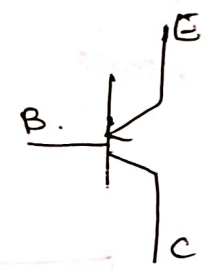
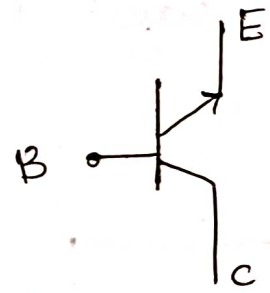
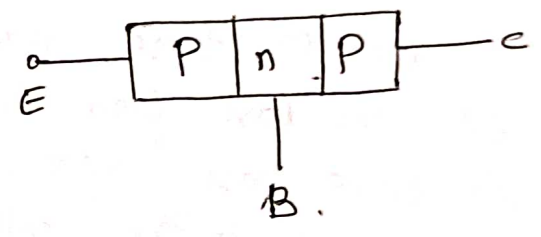
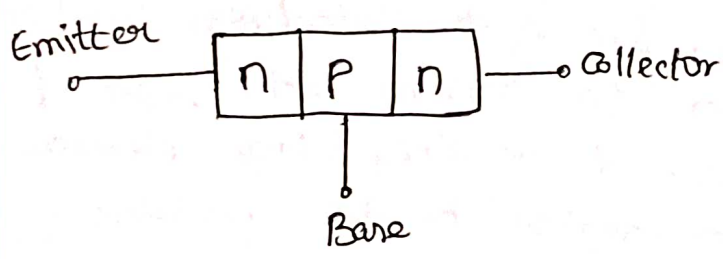


Junction Transistor :-

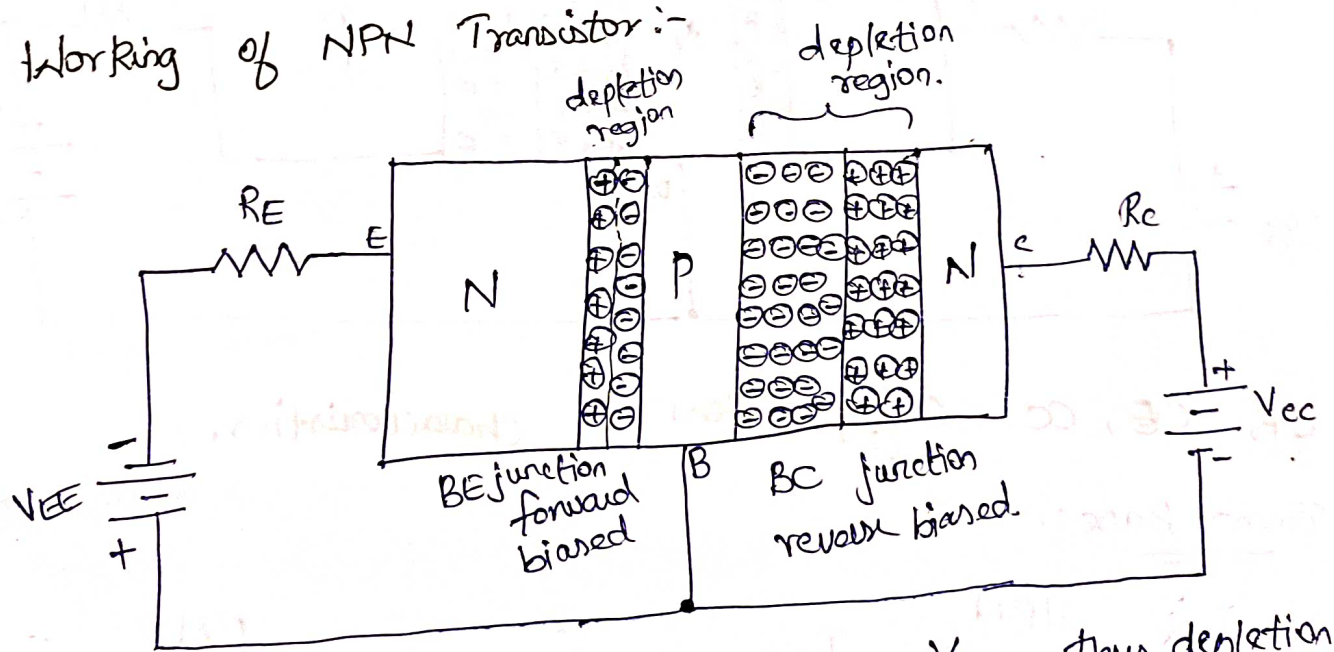
Transistor is a 3 terminal device : Base, emitter and collector. It is operated in 3 configurations. CB, CE & CC. Transistors are used for voltage amplification & current amplification.

Two types of BJT.

- * NPN type
- * Pnp type



Working of NPN Transistor :-



- forward biased by the dc source V_{EE} , thus depletion region at this junction is reduced
- reverse biased, increased the depletion region.

forward biased EB junction causes the free electrons in the n-type to move towards the p-type, & tend to combine with holes in p-region.

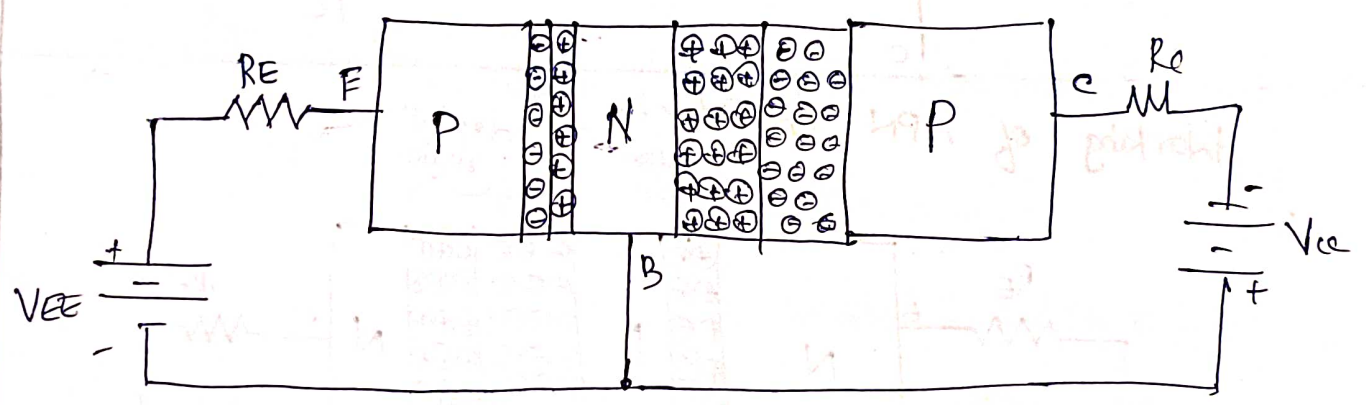
We know that, base region is very thin & lightly doped.

Lightly doping means

- * free electrons have a long lifetime in the base region
- * free electrons have only short distance to go to reach the collector.

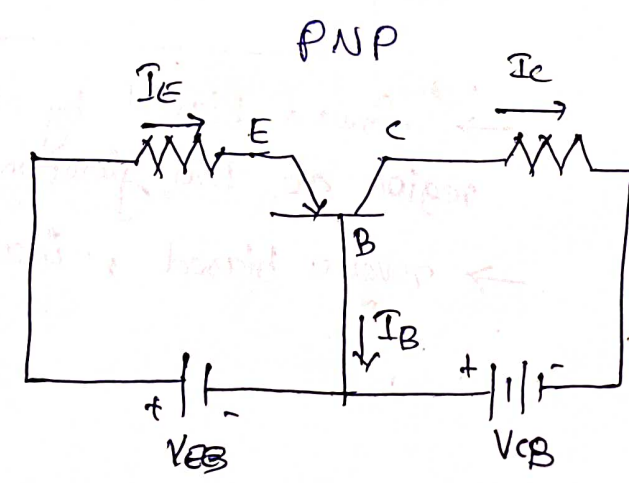
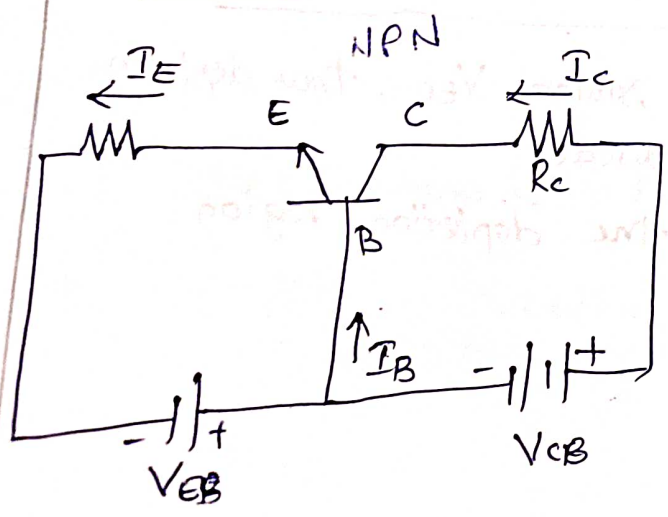
due to these reasons, few of the electrons injected into the base from emitter to combine with holes & constitute base current I_B . & remaining large electrons are moved to the collector region to the positive of external dc source. Constitutes collector current I_C .

PNP



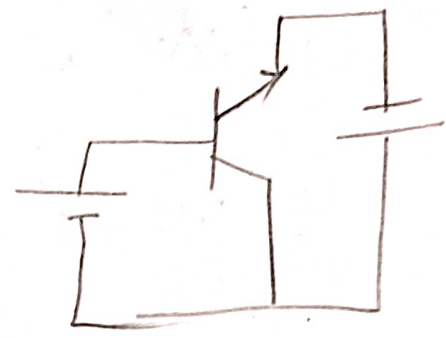
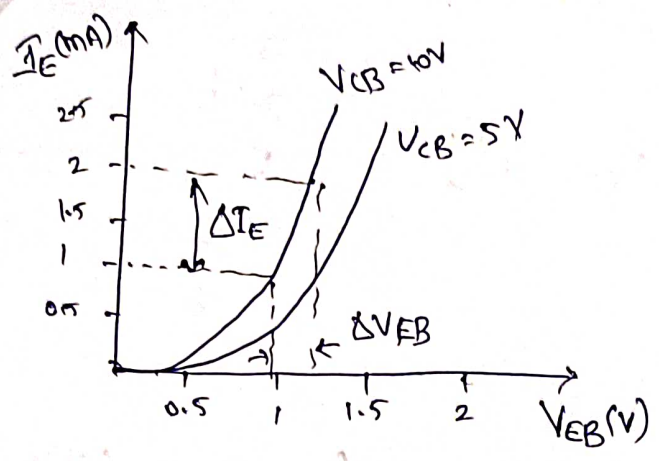
CB, CE, CC configurations & characteristics.

Common Base:



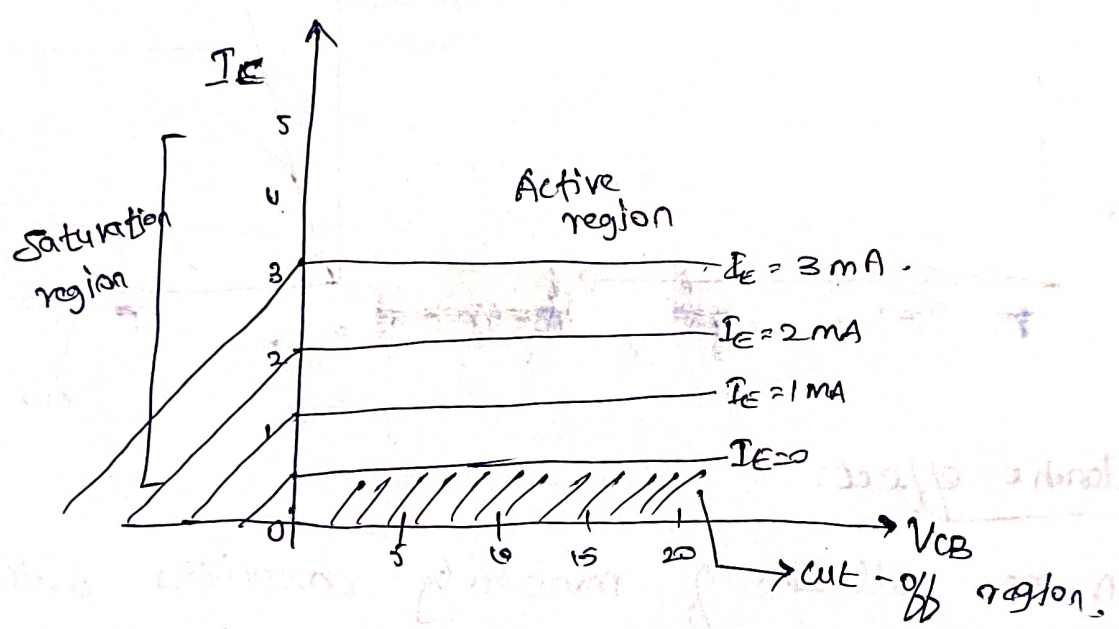
Characteristics.

Curve b/w I_E , Input Voltage V_{EB} . at constant collector base Voltage V_{CB} .



o/p characteristics:-

Collector current I_C , Collector base Voltage V_{CB} .



Active region:-

emitter base junction is forward biased
 collector base " is reverse biased

approx. $I_C = I_E$, transistor operates as amplifier.

Saturation region:-

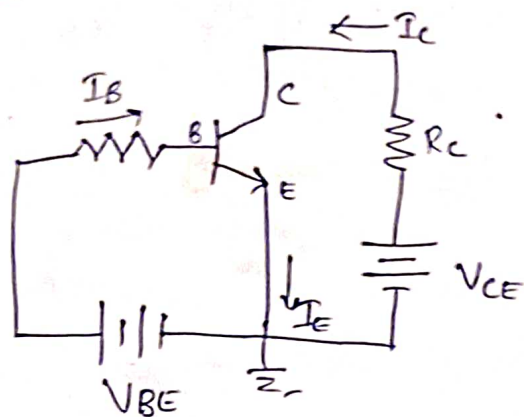
emitter base junction & collector base junction is forward biased.

cut-off region:-

collector base, emitter base are reverse biased.

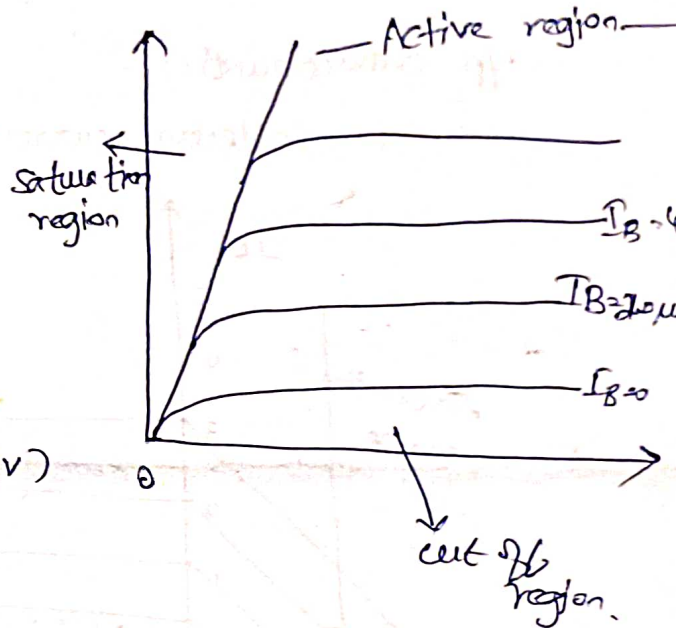
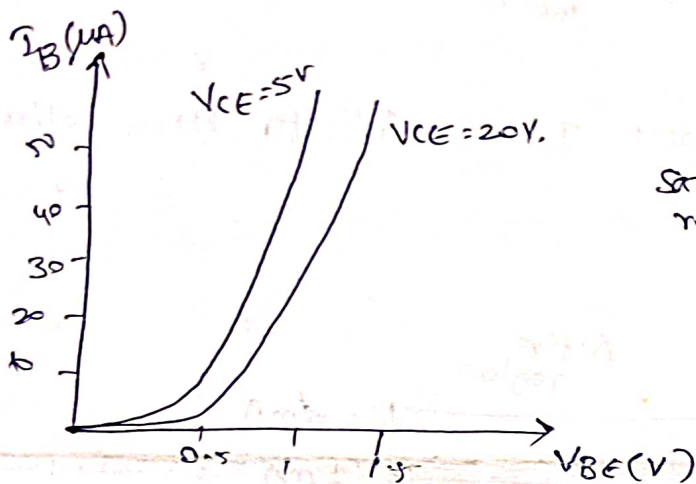
below the curve $I_E = 0$ is cut-off region.

Collector Emitter Configuration :-



3
2A
5
1
6

Input characteristics.



Avalanche effect

more collision of minority carriers with the atoms due to high reverse voltage. carrier multiplication.

high reverse current. This is called avalanche effect.

Zener electric field across the depletion layer is very intense. strong.

Pulls the electrons from valence bands to stable atoms. Creation of free electrons is called Zener effect.