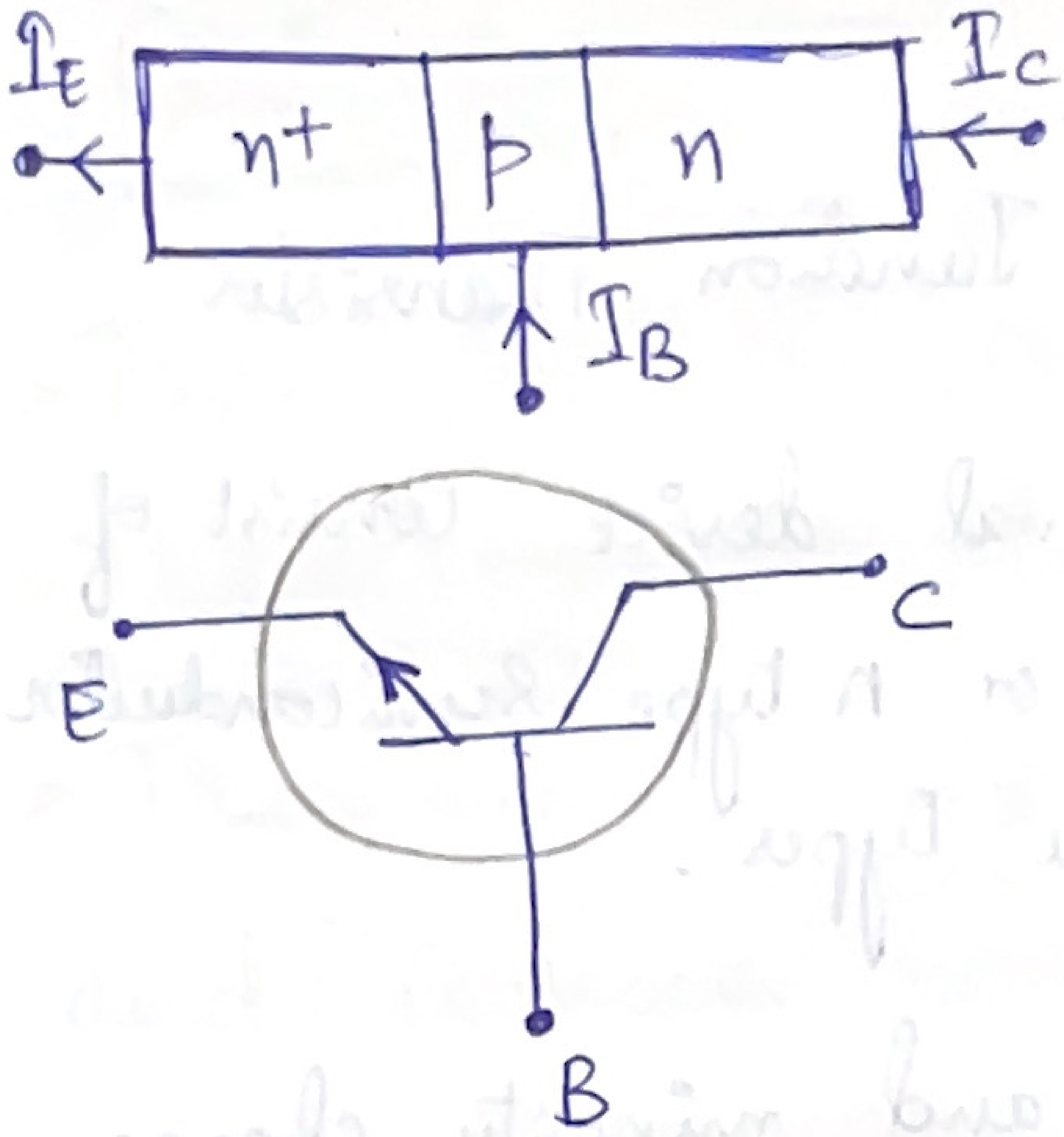
$$\Rightarrow I_E = I_C + I_B$$

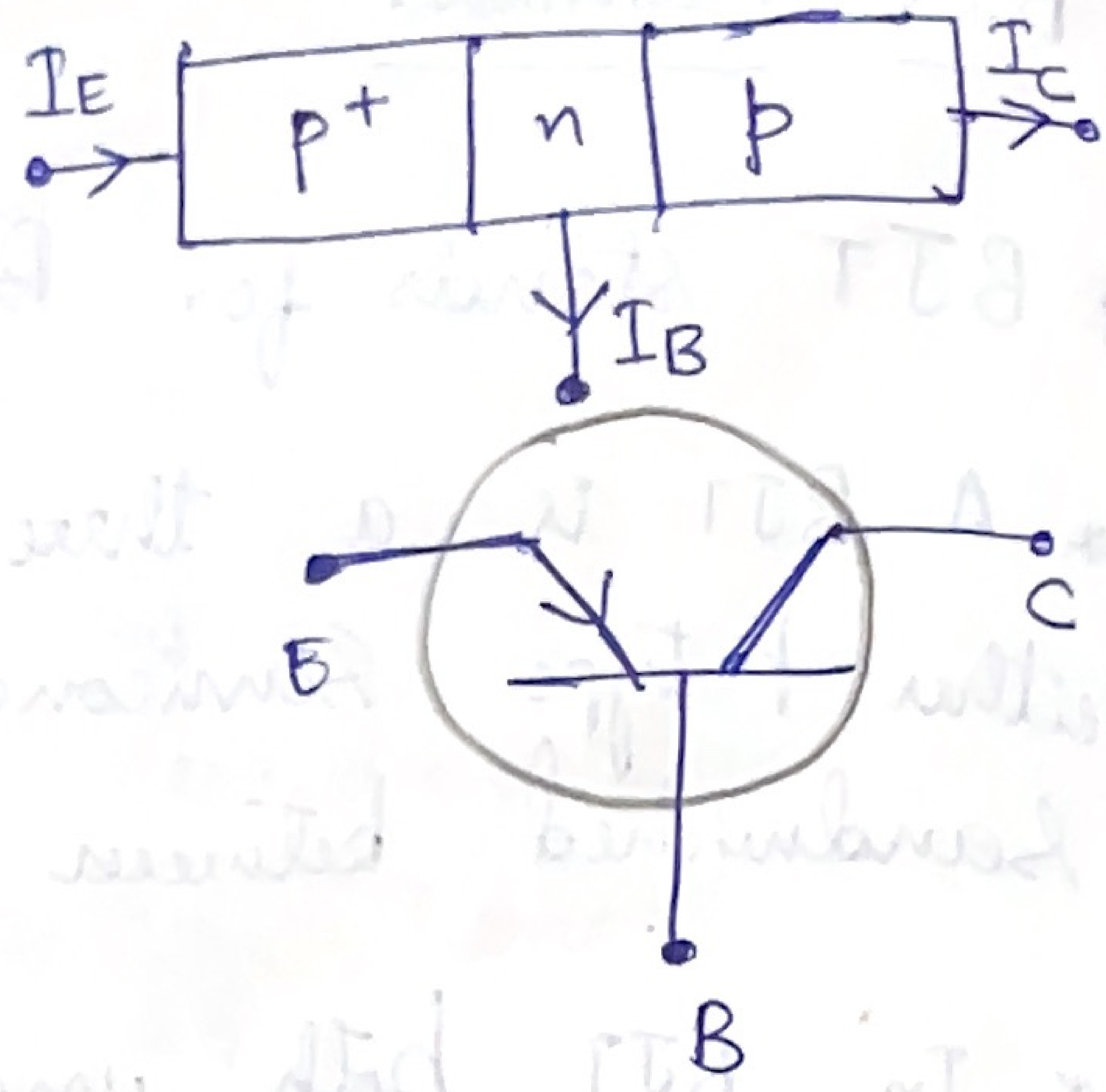
at Node T

$$I_E - I_C - I_B = 0$$

$$\Rightarrow I_E = I_C + I_B$$

$\therefore$ Total Current is $I_E$ which is i/p Current.



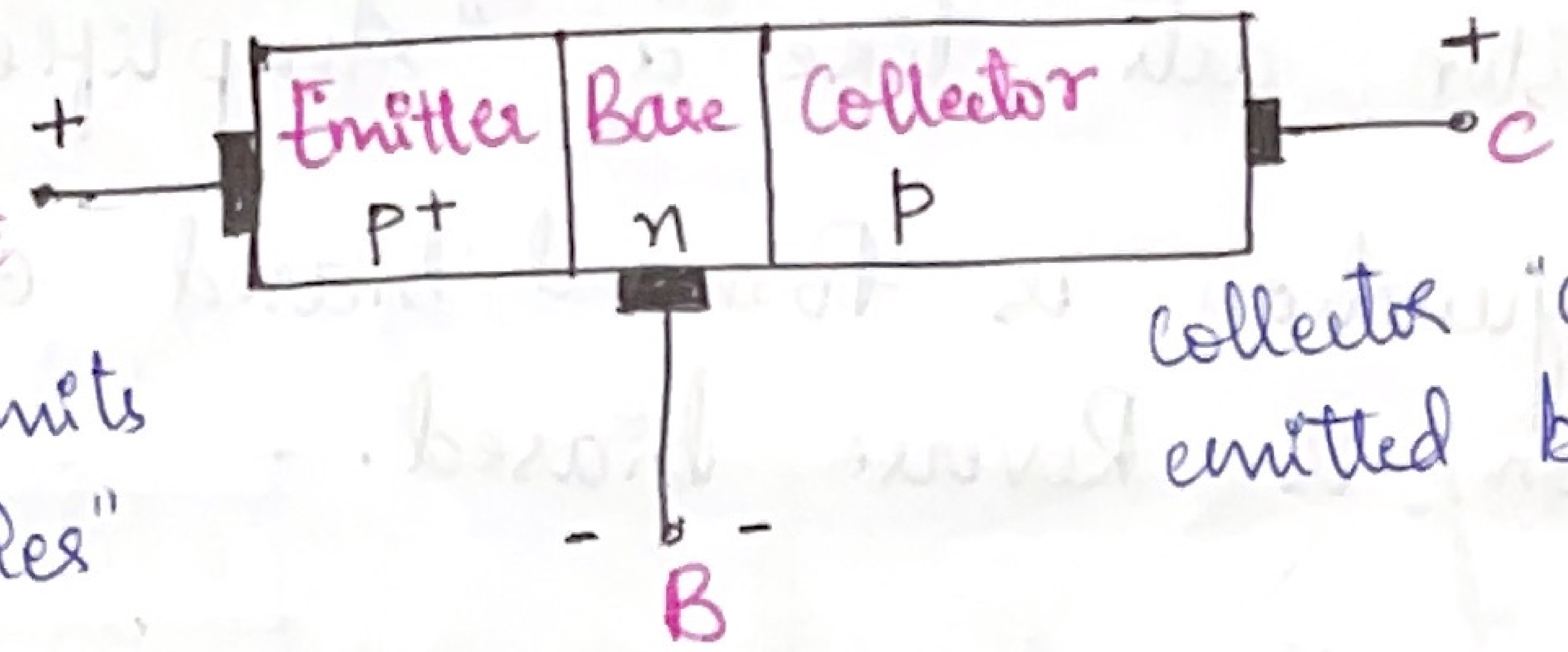

* **Emitter** (i/p side) :- is the portion of the transistor that supplies charge carriers (either electrons or holes). It is heavily doped ($n^+/p^+$) region and the area is moderate in size.

* **Base** :- is the middle portion of the transistor that forms two PN junction between emitter & collector. It is lightly doped region. It is the smallest in width of all three regions.

* **Collector** (o/p side) :- is the portion of the transistor that collects charge carriers (either electrons or holes) and it is a moderately doped region. It is the widest in width of all three regions as maximum heat is dissipated in this region.

# Types of BJT Transistor

1] PnP Transistor

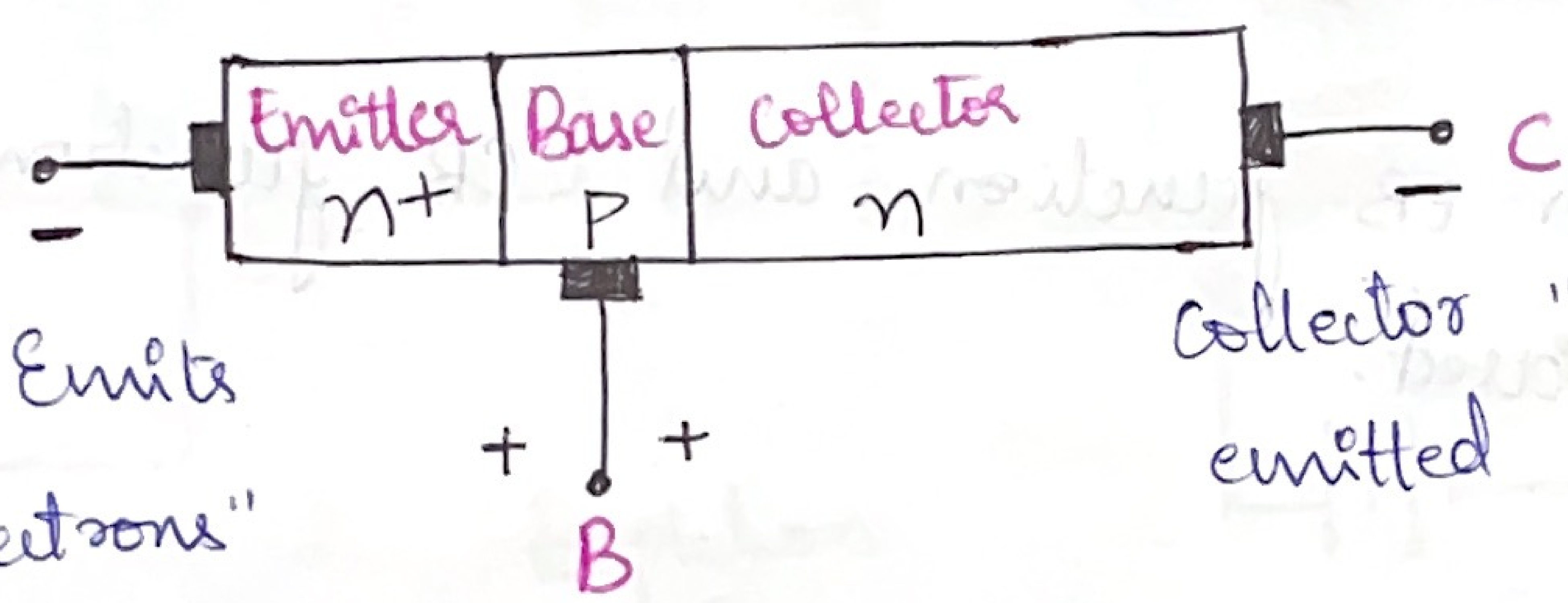



Emitter Emits "holes"

collector "collects" holes emitted by emitter

Base controls number of holes emitted

2] npn Transistor




Emitter Emits "Electrons"

Collector "collects" emitted by emitter.

Base controls number of electrons emitted

# Transistor Biasing

> WKT, A Transistor has two p-n junctions.

① Emitter-Base (EB) Junction

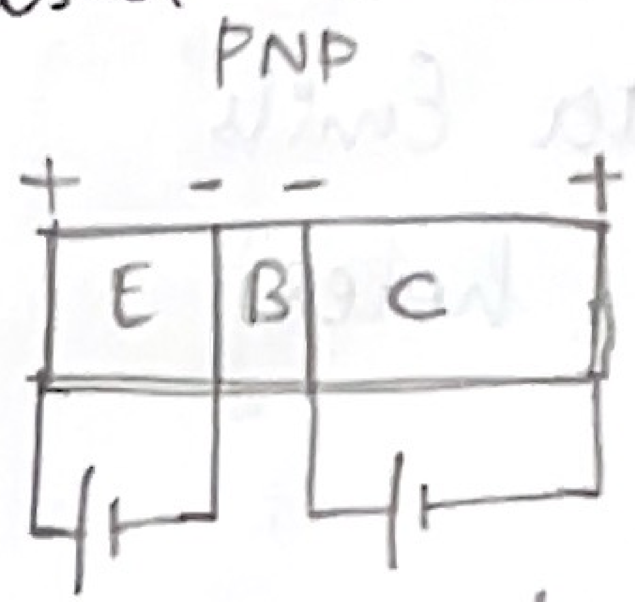
② Collector-Base (CB) Junction

> Each junction can be either forward biased or Reverse biased independently.

> Therefore there are four regions of Operation for a transistor:

## (1) Active Region

* This is the most commonly used configuration
* Here Transistor acts like a "Amplifier".
* Here EB junction is Forward biased and CB junction is Reverse biased.




Example

## (2) Saturation region

* Here Transistor acts as a closed Switch (ON Switch / Conductor)
* Here both EB junction and CB junction are Forward Biased.

## (3) Cutt-off region:

* Here Transistor acts as a Open Switch (OFF Switch)
* Here both EB junction and CB junction are Reverse biased.

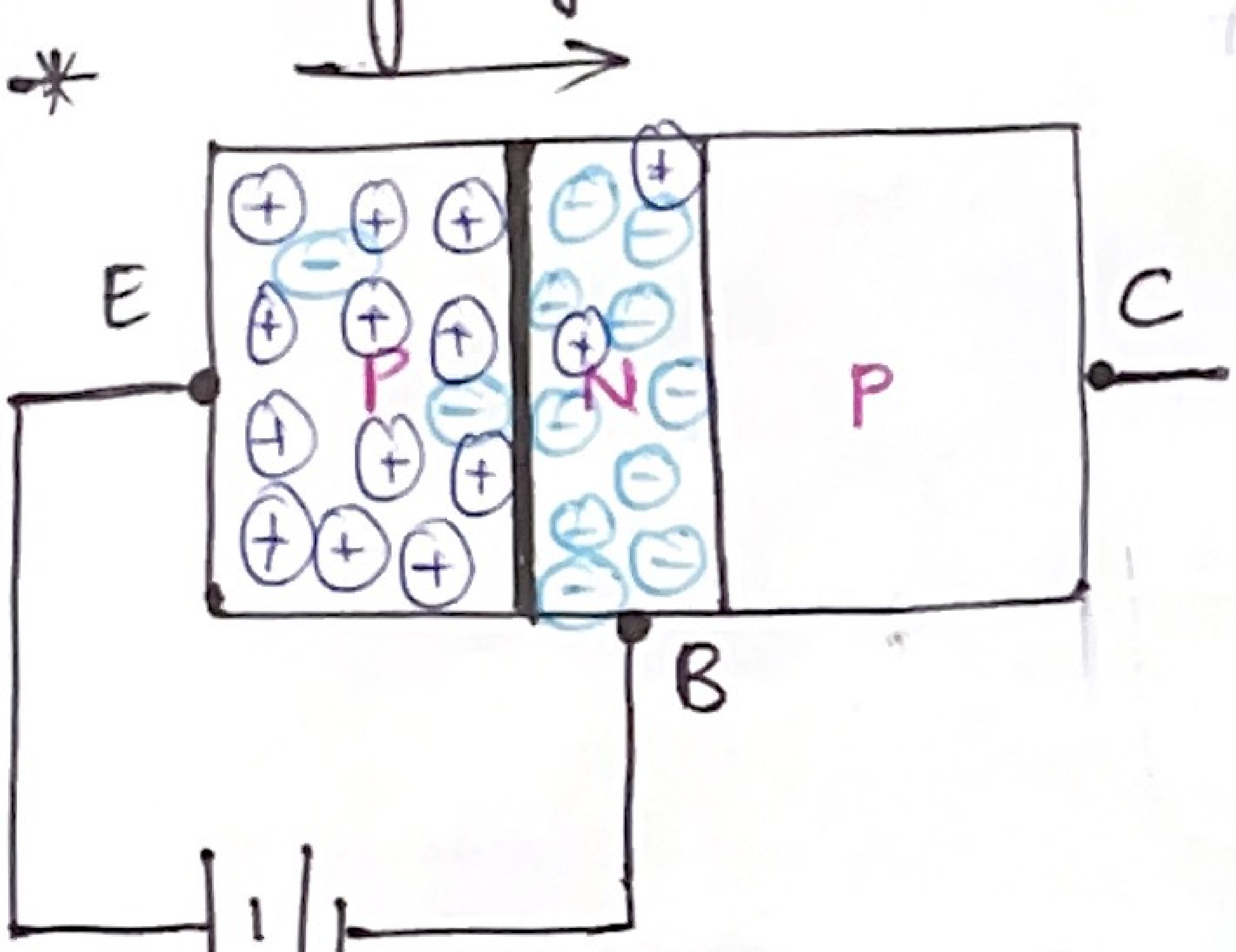
## (4) Inverse Active region

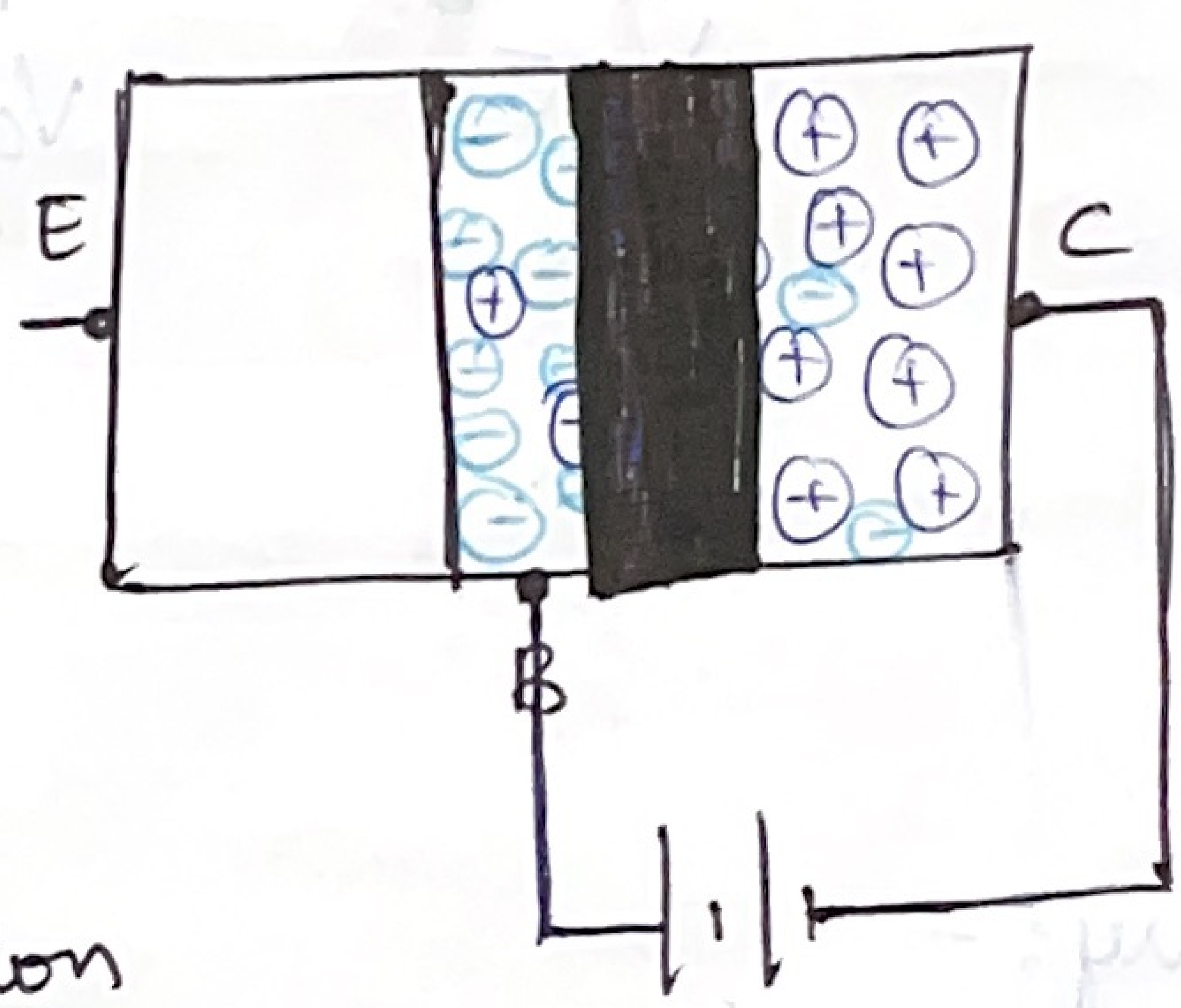
* Here Transistor acts as "Attenuator".
* Here EB junction is Reverse biased and CB junction is forward biased.

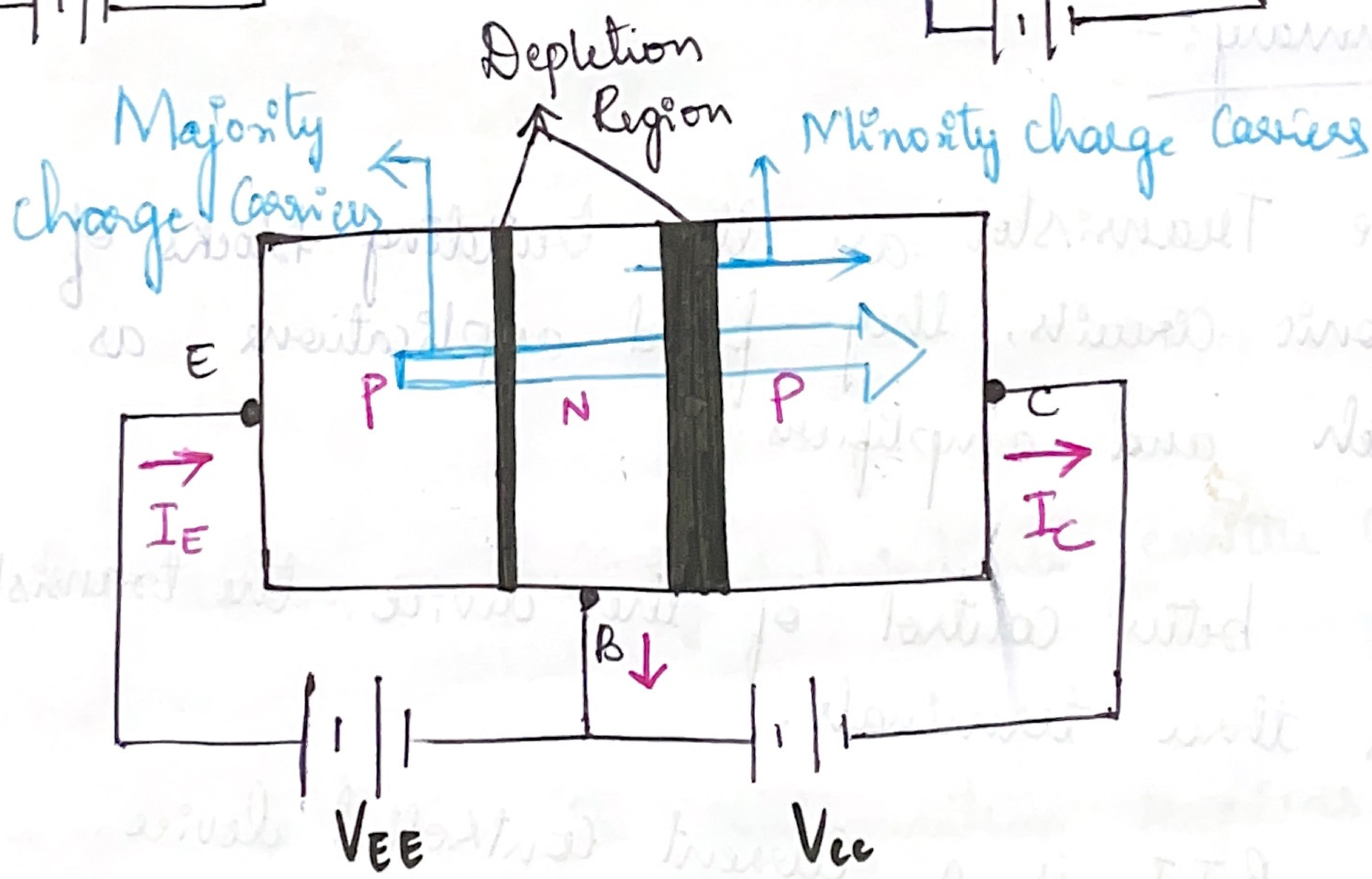
# BJT in Common Base Configuration :-

* A Transistor is Operated in Common Base Configuration with an external sources $V_{EE}$ & $V_{CC}$ connected as follows.

> Emitter Base junction is forward biased
> Collector Base junction is Reverse biased

* 


* Current in a transistor

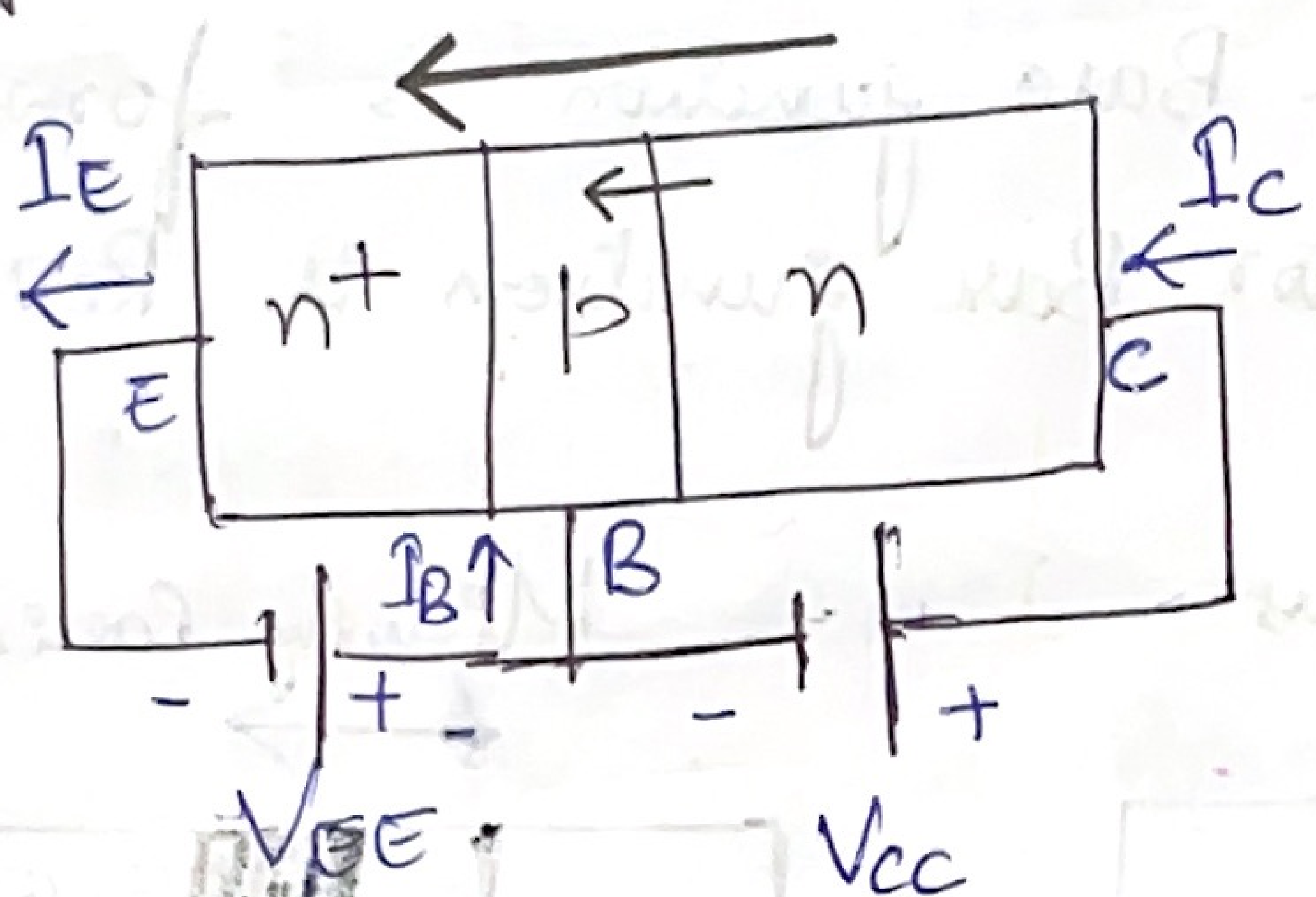
> Emitter Current is the Sum of the collector and base Current.

$$I_E = I_C + I_B$$

> The Collector Current is Comprised of two Currents :

$$I_C = I_C(\text{Majority}) + I_{CO}(\text{Minority})$$

> For n-p-n transistor




Summary :-

* The Transistor are the building blocks of electronic circuits, they find applications as switch and amplifiers.

* For better control of the device, the transistors has three terminals.

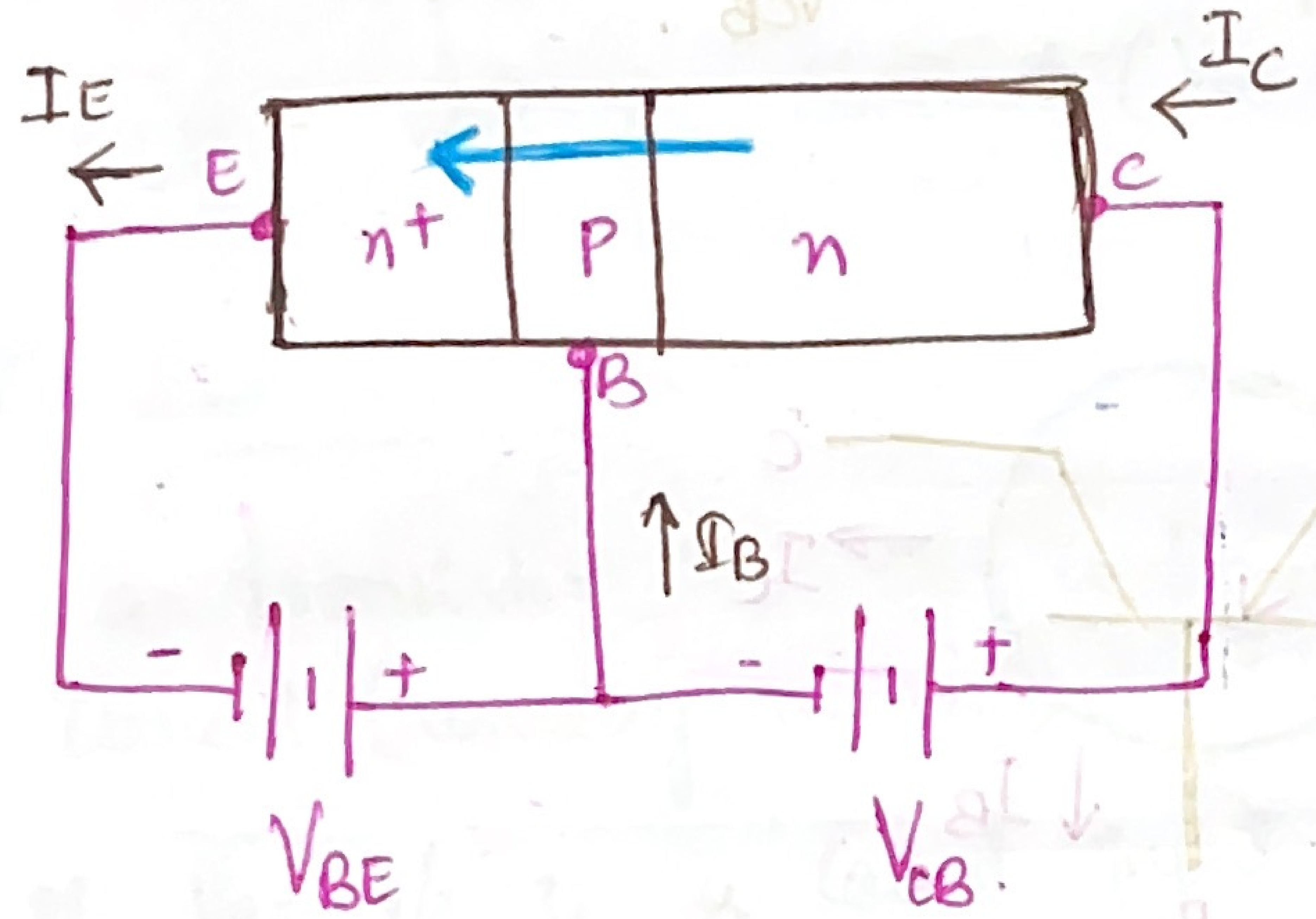
* The BJT is a current controlled device.

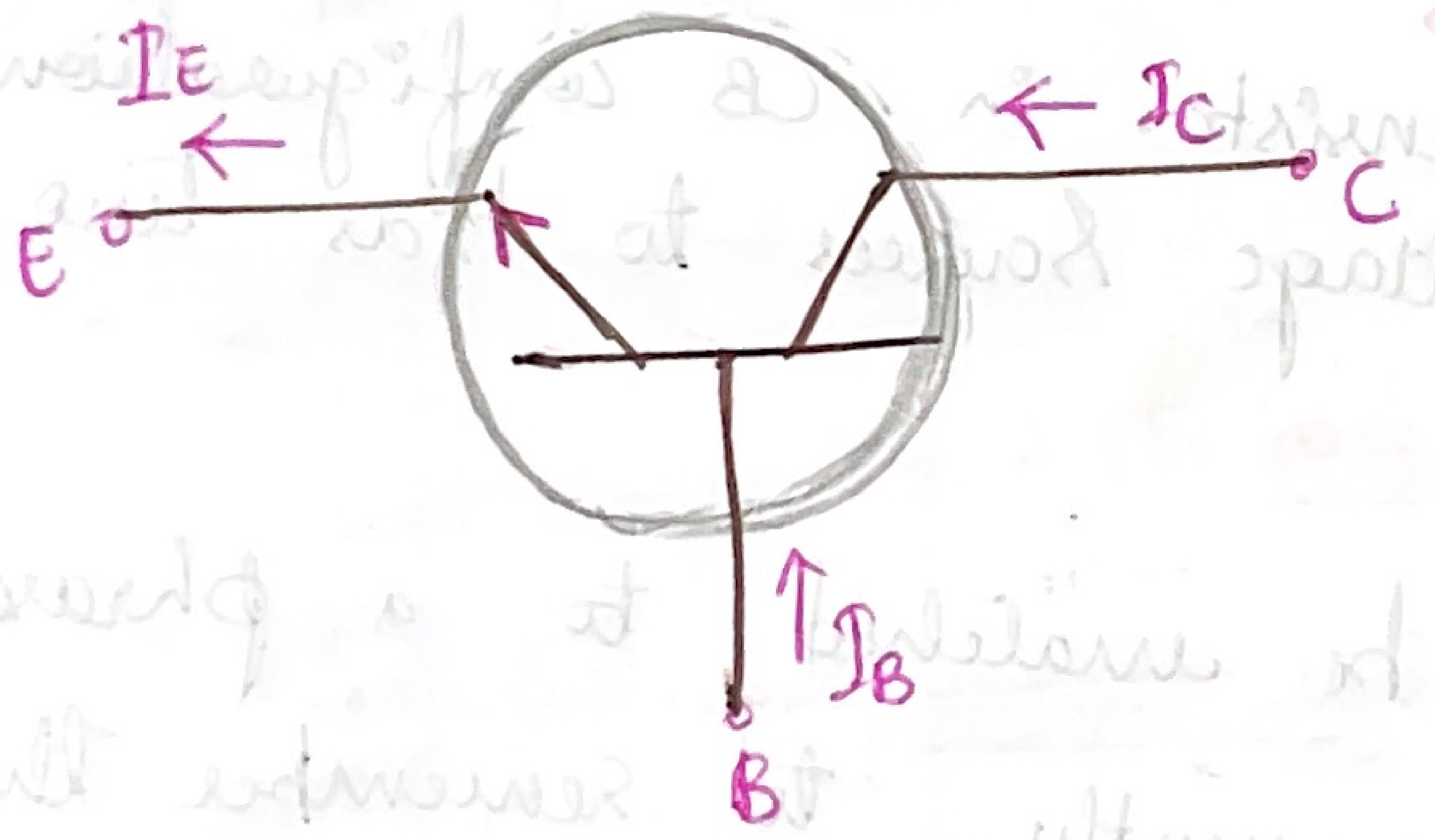
* The BJT biasing requires two voltage sources hence one terminal acts as common between the i/p & o/p side. ∴ we have
  - > Common Base (CB) configuration
  - > Common Emitter (CE) configuration
  - > Common Collector (CC) Configuration

# Common - Base Configuration:

* Here Base acts as a Common terminal between Emitter and Collector.

* n-p-n transistor in Common Base Configuration



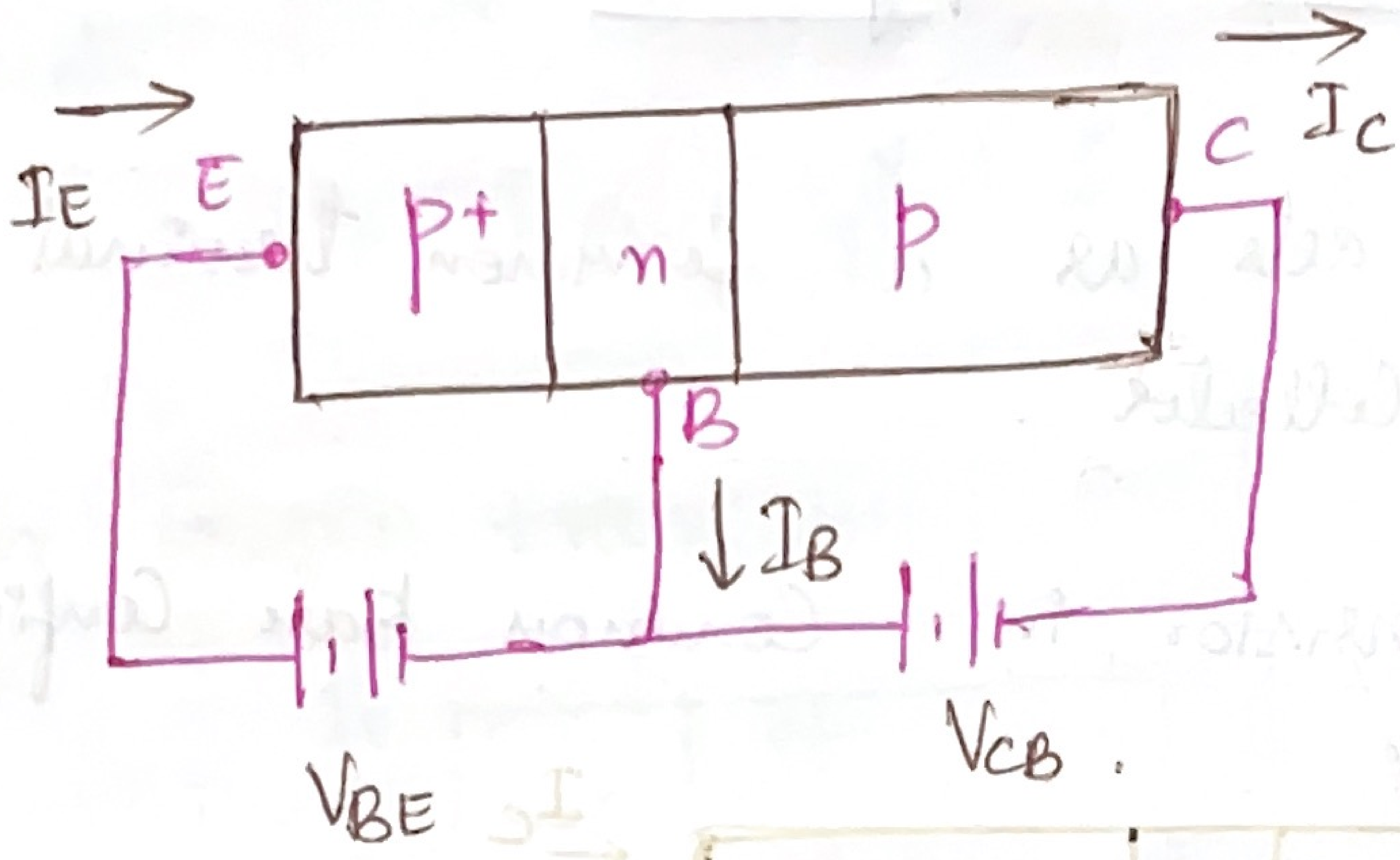



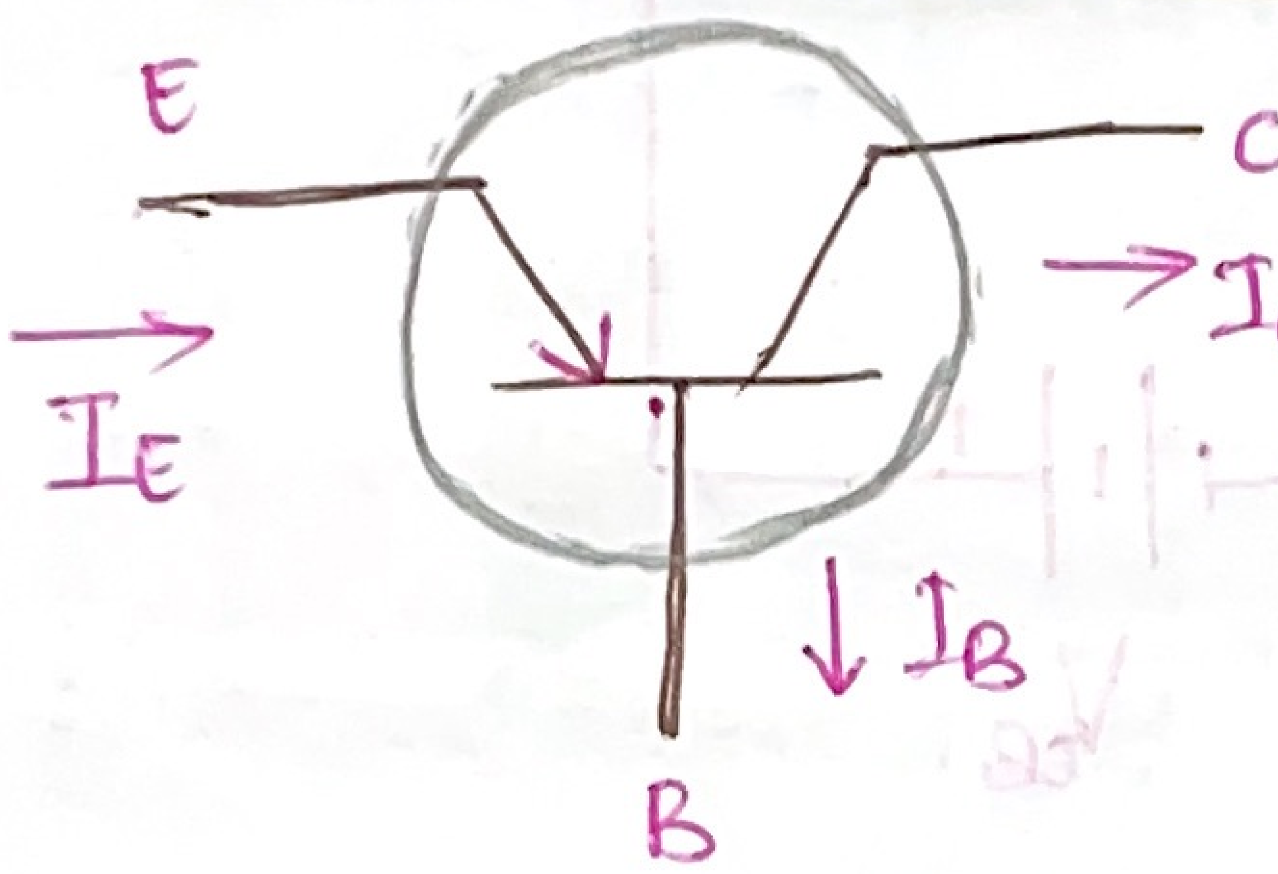

* The arrow in the symbol indicate emitter current direction.

* n-p-n BJT in CB configuration requires two Voltage Sources $V_{BE}$ and $V_{CB}$ to bias the 2 junctions.

* Hint:- For npn transistor n-p-n can be matched with phrase not pointing in which indicates the direction of arrow in symbol.

* p-n-p transistor in CB configuration

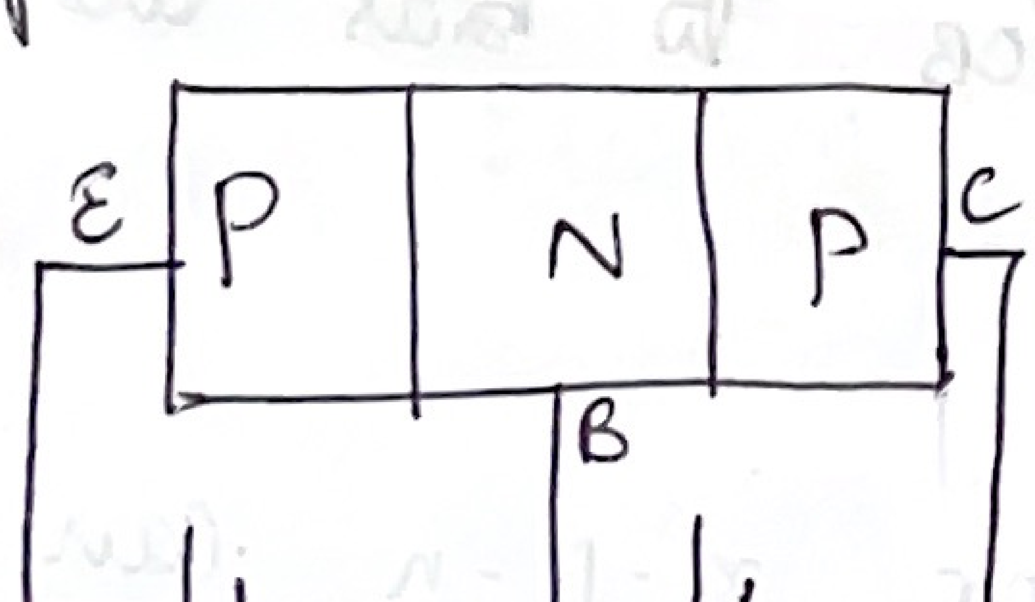


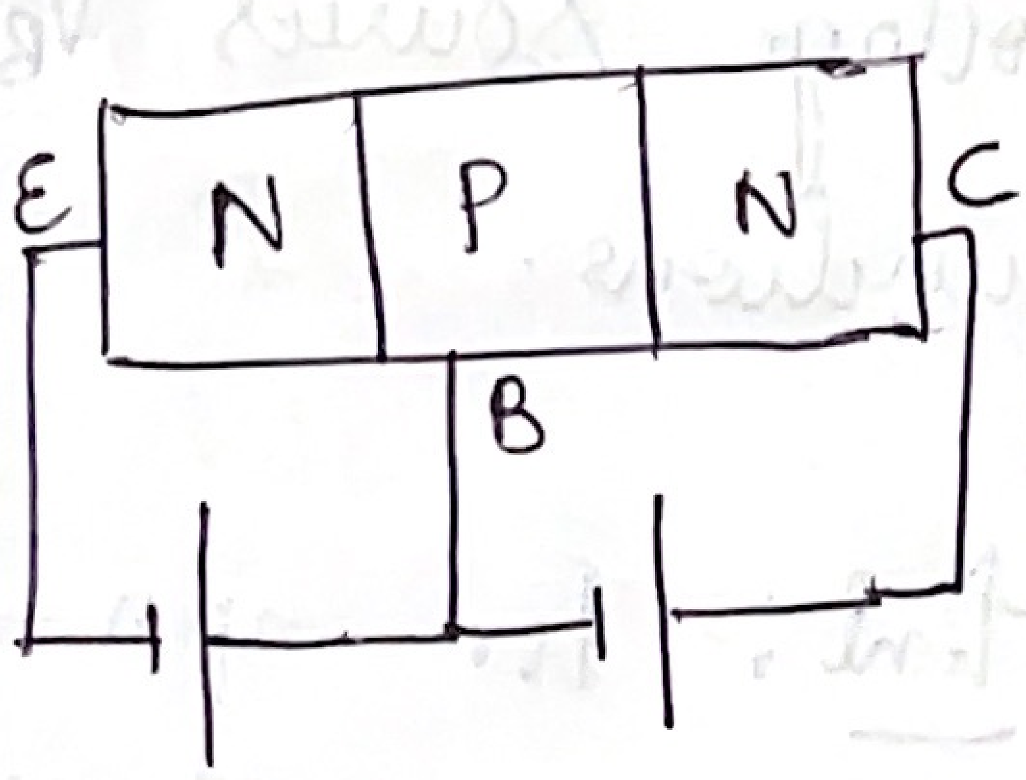




* A p-n-p transistor in CB configuration requires two voltage Sources to bias two junctions.

* p-n-p can be matched to a phrase Pointing in Permanently to remember the direction of emitter current in the symbol.

* The Biasing of NPN & PNP transistors to Operate in active region.



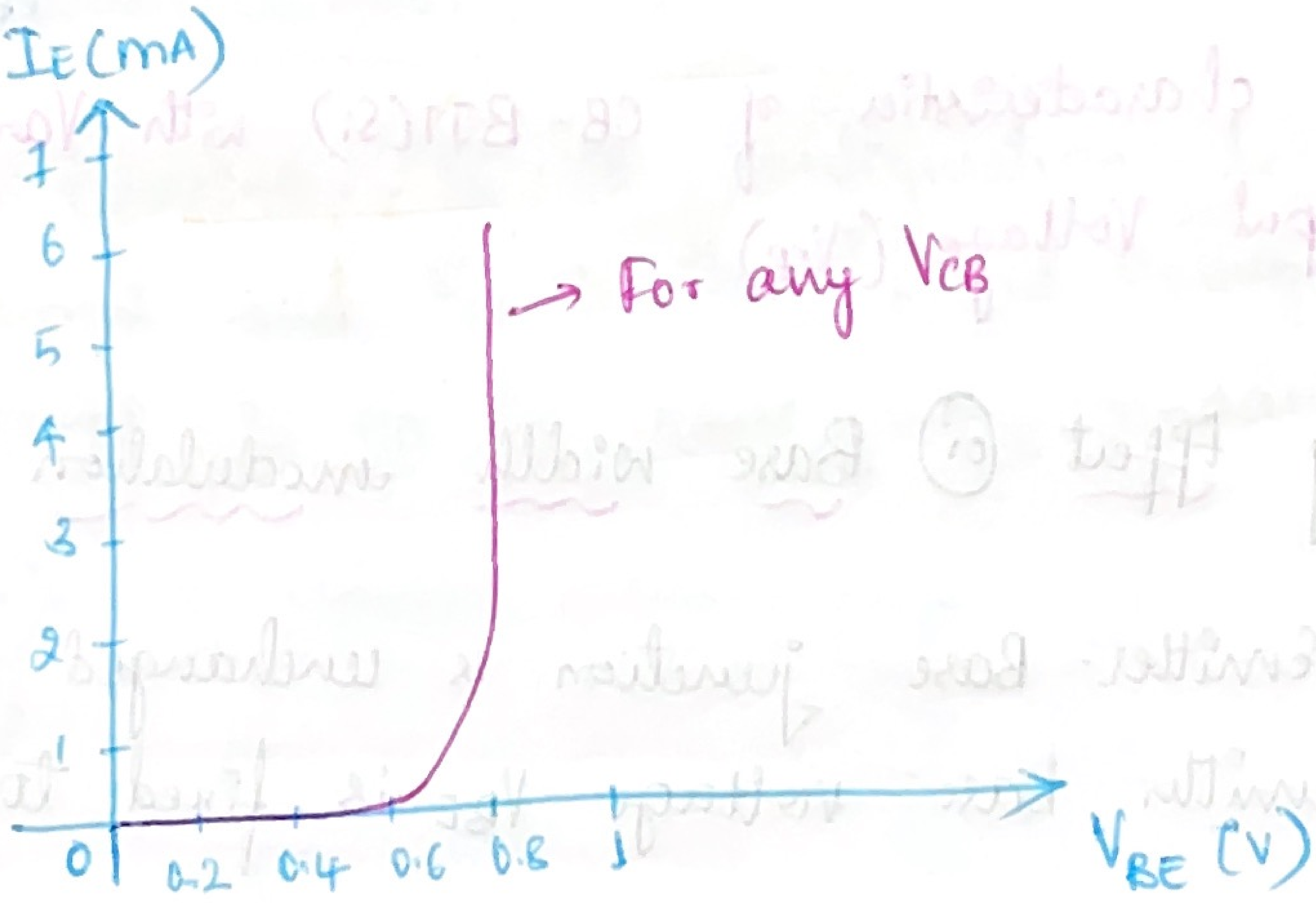



* According to the anology, two diodes are Connected back to back. Here one diode is forward biased and other is reverse biased for the device to operate in active region.

* ∴ Biasing EB junction in forward bias condition gives the input characteristics of device keeping the output Voltage Constant ($V_{CB}$ = Constant)

## Input characteristics:-

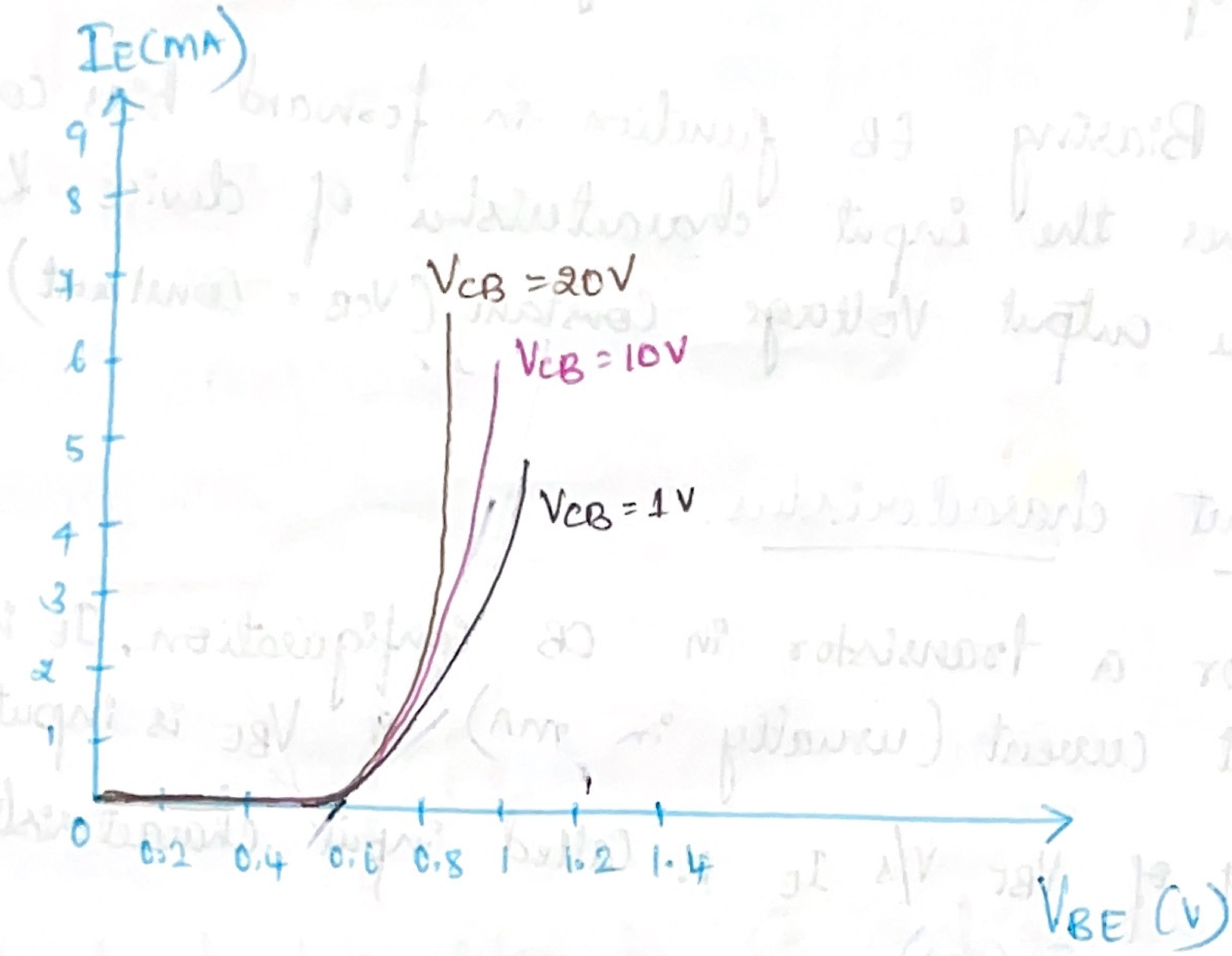
* For a transistor in CB configuration, $I_E$ is the input current (usually in mA) & $V_{BE}$ is input Voltage. ∴ Plot of $V_{BE}$ V/s $I_E$ is called input characteristic.




For Si diode $V_{BE}$ = 0.7V

Input characteristic of CB - BJT (Si)

* As the output Voltage ($V_{CB}$) increases (Keeping input Voltage $V_{BE}$ Constant (say 0.7V)), the current increases ∴ Graph shifts towards left as shown below.




Input characteristics of CB - BJT(Si) with Varying output Voltage ($V_{CB}$)

* Early Effect (or) Base width modulation

→ The Emitter-Base junction is unchanged because the emitter base voltage $V_{BE}$ is fixed to 0.7V.

→ A greater collector-Base Voltage, increase the reverse voltage across CB junction which inturn increases the width of depletion region.

→ Due to increase in its width, depletion region penetrate more towards base region which inturn decreases the base width.

→ The Process of narrowing down the base width is called "Base width Modulation"

→ The Base width modulation has two consequences that affect the current

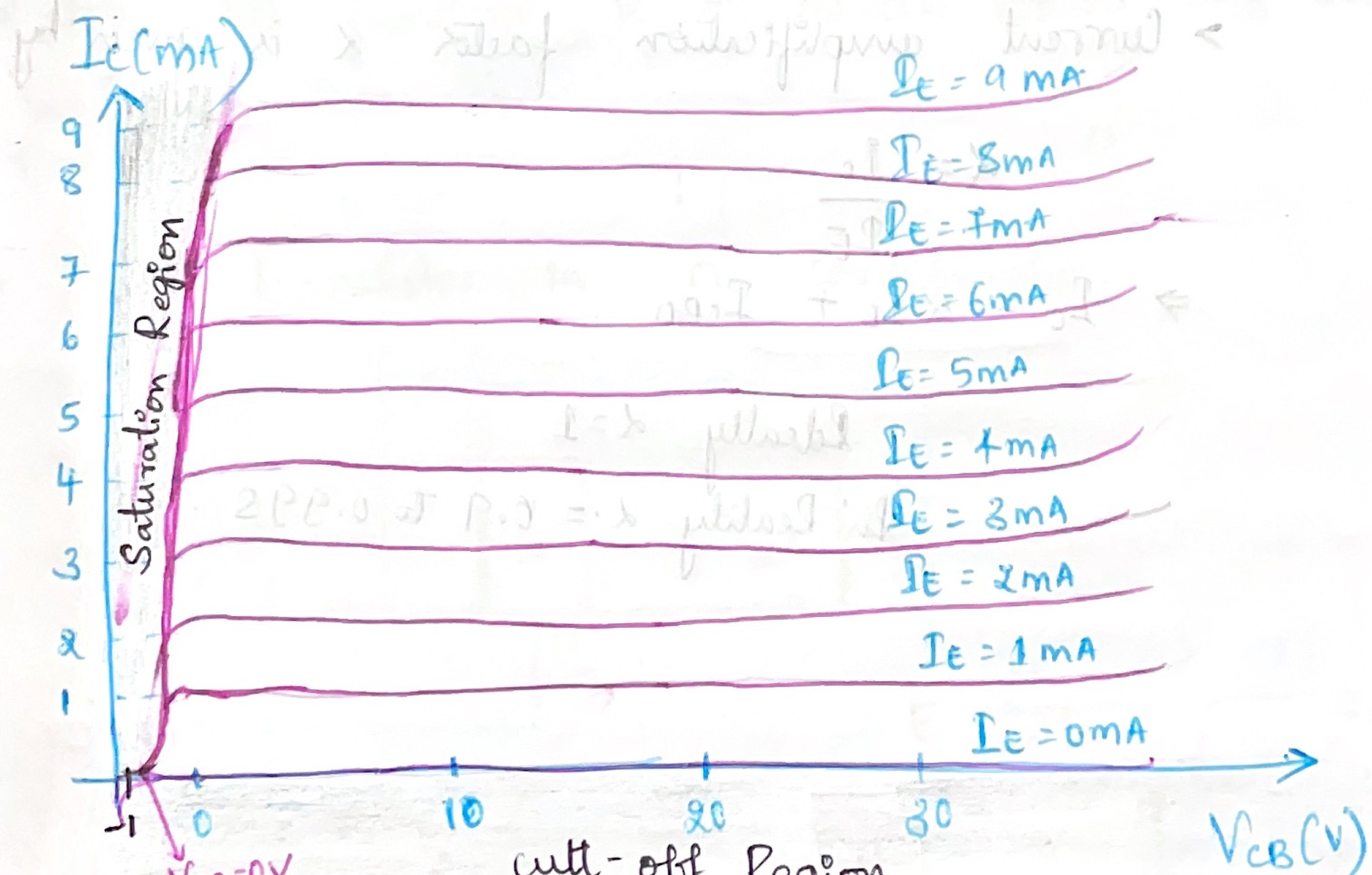
* There is a lesser chance of recombination due to smaller base region.

* The charge gradient is increased across the base and consequently, the current of minority carriers injected across the collector - Base junction increases which increases $I_{CBO}$ (minority current).

* The effect of increase in collector current which increases the emitter current with increase in $V_{CB}$ voltage is called "early effect".

## Output characteristics :-

* For a transistor in CB configuration $I_C$ is the output current and $V_{CB}$ is the output voltage. ∴ The plot of $I_C$ v/s $V_{CB}$ keeping $V_{BE}$ constant.




The output characteristics of BJT(Si) with varying i/p current $I_E$

* The three regions indicated are.

① Active region: Here current $I_C = I_E$ and transistor acts like an amplifier.

② cutt-off region: Here the collector current $I_C$ is approximately zero.

③ Saturation region: Here the collector current is approximately equals to emitter current and Transistor acts like a closed switch.

* Following are the approximations of Transistors in CB configuration.

> Emitter current & collector current are almost equal to each other. $I_C \approx I_E$.

> Base-emitter Voltage is fixed to 0.7V (Si)

> Current amplification factor $\alpha$ is given by

$$\alpha = \frac{I_C}{I_E}$$

$$\Rightarrow I_C = \alpha I_E + I_{CBO}$$

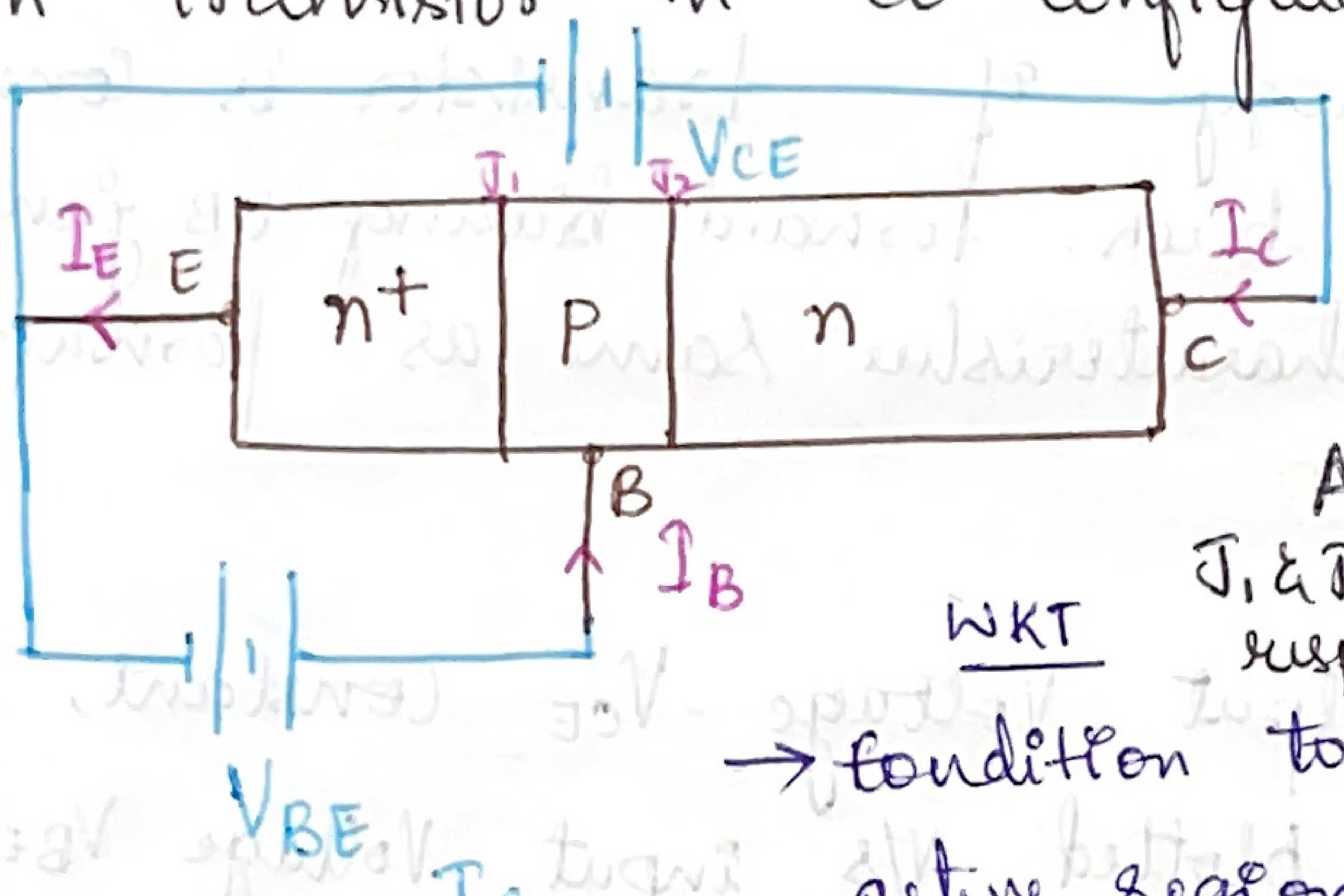
Ideally $\alpha = 1$

In Reality $\alpha = 0.9$ to $0.998$.

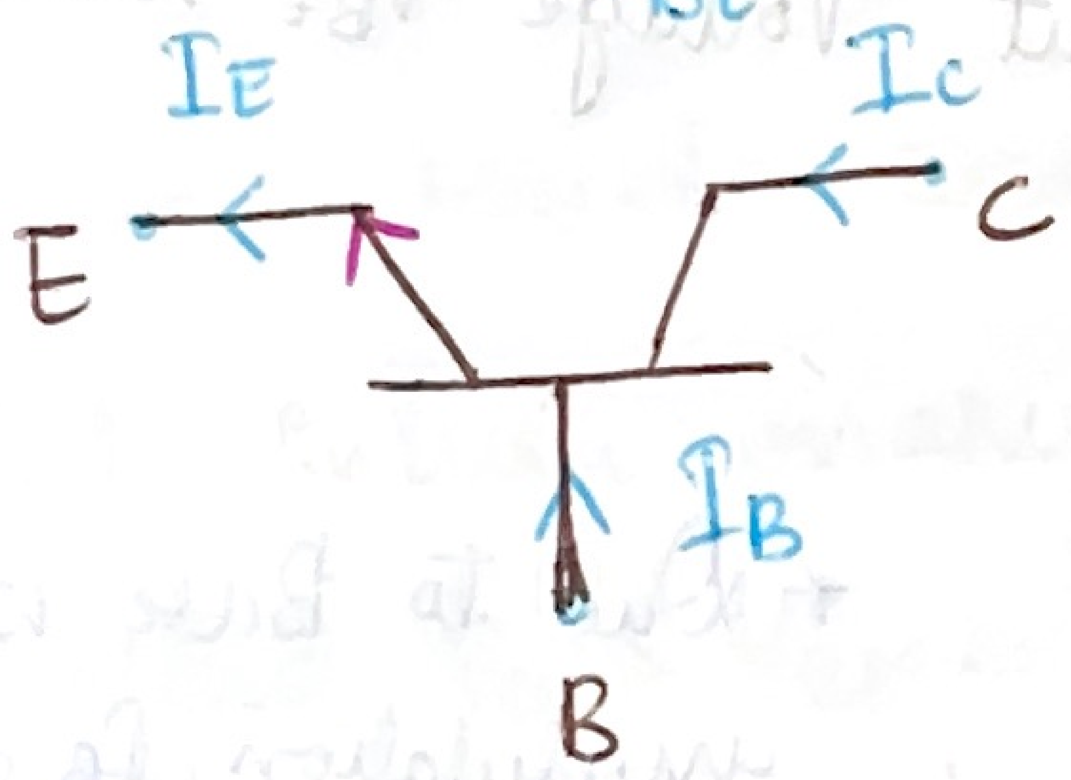
# Common Emitter Configuration

* Here Emitter terminal is common between Base and collector terminal. Hence the name Common emitter configuration.

* n-p-n transistor in CE configuration.



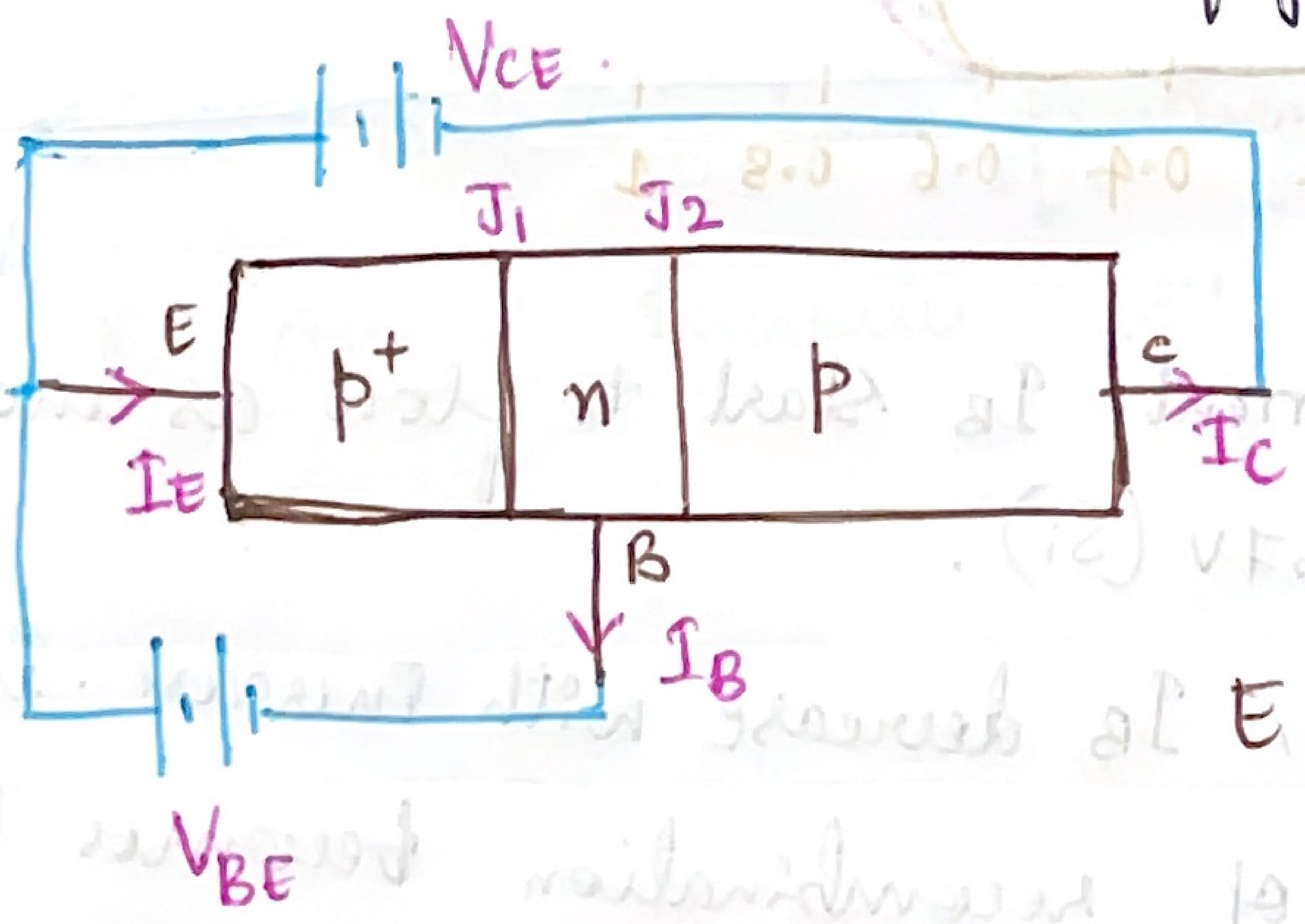

* For the transistor to be in Active Region Junction $J_1$ & $J_2$ should be F.B & R.B respectively

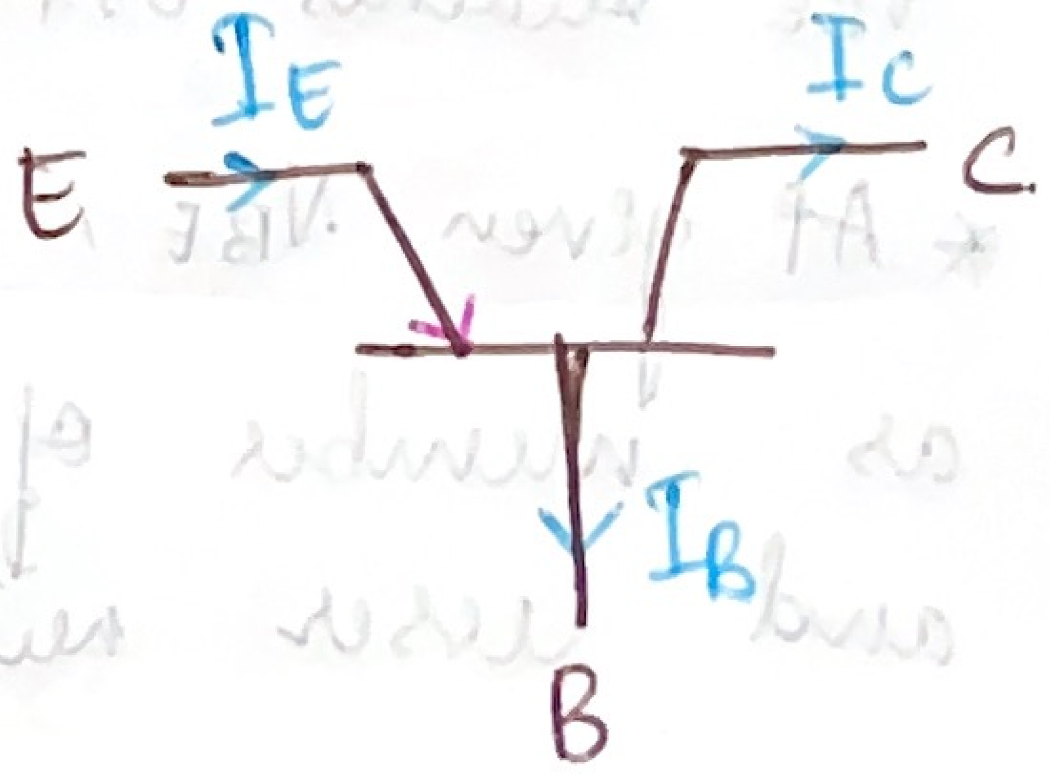



WKT
→ Condition to keep BJT in active region is
* Emitter - Base junction has to be forward biased
* collector - Base junction has to be reverse biased.

* For CB junction to be reverse biased $V_{CE}$ should be greater than $V_{BE}$.

* P-n-p transistor in CE configuration



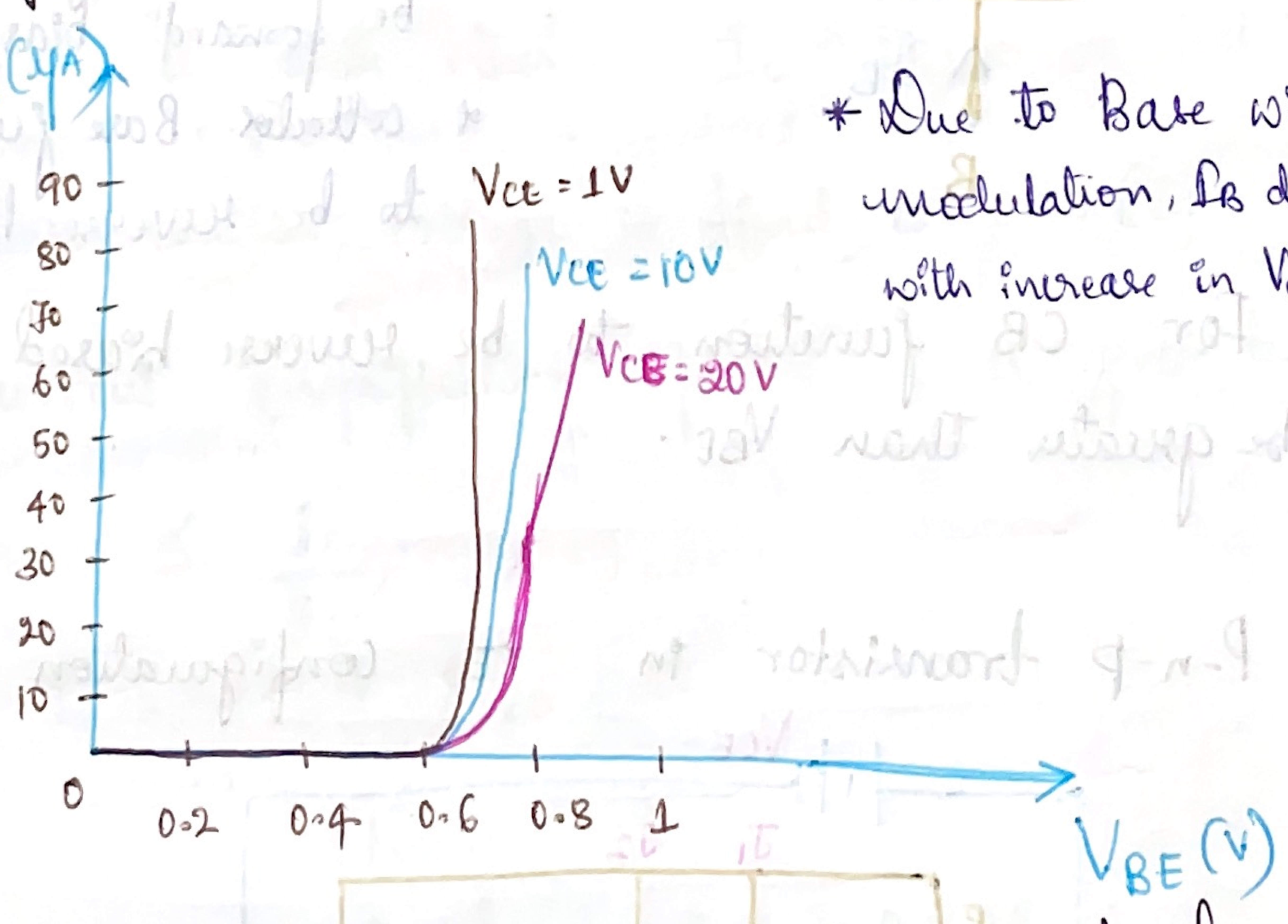
* For the transistor to be in active region junction $J_1$ & $J_2$ should be forward biased and Reverse biased respectively.

* therefore $V_{CE}$ should be greater than $V_{BE}$.

## Input characteristics:-

* As the analogy of transistor is connecting diodes back to back. Forward biasing EB junction gives input characteristic same as forward biased diode.

* Keeping output Voltage $V_{CE}$ constant, Input current $I_B$ is plotted v/s input Voltage $V_{BE}$ which gives input characteristics.

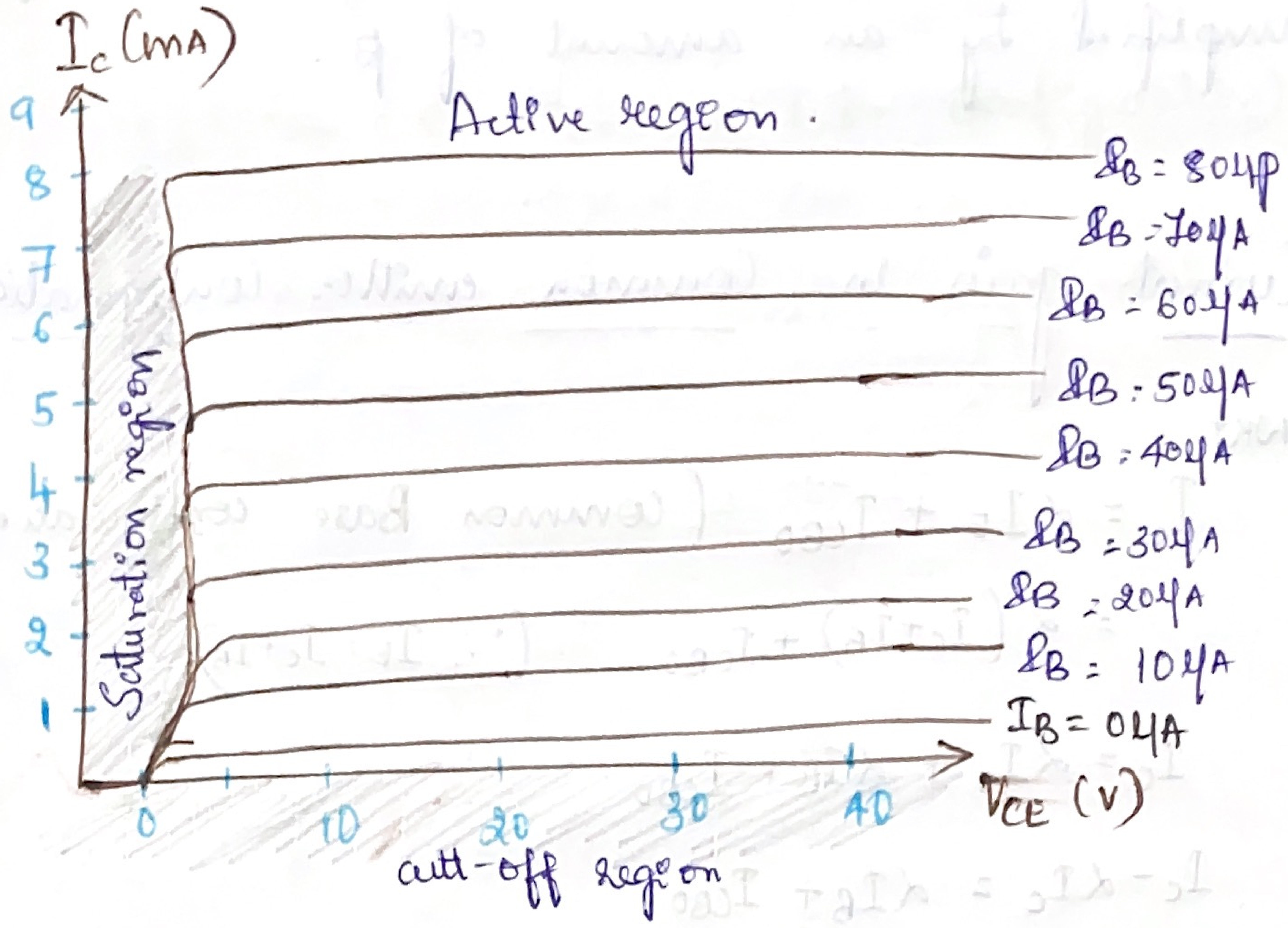



* Due to Base width modulation, $I_B$ decreases with increase in $V_{CE}$.

* The input current $I_B$ start to flow as and when $V_{BE}$ reaches 0.7V (Si).

* At given $V_{BE}$, $I_B$ decrease with increase in $V_{CE}$ as number of recombination becomes lesser and lesser with increase in $V_{CE}$.

## Output characteristics




* Three regions are

1) Active region: BE junction & CE junction is forward biased and reverse biased respectively which in turn makes CB junction reverse biased provided $V_{CE} > V_{BE}$.

$$I_c = \beta I_B.$$

2) cutt-off Region: Both junctions are reverse biased

∴ There is no current flow.

3) Saturation region: Both junctions are forward biased. $I_c$ current increases with increase in $V_{CE}$.

NOTE

In Common Emitter Configuration current is getting amplified by an amount of $\beta$.

## Current gain in Common emitter Configuration

WKT

$I_C = \alpha I_E + I_{CBO}$ (common Base configuration).

$= \alpha(I_C + I_B) + I_{CBO}$ $(\because I_E = I_C + I_B)$

$I_C = \alpha I_C + \alpha I_B + I_{CBO}$

$I_C - \alpha I_C = \alpha I_B + I_{CBO}$

$$I_C = \frac{\alpha I_B + I_{CBO}}{1-\alpha} = \frac{\alpha I_B}{1-\alpha} + \frac{I_{CBO}}{1-\alpha}$$

Let $\frac{\alpha}{1-\alpha} = \beta \Rightarrow \frac{1}{1-\alpha} = \beta + 1$

$\therefore I_C = \beta I_B + (1+\beta) I_{CBO}$

$= \beta I_B + I_{CEO}$

WKT

$I_{CEO} = (1+\beta) I_{CBO}$

$I_{CEO} = \beta I_{CBO}$ $(\because \beta$ is v. large$)$

or

$$I_{CEO} = \frac{I_{CBO}}{1-\alpha}$$

$I_C = \beta I_B$ (Neglecting leakage current $I_{CEO}$)

* $\beta$ value ranges from 50 to 500.

$50 \leq \beta \leq 500$

# Relationship between $\alpha$ and $\beta$.

WKT

$$I_C = \alpha I_E \quad \text{(In Common Base configuration)}$$

and

$$I_C = \beta I_B \quad \text{(In Common emitter configuration)}$$

WKT

$$I_E = I_C + I_B$$

$$\frac{I_C}{\alpha} = I_C + \frac{I_C}{\beta}$$

$$\cancel{I_C}\left[\frac{1}{\alpha}\right] = \cancel{I_C}\left[1 + \frac{1}{\beta}\right]$$

$$\frac{1}{\alpha} = 1 + \frac{1}{\beta} = \frac{\beta+1}{\beta}$$

$$\therefore \boxed{\alpha = \frac{\beta}{1+\beta}}$$

Similarly

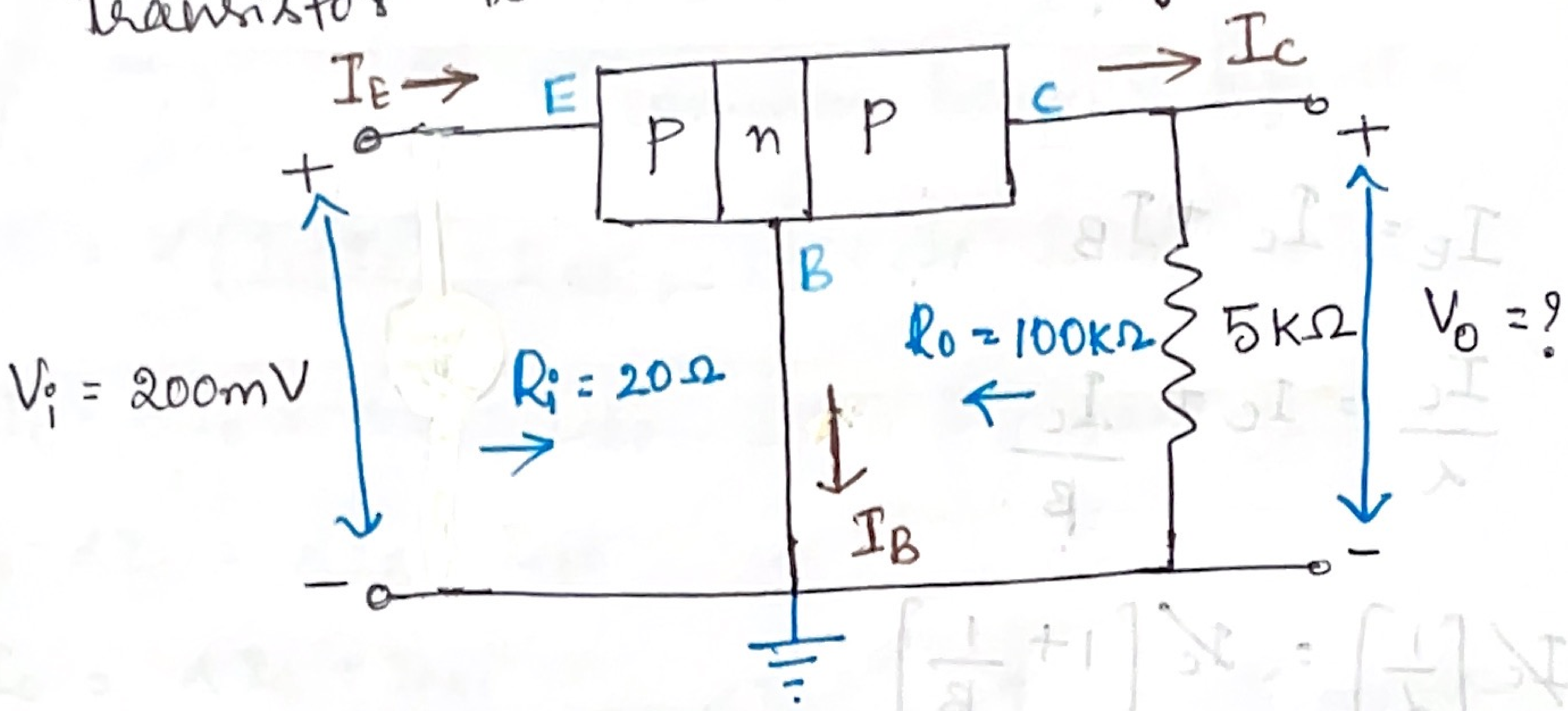
$$\frac{1}{\alpha} - 1 = \frac{1}{\beta}$$

$$\frac{1}{\beta} = \frac{1}{\alpha} - 1 = \frac{1-\alpha}{\alpha}$$

$$\therefore \boxed{\beta = \frac{\alpha}{1-\alpha}}$$

# Common Base Amplifying action :

Consider p-n-p transistor in Common Base Configuration. Let EB junction is forward biased and CB junction is reverse biased so that the transistor is in "active region".




Input current $I_i = \frac{V_i}{R_i} = \frac{200mV}{20} = 10mA$;

$I_E = I_i = 10mA$.

Assume $\alpha = 1$ $\therefore I_C = I_E$

$\therefore I_L = I_C = I_E = 10mA$.

$V_L = I_L R_o$

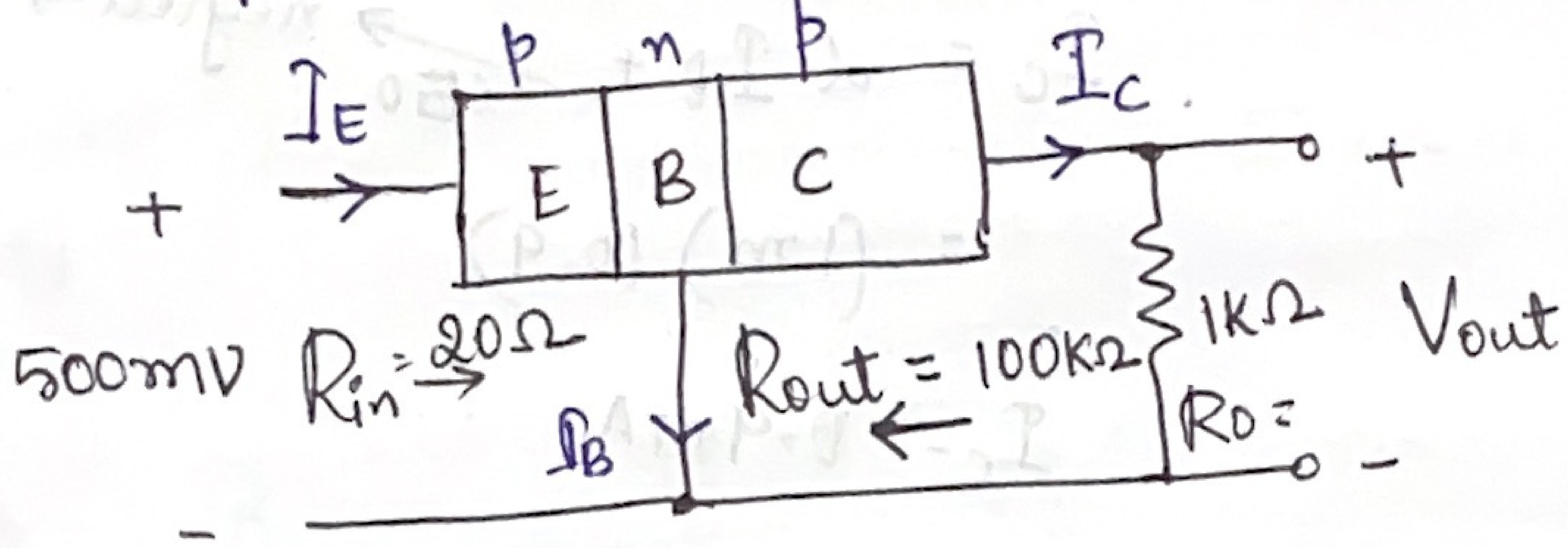
$= 10 \times 10^{-3} \times 5 \times 10^{3}$

$\boxed{V_L = 50V}$

The voltage amplification factor $A_v$ is

$A_v = \frac{V_L}{V_i} = \frac{50}{200m} = 250$

1] A Common base transistor amplifier has an input resistance of $20\Omega$ and output resistance of $100K\Omega$. The collector load is $1K\Omega$. If a signal of 500mV is applied between emitter and base, find the voltage amplification. Assume $\alpha$ to be nearly one.




Input Current $I_E = \frac{V_i}{R_{in}} = \frac{500m}{20} = 25mA$.

given $\alpha \simeq 1$

$I_c = I_E$

$\therefore I_c = 25mA$

Output Voltage $V_{out} = I_C R_O$

$= 25m \times 1K$

$= \underline{\underline{25V}}$

Voltage amplification $A_v = \frac{V_{out}}{V_i} = \frac{25}{500 \times 10^{-3}} = \underline{\underline{50}}$

2] In a Common base connection, $I_E = 1mA$, $I_c = 0.95mA$. Calculate the value of $I_B$.

WKT $I_E = I_c + I_B$

$\Rightarrow I_B = I_E - I_c = 1m - 0.95m = \underline{0.05mA}$

3. In a Common base Connection, Current amplification factor is 0.9. If the emitter current is 1mA, determine the value of base current.

$\alpha = 0.9$.   $I_B = I_E - I_C$

$I_E = 1mA$.

$I_C = \alpha I_E + \cancel{I_{CBO}}$ neglected

$= (1m)(0.9)$

$I_C = 0.9mA$

$I_B = 1m - 0.9 = 0.1mA$.

4. In a Common base Connection, $I_C = 0.95mA$, $I_B = 0.05mA$. Find the Value of $\alpha$

$I_E = I_C + I_B = 0.95m + 0.05m = 1mA$.

$\alpha = \frac{I_C}{I_E} = \frac{0.95mA}{1m} = \underline{\underline{0.95}}$

5. In a Common base Connection, the emitter current is 1mA. If the emitter circuit is open, the collector current is 50μA. Find the total collector current given that $\alpha = 0.92$.

$I_E = 1mA$, $I_{CEO} = 50μA$, $I_C = ?$ $\alpha = 0.92$

$I_C = \alpha I_E + I_{CEO} = (0.92)(1m) + 50μ$

$= 0.92m + 50μ$

$= \underline{\underline{0.97mA}}$

6. Find the Value of $\beta$ if

(i) $\alpha = 0.9$

$$\beta = \frac{\alpha}{1-\alpha} = \frac{0.9}{1-0.9} = 9$$

(ii) $\alpha = 0.98$

$$\beta = \frac{\alpha}{1-\alpha} = \frac{0.98}{1-0.98} = 49$$

(iii) $\alpha = 0.99$

$$\beta = \frac{\alpha}{1-\alpha} = \frac{0.99}{1-0.99} = 99$$

## MOSFETS

Metal Oxide Semiconductor Field Effect Transistor.

* These are one of the types of Transistor.
* The Similarities b/w MOSFETS & BJT are
  * Both are used as Amplifiers
  * Both are used as Switch
* The Differences b/w MOSFETS & BJT are
  * MOSFETS has high input impedence
  * MOSFETS are less sensitive to temp variations
  * MOSFETS are easily integrated on ICs
  * BJT have higher gain.

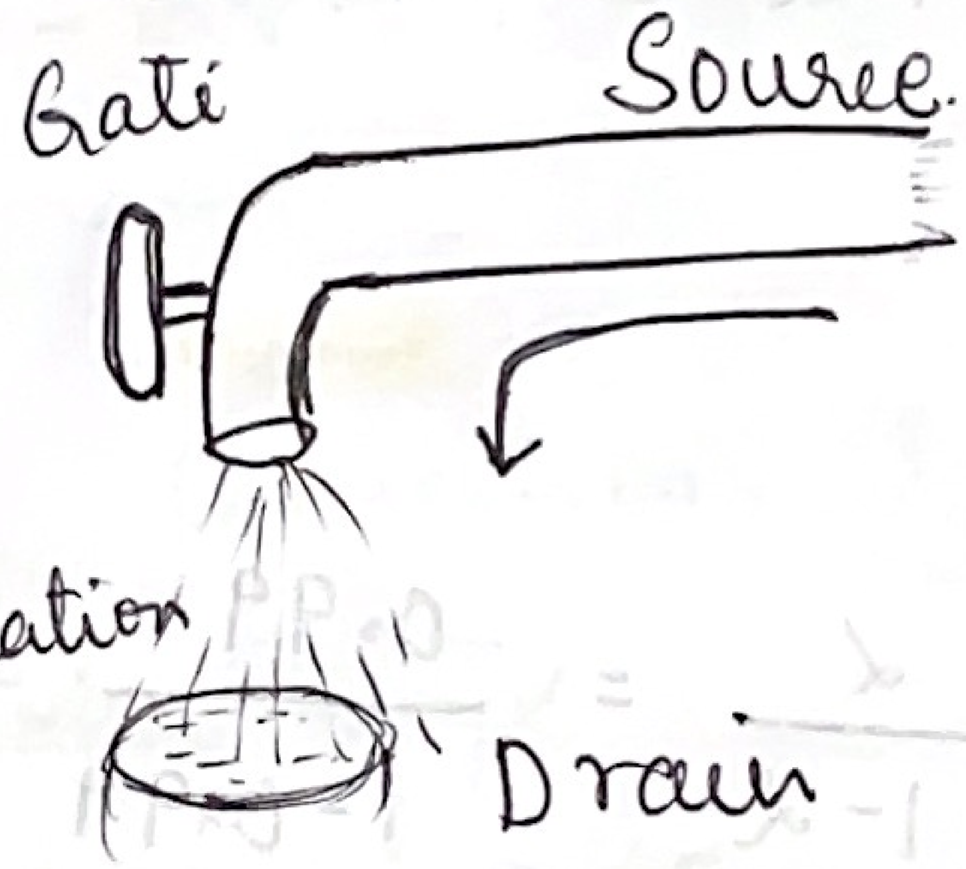
Types of MOSFETS

* Based on the construction process, there are 2 types of MOSFETs

① D- MOSFET : Depletion mode MOSFET

② E- MOSFET : Enhancement mode MOSFET.

* The operation of MOSFET can be compared to a water spigot.



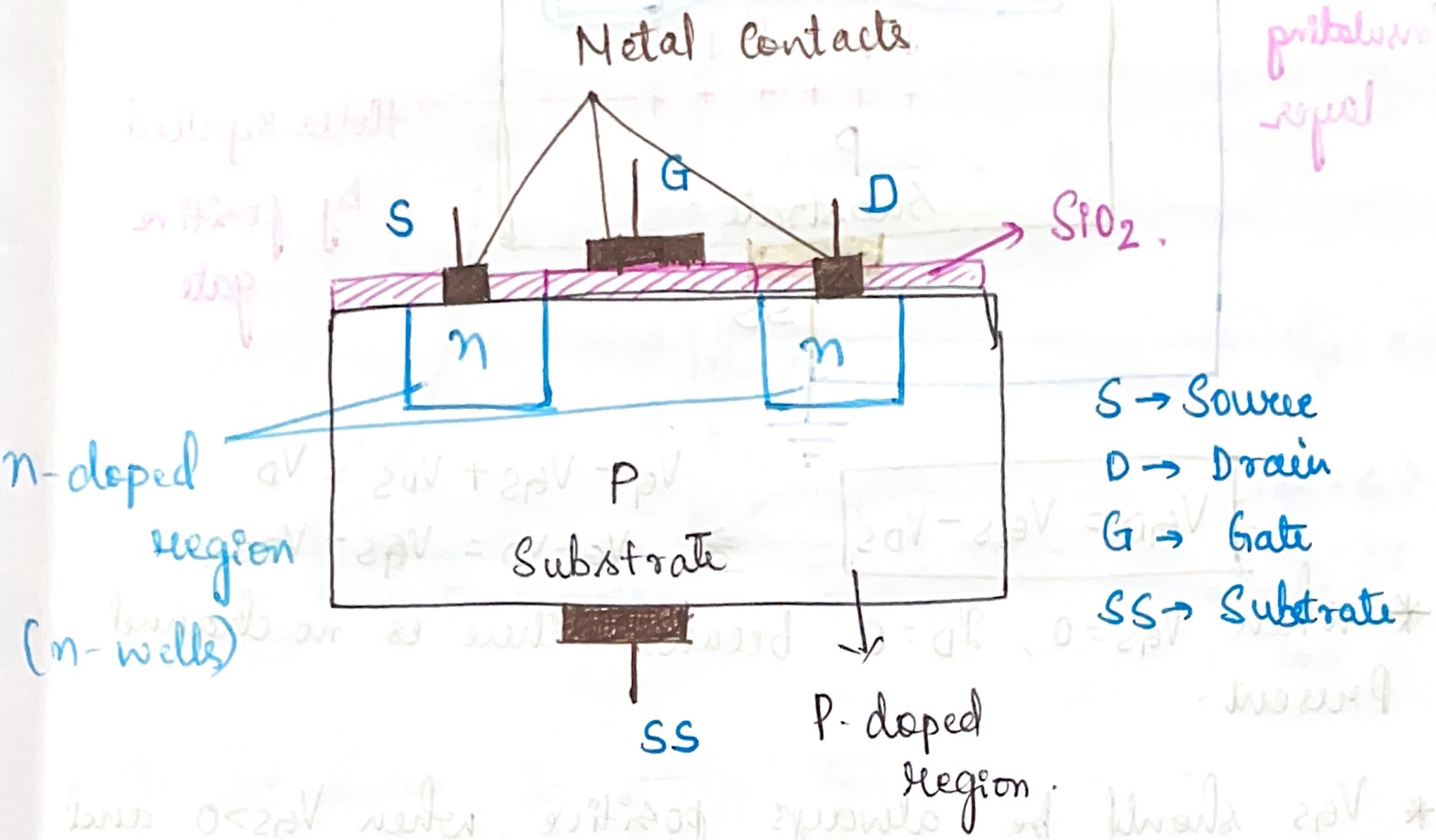

> The Source of water Pressure is the accumulation of electrons at negative pole of drain-Source Voltage.

> The drain of water is the electron deficiency at the positive pole of applied voltage.

> The Gate of flow of water is the gate Voltage that controls the width of n-channel and ∴ the flow of charges from Source to drain

# Enhancement type MOSFET (n-channel)

## Construction :-



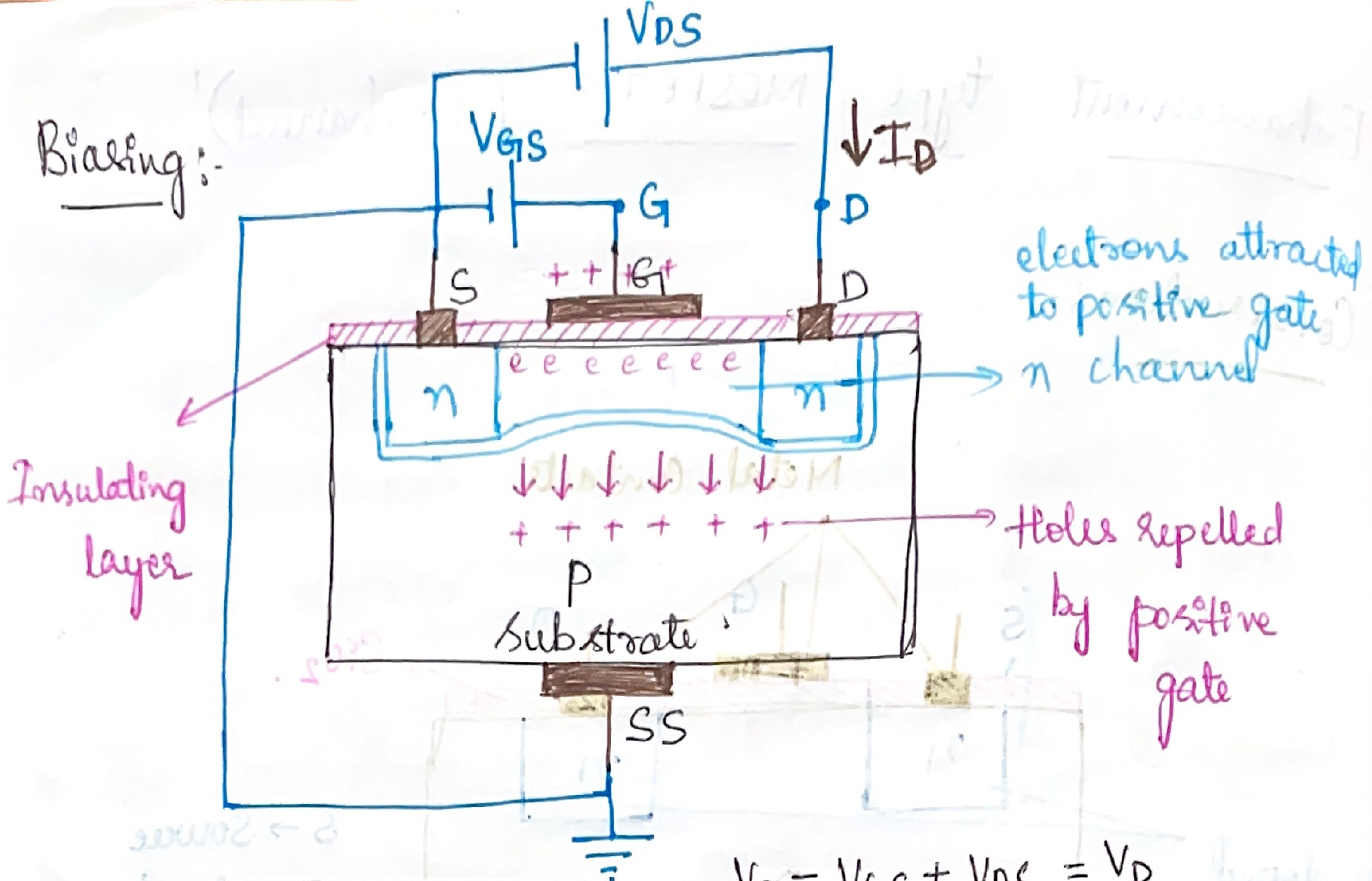

* Consider a P-type material (P-substlate). It is also called as Body / Bulk.

* Source and drain terminals are Connected to n-doped regions Via a metal Contact
* Gate is Connected to P-doped Substrate Via thin insulating layer of $SiO_2$.

* Initially (without biasing), there is no channel Present. ∴ Transistor is not functioning.

* One more terminal is Body terminal. Source and body terminal are always connected to each other.

Biasing:-




$\boxed{V_{GD} = V_{GS} - V_{DS}}$

$V_G - V_{GS} + V_{DS} = V_D$

$\Rightarrow V_G - V_D = V_{GS} - V_{DS}$

* when $V_{GS}=0$, $I_D=0$ because there is no channel Present.

* $V_{GS}$ should be always positive. when $V_{GS}>0$ and $V_{DS}>0$, a depletion region is created near $SiO_2$ layer void of holes.

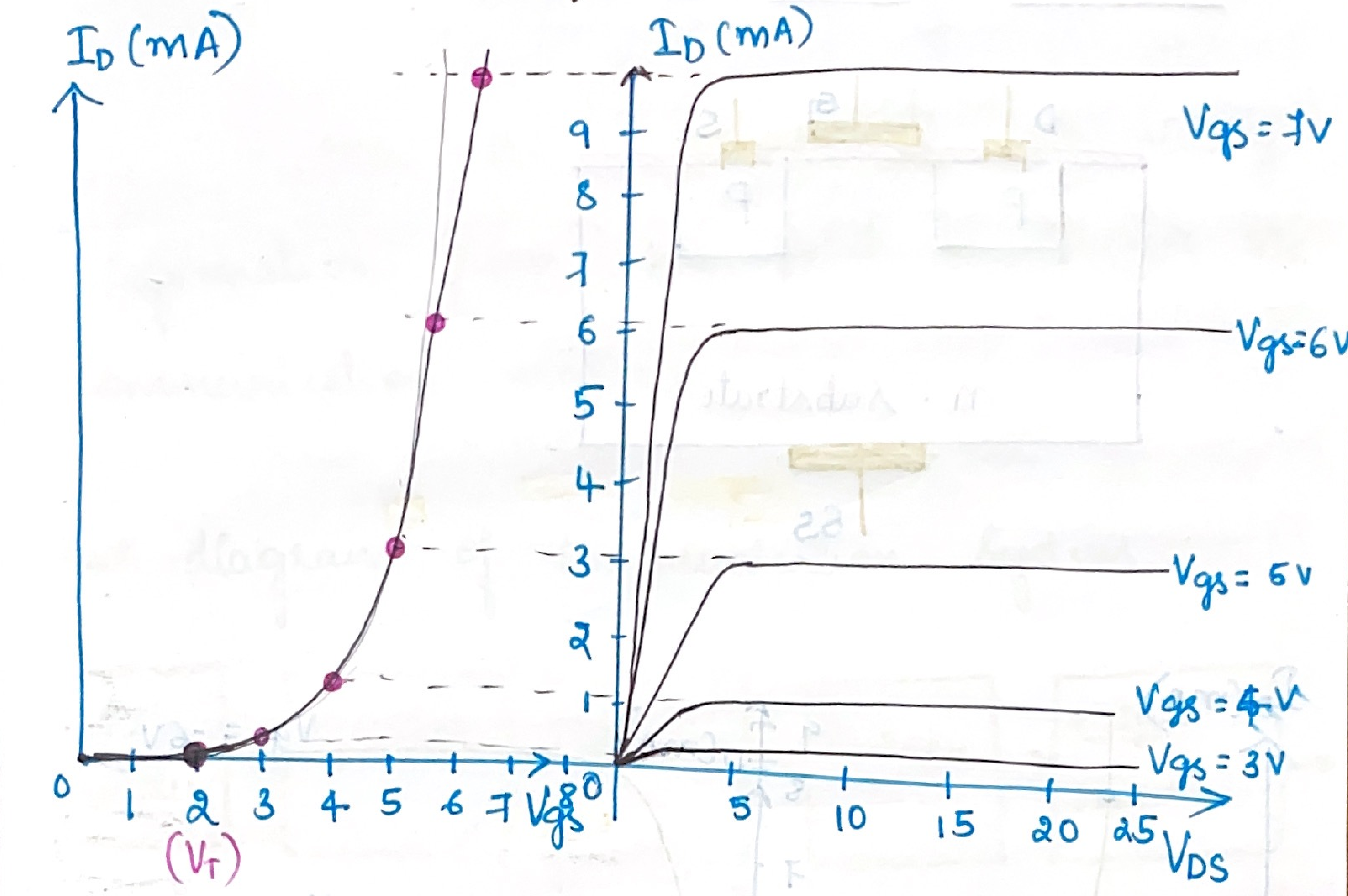
* As $V_{GS}$ increases, Concentration of electrons near the $SiO_2$ layer increases and there is some flow between Source & drain.

* As $V_{GS}$ increases, gate terminal become more positive and attracts more number electrons towards it.

* The level of $V_{GS}$ that results in the significant increase in $I_D$ is called threshold Voltage $V_T$.

* As $V_{GS}>V_T$ is Constant and $V_{DS}$ is increased then $I_D$ saturates ($I_{DSS}$) and saturation level $V_{DS\,sat}$ is reached.

V-I characteristics of Enhancement type MOSFET.




* To determine $I_D$ given $V_{GS}$:

$$I_D = K\left(V_{GS} - V_T\right)^2$$

where

$V_T$ = Threshold Voltage at which MOSFET turns ON.

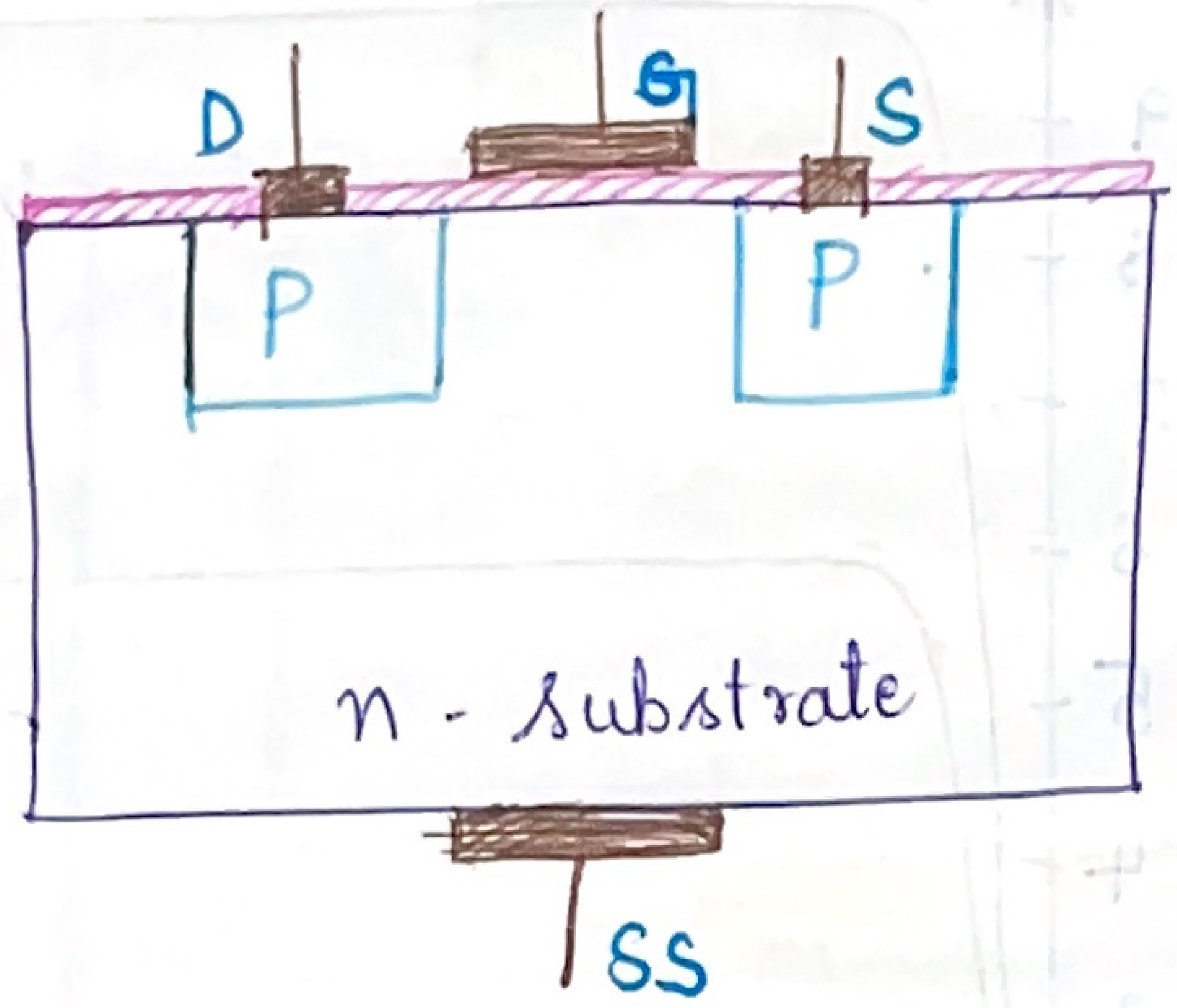
$V_{GS}$ = Gate to Source Voltage

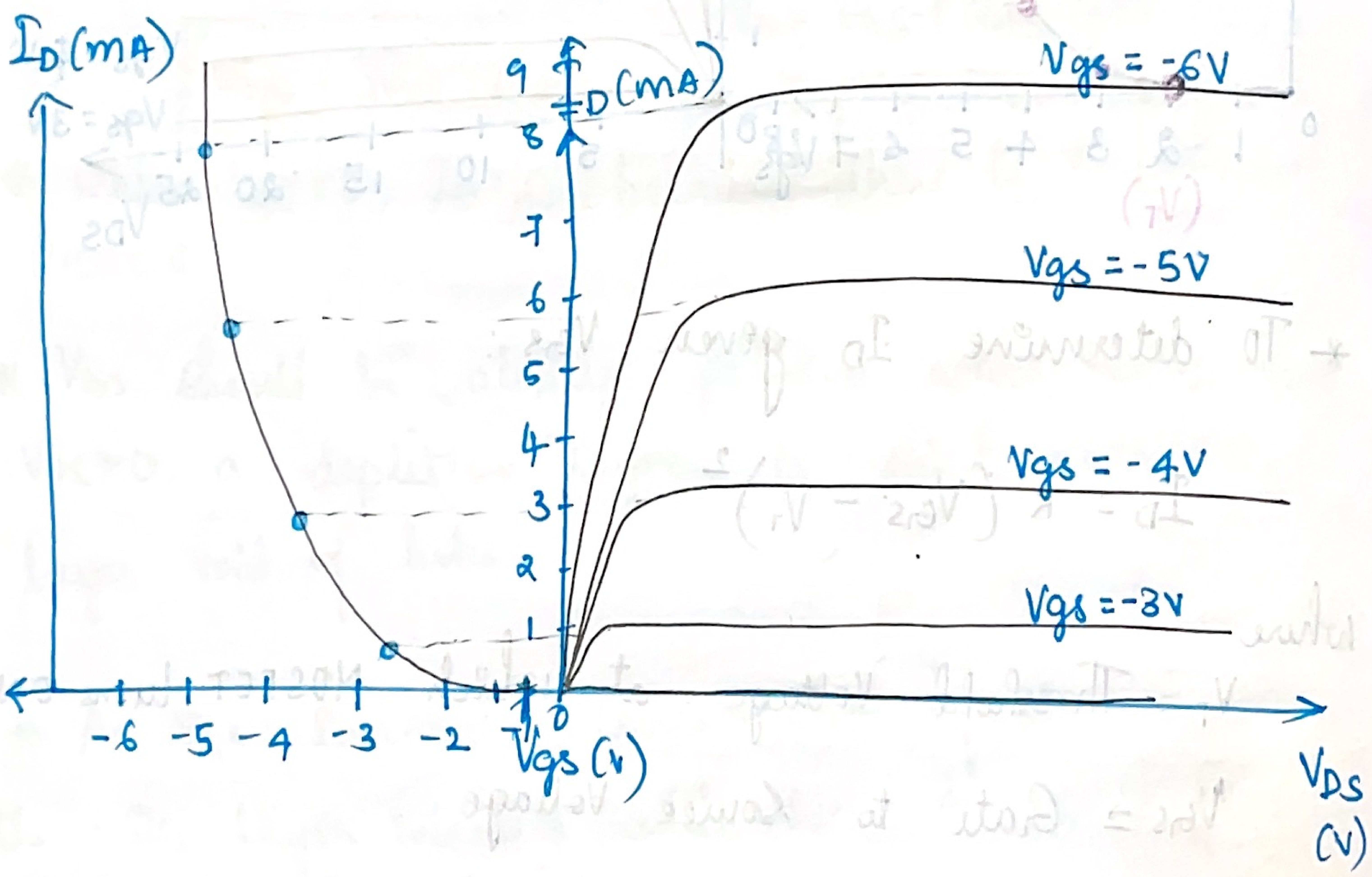
$$K = \text{Constant} = \frac{I_{D\,(ON)}}{\left(V_{GS\,(ON)} - V_T\right)^2}$$

* $V_{DS\,SAT}$ can be calculated by

$$V_{DS\,SAT} = V_{GS} - V_T$$

# P- channel MOSFETs

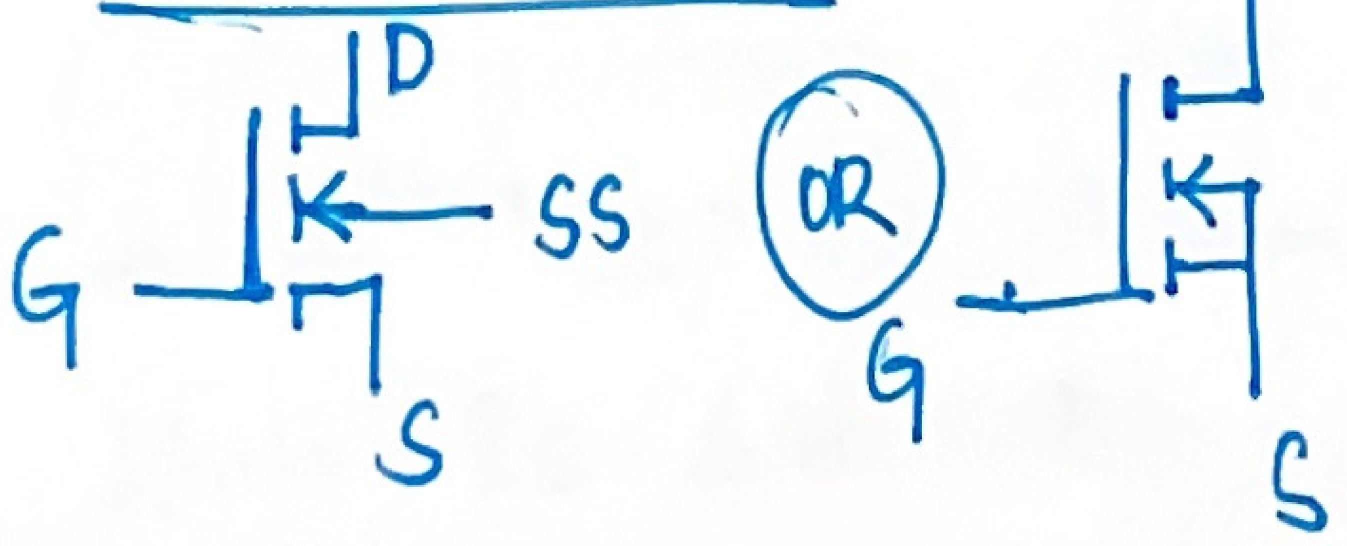


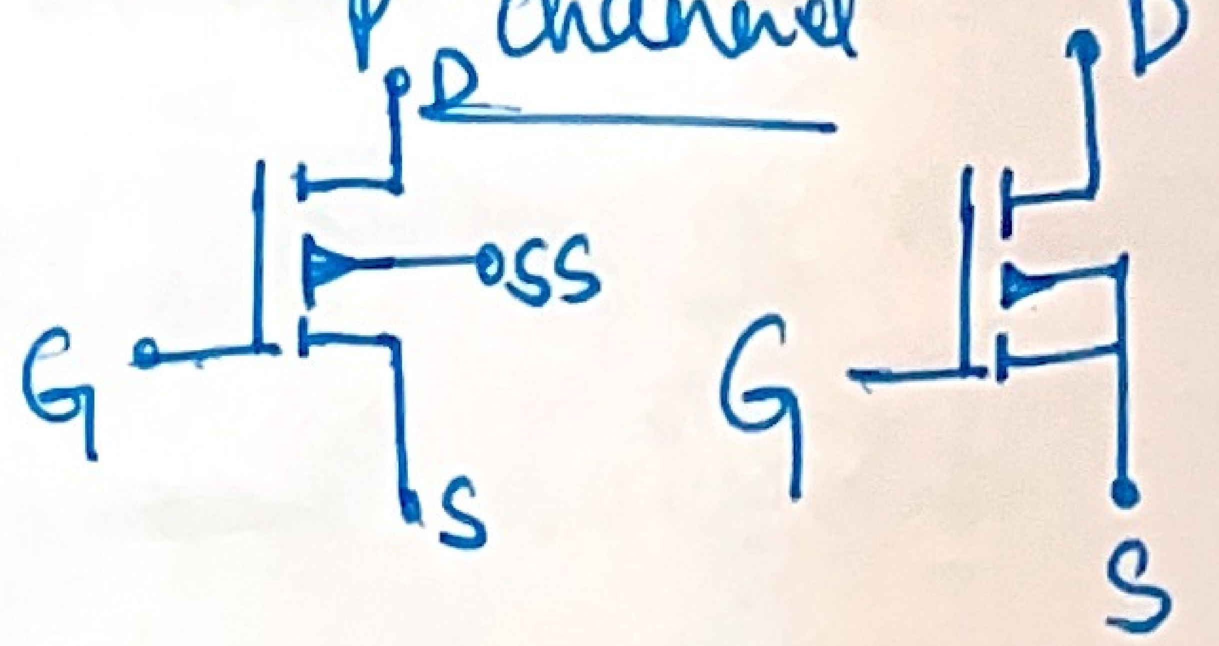

* The P- channel enhancement type MOSFET is similar to the n- channel except that the voltage polarities and current directions are reversed.

## MOSFET Symbols :

n channel



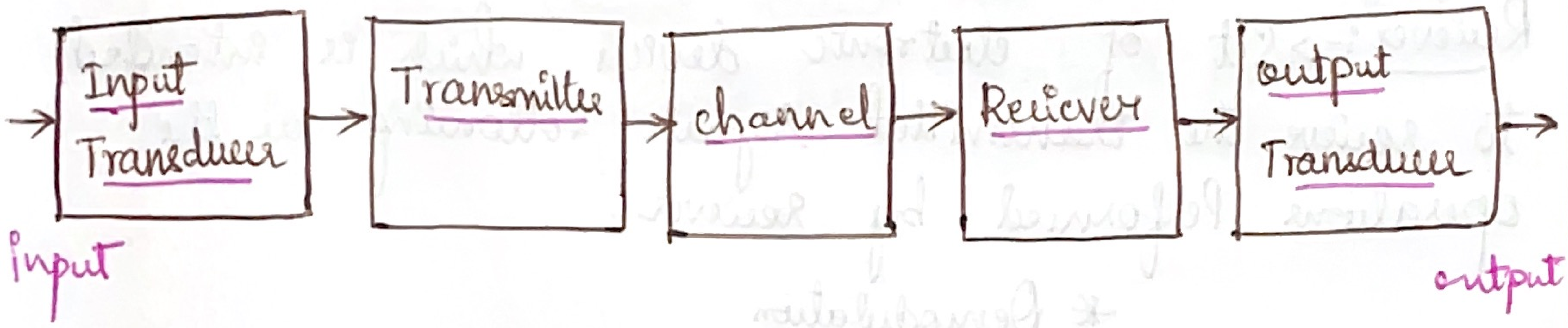

P channel



# Introduction to Communication Systems

* Communication is a Process of transmitting an information from one point to another via a Communication medium.

* Block diagram of Communication System.




Input : is the Source of information where the message to be transmitted is generated.

Ex:- User at Transmitting end.

Input transducer: is the device which converts non-electrical signal generated at Source to electrical Signal for the further process & transmission of Signal.

Transmitter: is a set of devices which is able to transmit the processed signal onto a channel. Following are the Processes Performed by transmitter.

* Modulation
* Encryption if required
* Encoding
* Compression
* Analog to Digital Conversion

Channel :-> is the medium between transmitter and reciever through which the transmitted signal travels and reaches reciever.

> Channel can be either any physical cable (or) free space.

Ex:- Co-axial cable, optical fiber etc

> Noise in the recieved signal occurs in this stage of transmission.

Reciever :-> Set of electronic devices which is intended to recieve the transmitted signal. Following are the operations performed by reciever.

* Demodulation
* Decryption
* Decoding
* Decompress.

Output transducer :- is a device which converts a demodulated, electrical signal back to non electrical signal according to the user convinience.

Output :- The non electrical signal which is generated by output transducer.

# Modulation :-

The Process of changing any of the properties (amplitude / Frequency / Phase) of Carrier Signal in accordance with message Signal.

where

- $m(t) \Rightarrow$ message Signal which is of low frequency (20Hz to 20KHz).

- $c(t) \Rightarrow$ Carrier Signal which has constant high frequency, Constant amplitude and constant phase.

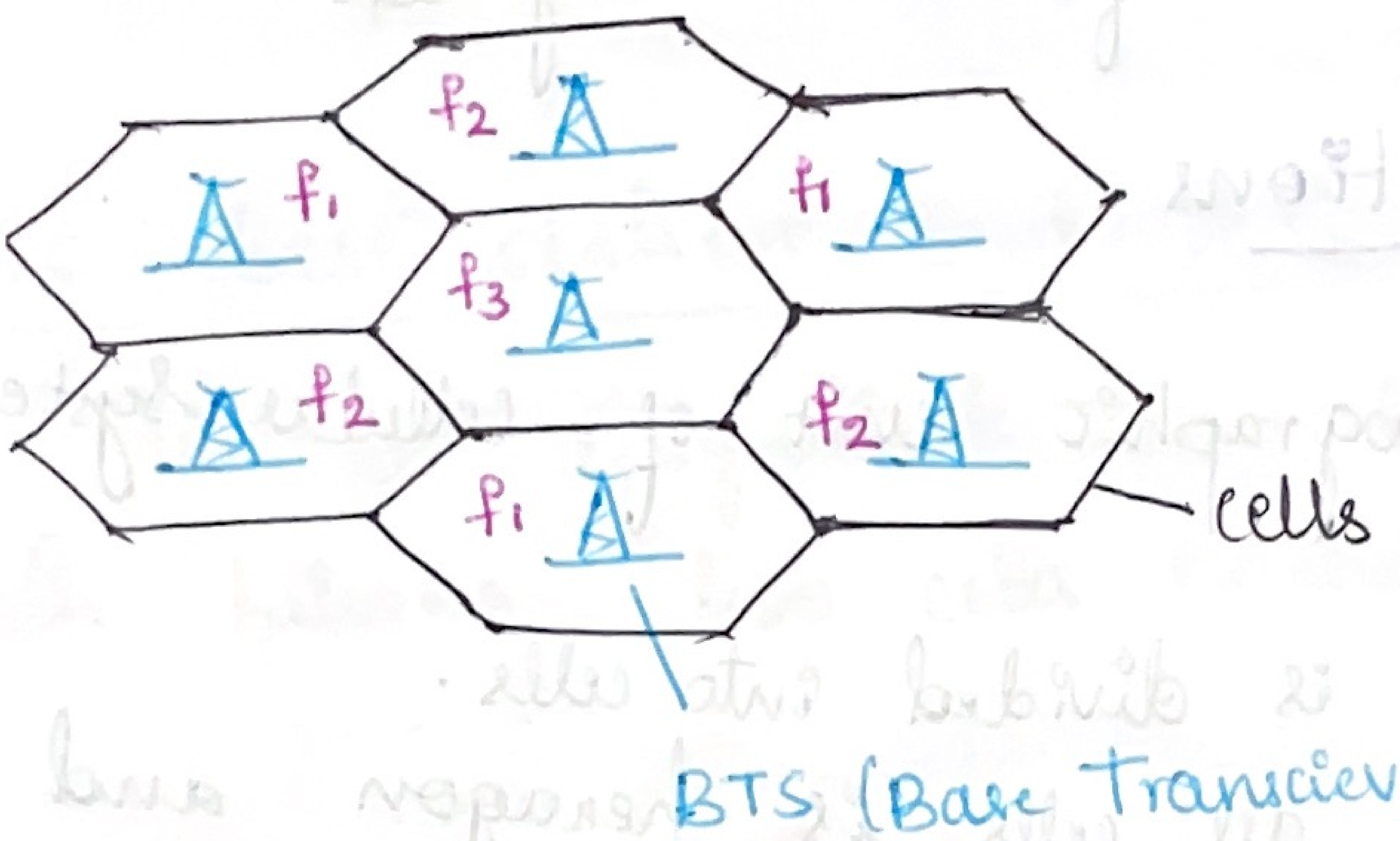
# Fundamentals of Cellular System:-

## Cellular network :-

It is a radio network distributed over land areas called "cell".

* Each cell Consist of atleast one fixed location transciever known as Base Transciever Station (BTS).

*




* BTS are located at center of cell.

## Advantages of cellular network Concept:-

(1) Increased Capacity:
A single transciever could cover minimum area around it. ∴ cellular network concept increases the capacity of network.

(2) Reduced power use:
High power is required if a single transciever is used for entire area. The power is reduced by splitting the areas into cells which can operate well transcievers consuming less power.

③ Larger Coverage area:-

A single transciever is not able to cover the network of entire area. With the help of cellular technology almost all areas on the geographical area is covered into network.

④ Reduce interference from other signals:-

Since adjacent cells operates on different frequencies changes of signal interference is very less.

Important definitions

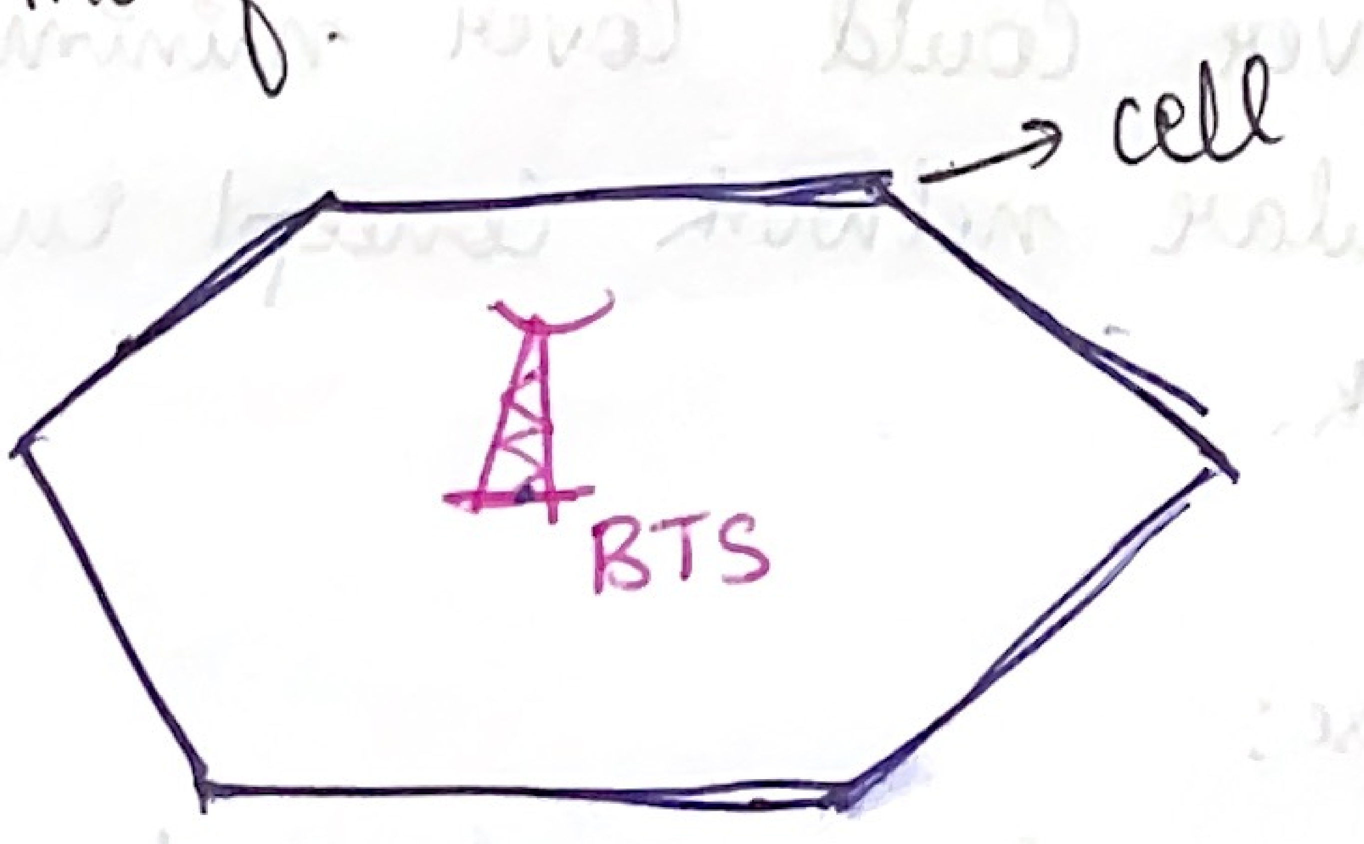
1] Cell: Basic geographic unit of cellular system is called "cell".

> Coverage area is divided into cells.

> The shape of all cells is hexagon and same size throughout.

> Each cell has its own tranceiver antenna called BTS (Base Transciever System).

> Adjacent cells are assigned with different freq to avoid interference.



## (2) Base Transciever station:

* A Transreceiving antenna at Every base station which Transmits & recieve the signal of communication from one cell to another cell.

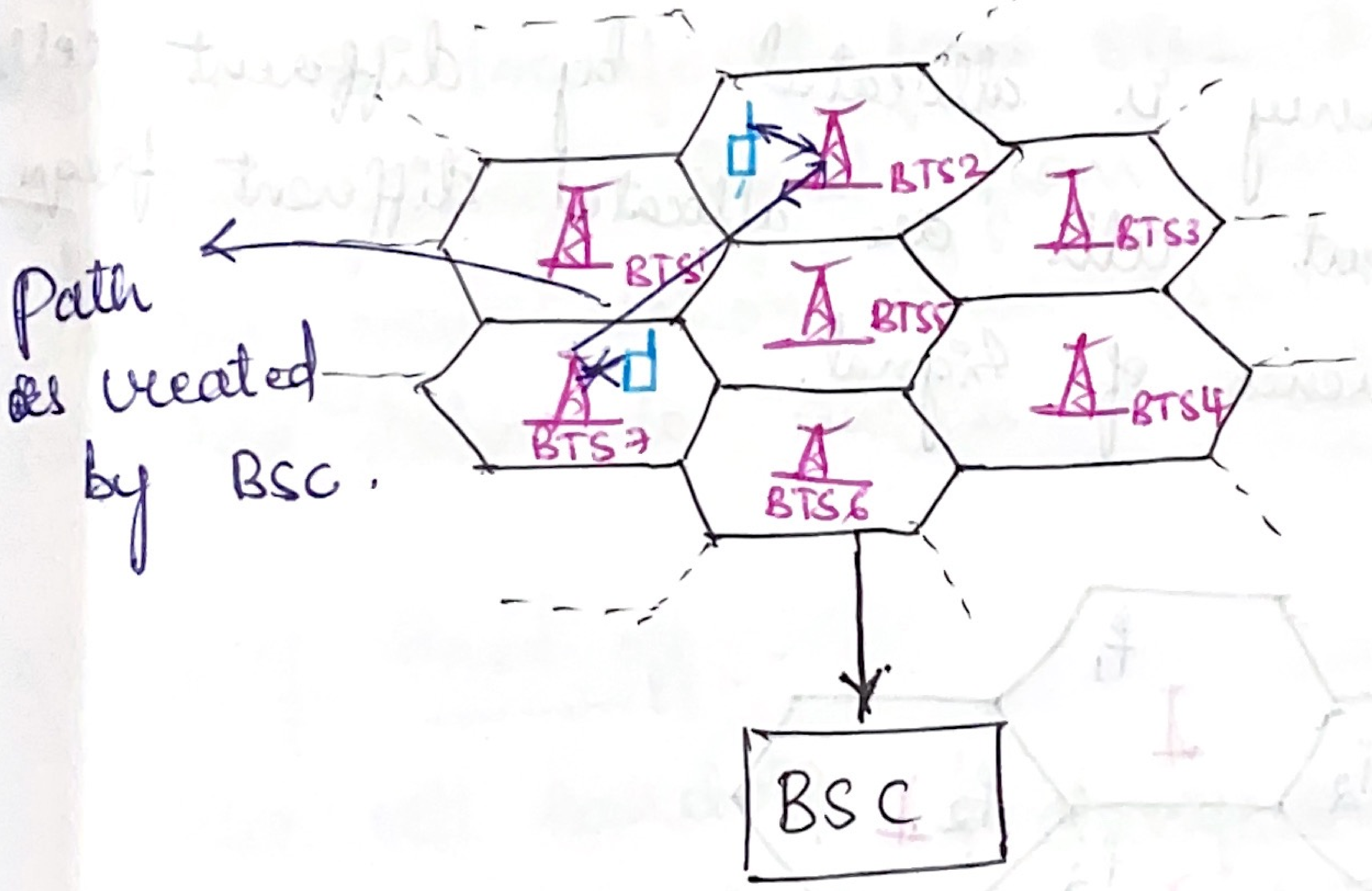
* BTS is associated with BSC and MSC.

* BSC : Base Switching center : It acts like a router between two cells under communication.

* MSC : BTS passes a traffic to MSC if any.

## (3) BSC : Base station controller

* Few cells are assigned to one BSC. It creates a path between two cells intended to communicate




## (4) MSC : Mobile Switching center

* A set of BSC is assigned with MSC.
* It Performs routing and switching operations.
* MSC arranges BTS for mobile communication
* It handles all the connections
* It also Perform functions such as host of other duties, call set up, call releas, Con- call, Billing etc

* MSC is associated with HLR & VLR.

HLR:- Home Location Register:

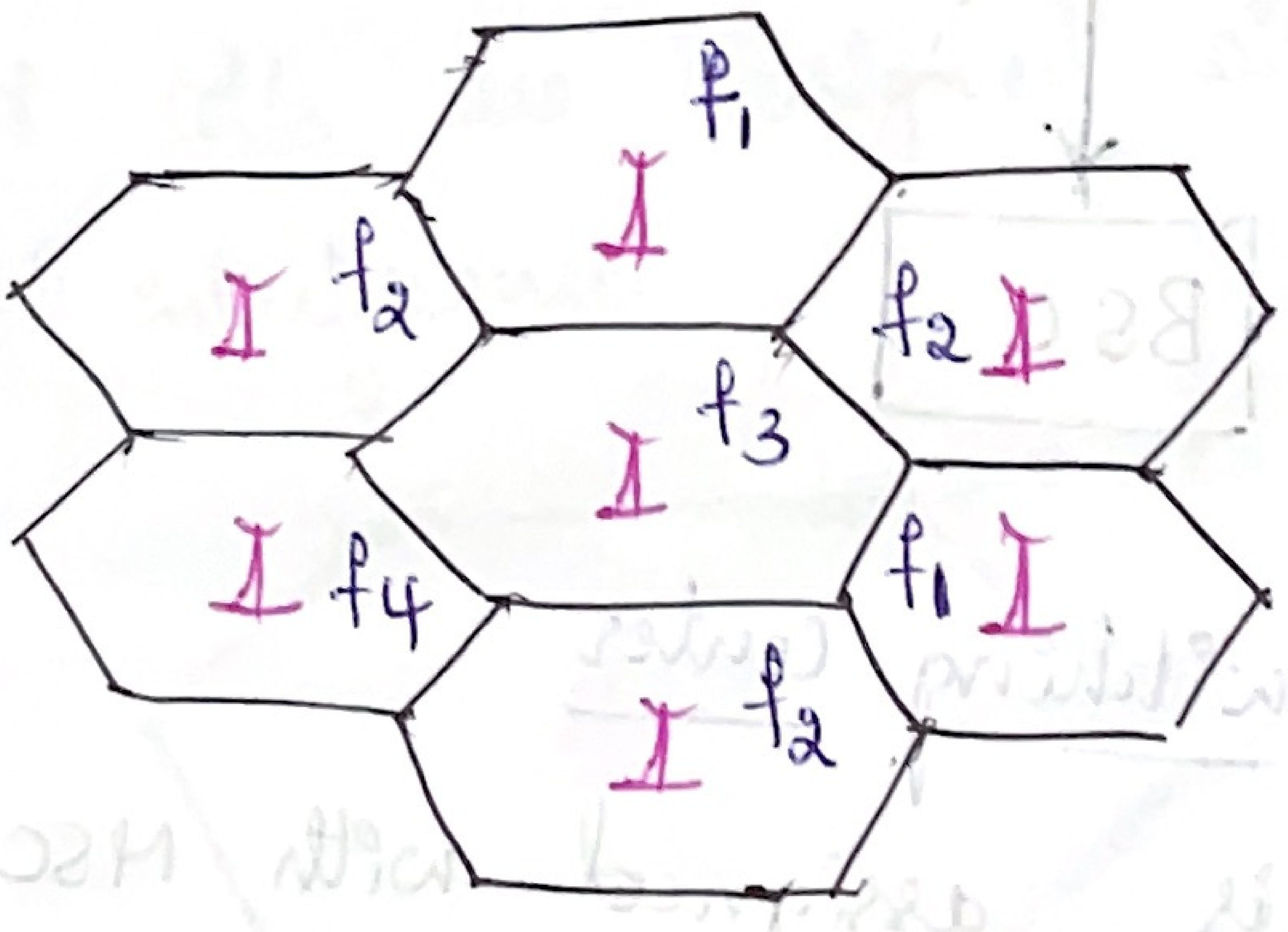
It is a database which contains current location of each mobile belongs to MSC.

VLR:- Visitor Location Register:

It is a database which contains current location of each mobile visited to MSC.

## Frequency Re-use:

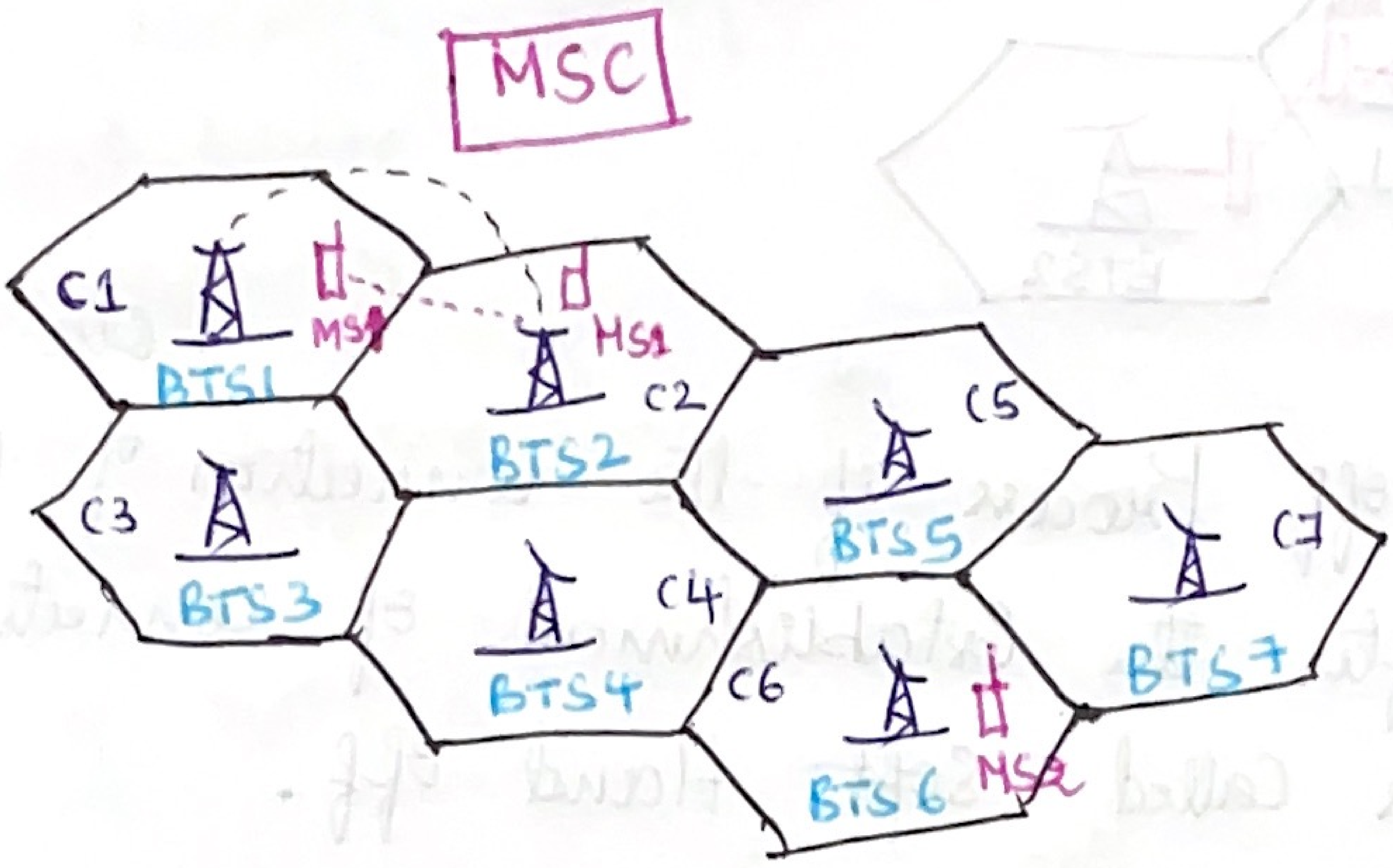
* It is the concept of reusing a set of frequency.
* It enables to expand total system capacity without the need to employ higher power antenna.
* Same frequency is allocated by different cells provided adjacent cells are allocated different freq. to avoid interference of signal.




* Fixed frequency Reuse and Dynamic frequency reuse are two types of frequency reuse.

# Hand off

* It is an ability to transfer call from one Base station to another Base station.

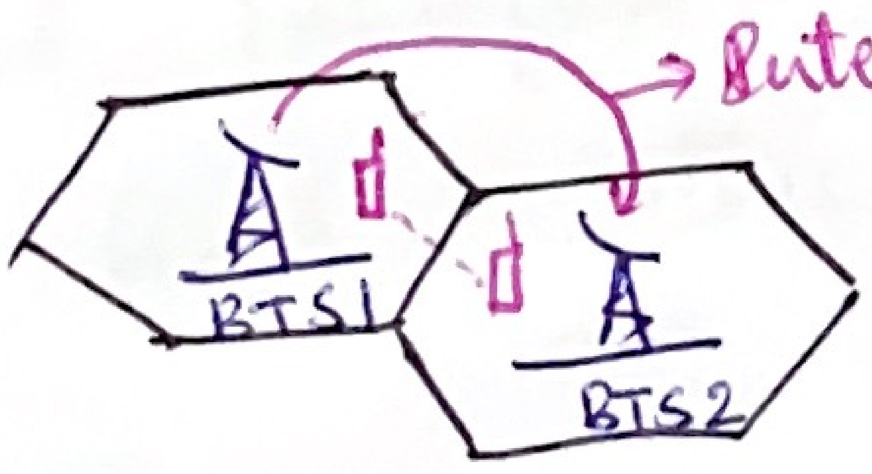



* Let us assume MS1 is communication with MS2 using BTS1 and BTS6. If MS1 is travelling and crosses the border of C1 and reached C2 then the signal should be transferred from BTS1 to BTS2. "This Process of transferring signal from one Base station to another base station when user (MS) crossed from one ~~base station~~ cell to another is called "Hand off""

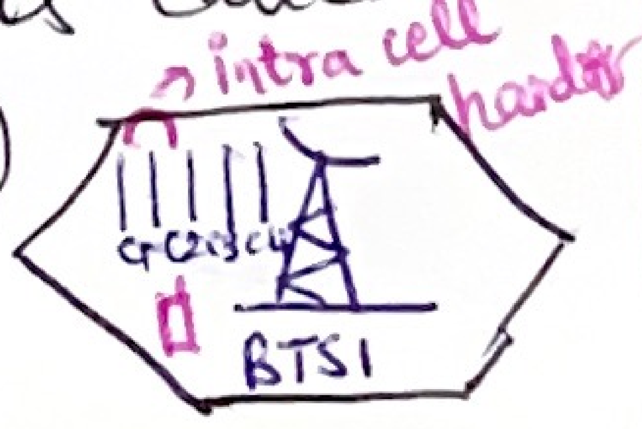
## Types of Hand off :-

1] Inter cell Hand off } classification based on location of cell.
2] Intra cell Hand off

* Inter cell Hand off is One when target cell and source cell are ~~located~~ .one.

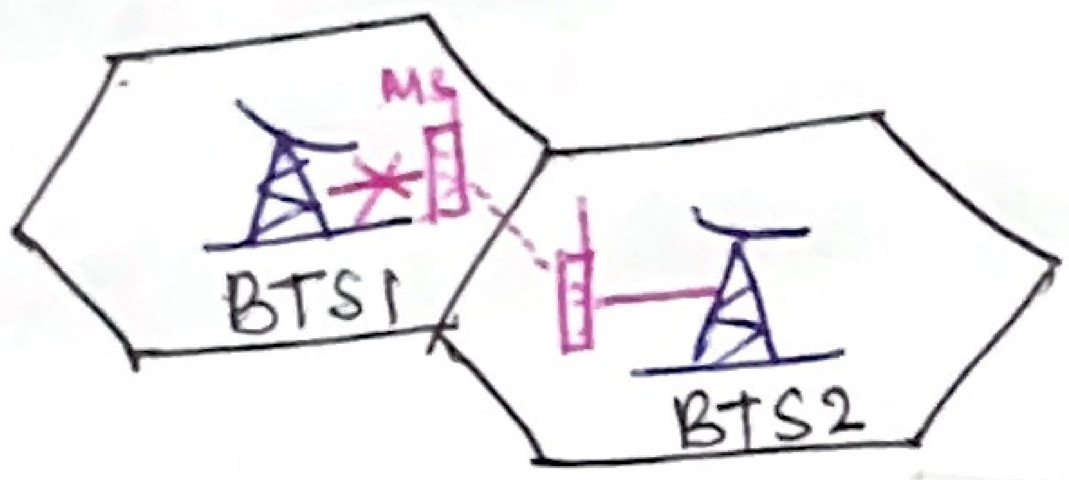



* If Target cell and Source cell are same is called intra cell. Here Only allocated channel is changed



① Soft Hand off ② Hard handoff

* Soft Hand off (Make before Break).




While Hand off Process if the connection of MS with One BTS is broken after the establishment of connection with another BTS is called Soft Hand off.

* Hard Hand off (Break before make)

While Hand off in Process, if connection of MS is broken with current Base station before establishing connection with new base station is called Hard handoff. Here there will be loss of Signal for small duration until the new connection with new BTS.

Interference :-

Interference is that which modifies a signal in disruptive manner. when it travels from Transmitter to reciever. Interference of signal may results in → Disturbance

→ Missed call.

→ Call disconnection.

→ cross talk

Sources of interference :

→ Another mobile in same cell.

→ Ongoing call in neighbouring cell.

→ when a different BTS operate on same freq.

Types of Interference

(1) Co-channel interference (2) Adjacent interference.

→ co-channel interference :-

* Co-channel : cells which are using same frequency is called co channel.

* co-channel interference occurs when signals from different cells operating at same frequency co-incides each other.

* Co. channel interference occurs due to bad frequency Planning, Bad weather condition.

→ Adjacent interference :* is due to interference between signals of adjacent cells. When transciever of other cells capture the signal intended to some other cell is called Adjacent interference.

* Adjacent interference occurs due. Poor filtering.
it can be minimized by Proper filtering & Proper channel assignment ( there should be good separation in frequency allocated for different cells).