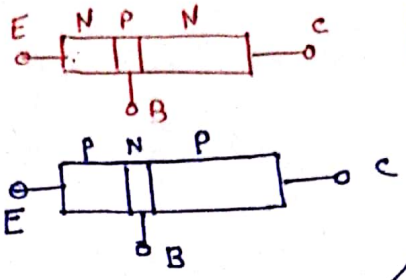
BJT – Bipolar Junction Transistor

Two type
- npn
- pnp



Q.1 Note :- which one is better

NPN – Best

Both operation same.

Reason: (1) npn Fast

(2) small in size

Because: Mobility of e^- are greater as compared to hole mobility.

$\mu_n > \mu_p$

↙ Mobility of e^- ↘ mobility of hole

Q.2 How many terminal and how many Junction?

Ans:- 3 terminal and Two Junction as seen from above Fig.

Q.3 How many configuration possible:

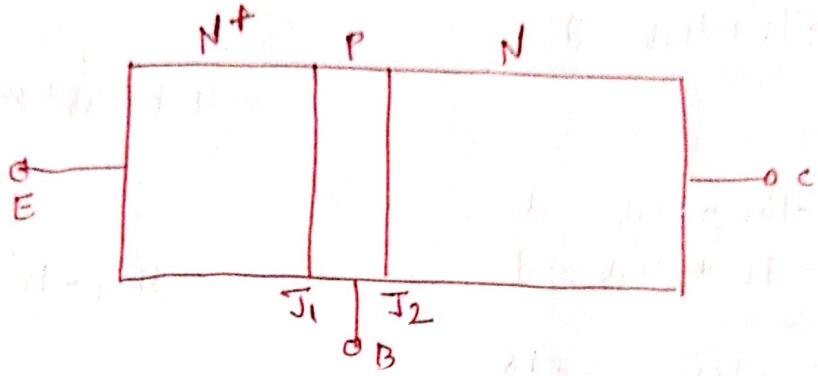
3 Configuration possible.

- Common Emitter
- Common Base
- Common Collector

Q.4 Which Configuration is best -

Common Emitter Configuration mostly Used.
Have high power gain and useful for amplification.

Q.5



Size: C > E > B.

Doping: E > C > B

Q.6 Symmetric device or Asymmetric

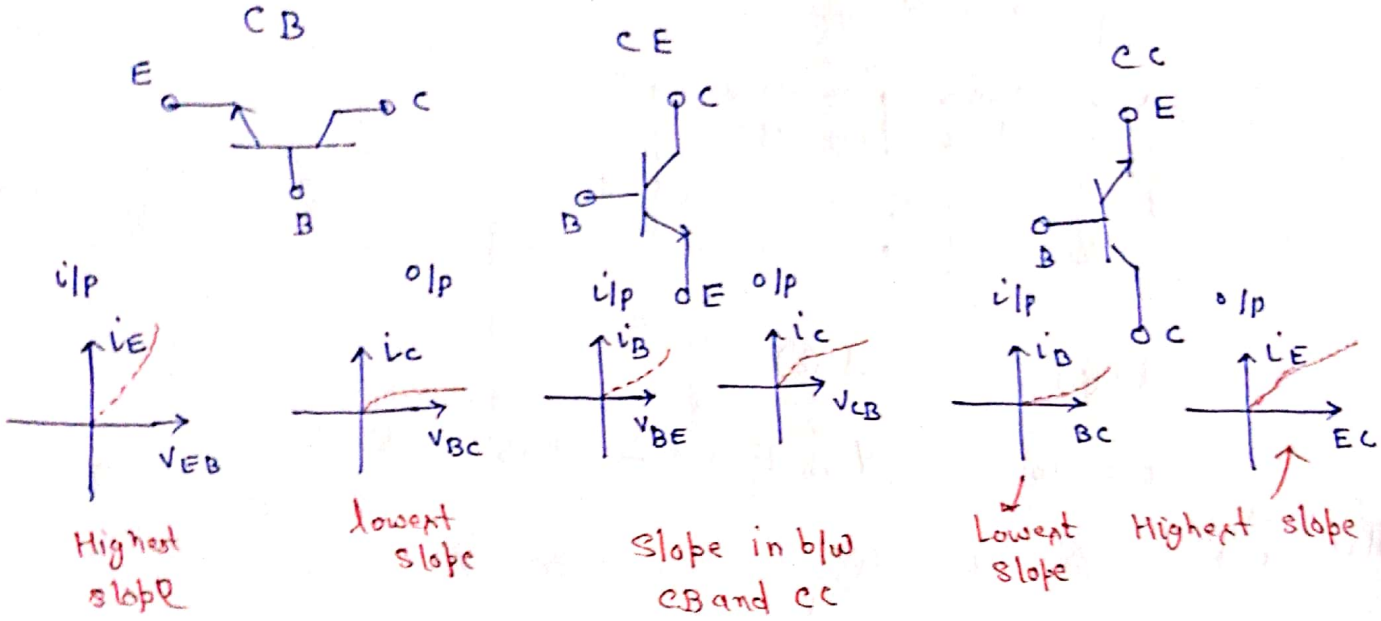
↓ BJT is assymetic device

as they have different size and doping profile ← We can not interchange Emitter, Base, Collector

Q.7 We can apply External voltage to bias J_1 and J_2 Junction. → Base on J_1 and J_2 Junction biasing we can make our BJT to operate in Four Modes

	J_1	J_2	
I - Mode	FB	RB	→ Active Mode → Used for amplify
II - Mode	FB	FB	→ Saturation Mode → Used for switch
III - Mode	RB	RB	→ Cut-off mode → Used for switch
IV - Mode	RB	FB	→ Reverse active → No such useful application

Q.8 Characteristic { i/p → input ; o/p → output



Highest slope

Lowest slope

Slope in b/w CB and CC

Lowest slope

Highest slope

↓

First of all we will draw characteristic of this

Current Gain (α)

$$\alpha = \frac{I_c}{i_E}$$

$$I_c = \alpha I_E$$

↓

$$\alpha < 1$$

Current gain (β)

$$\beta = \frac{I_c}{I_B} \Rightarrow I_c = \beta I_B$$

current gain (γ)

$$\gamma = \frac{I_E}{I_B}.$$

$$I_E = \gamma I_B.$$

$\because$ $I_E > I_c > I_B$

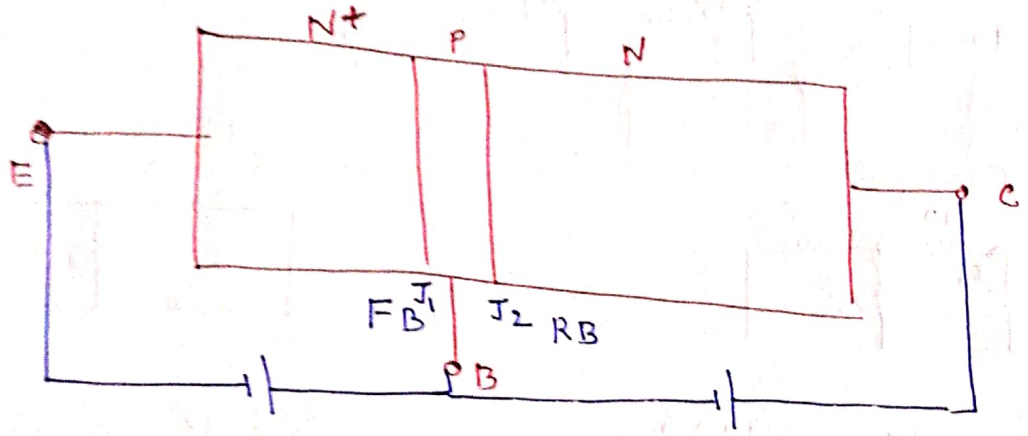
$\beta > 1$

$\gamma >>> 1$

Q.9 Operation of BJT in Active Mode and with CE configuration.

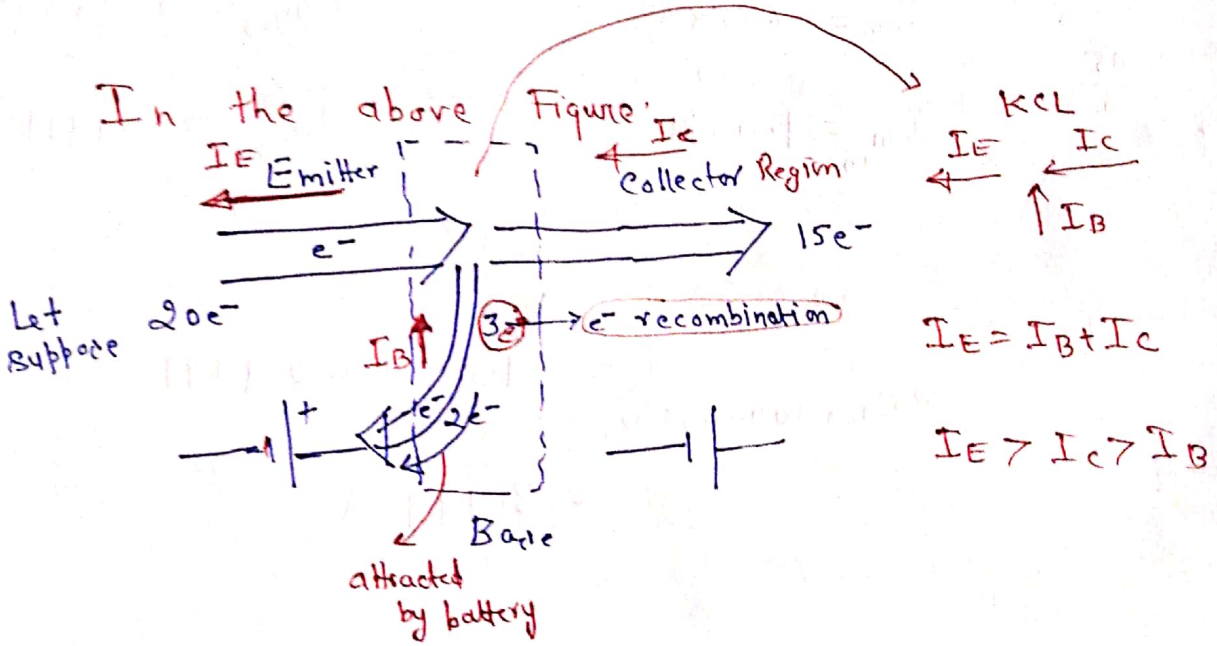
→ Very important Mostly Used.

Q.10 BJT → Common base → Active mode is drown below



⇒ J_1 (FB), J_2 (RB) First elementary Condition so that how our BJT work in Active mode.

Q.11 In the above Figure:



Q.12 ⇒ GAIN occur in BASE REGION