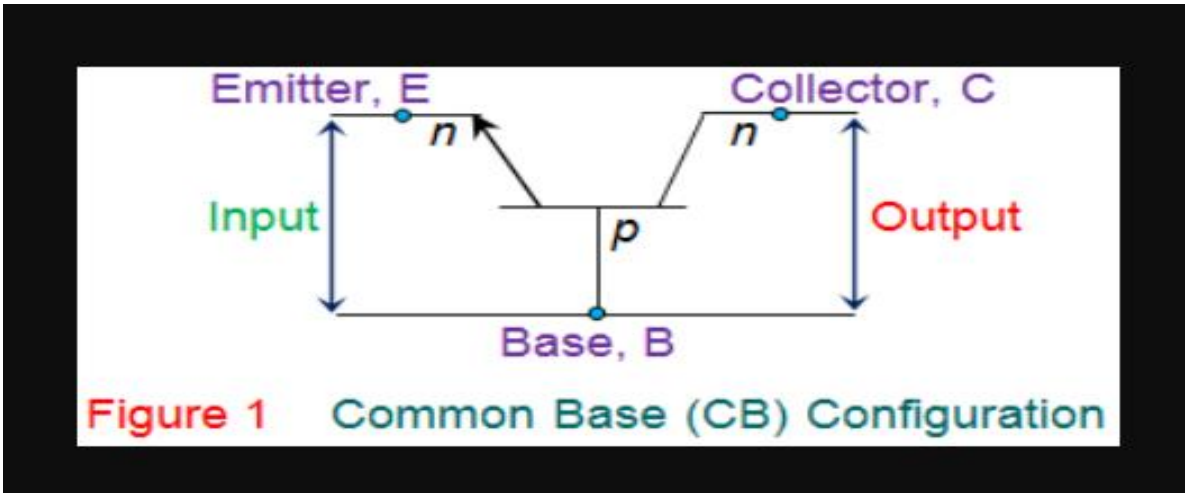
COMMON BASE(CB) CONFIGURATION



- ***The common base configuration for the N-P-N Transistor is shown in image.***
- ***In common base configuration, emitter is the input terminal, collector is the output terminal, and base is the common terminal between input and output.***
- ***As shown in figure EB junction is forward biased and CB junction is reverse bias.***
- ***The input voltage is VEB and input current is IE.***
- ***And The output is taken between Collector and base, Therfore the output voltages is VCB and the output current is IC.***

➢ ***CURRENT AMPLIFICATION FACTER(α):***

The current amplification facter is the relation between output current and total input current. For CB Configuration input current us IE and output current is IE.

So,

$$\alpha = I_C/I_E \text{.....(1)}$$

The value of α for CB configuration will always be less then 1.

This is because IC<IE.....(2)

- ***Collector Current IC:***

Collector Current can be written as IC= αIE.....(3)

- ***Emitter Current IE:***

  -We know that Emitter current is sum of Base current and Collector current So,
  IE=IC+IB.....(4)

Therefore :

Base current is IB=IE-IC.....(5)

Now, putting the value of (3) in (5) so,

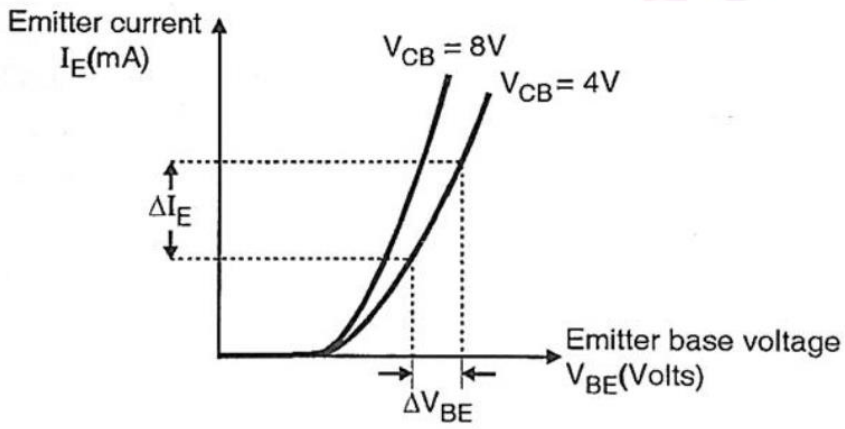
IB=IE – αIE

IB= IE(1- α).....(a)

INPUT CHARACTERISTICS:

- ***Input Characteristics is the relation between transistor input current IE and input voltage VBE, keeping the output voltage VCB constant.***

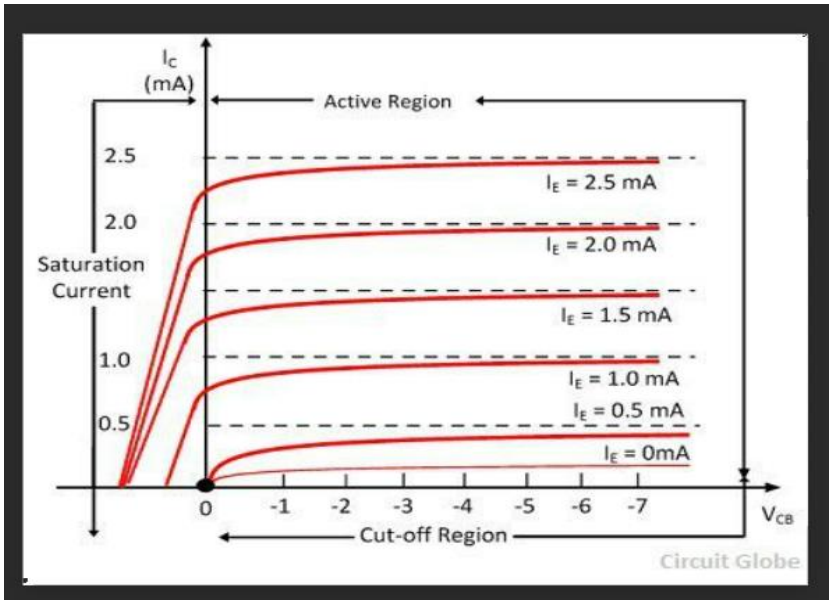
- ***The emitter base voltage (VBE) is plotted on the X-axis and Emitter Current IE is plotted on the Y-axis.***



BASE WIDTH MODULATION/ EARLY EFFECT:

- ***IN CB CONFIGURATION OF TRANSISTOR, IF WE INCREASE VCB, THEN DEPLETION LAYER AT CB JUNCTION WILL INCREASE, WHICH RESULTS IN DECREASE IN EFFECTIVE BASE WIDTH.***
- ***Hence, concentration gradiant at EB junction will increase which allows more electron from emitter to difuse into the base.***
- ***So, emitter current IB will increase Thus, when collector base voltage VCB is incsemitter current will also increas.***

OUTPUT CHARCTRISYICS:



- **Output characteristics is the relation between transistor output current IC and output voltage VCB , keeping the input current IE constant.**
  (1) A transistor can operate in any of three region of operation.
    (i) Cutoff region
    (ii) Active region and
    (iii) Saturated region

  As reverse bias voltage VCB is increase. Collector-base depletion region also increase If an expensive reverse-bias voltage is applied then collector-base depletion region penetrating into the base until it makes contact with emitter base depletion region.