SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE NAME : **19EC304 – ELECTRONIC CIRCUITS I**

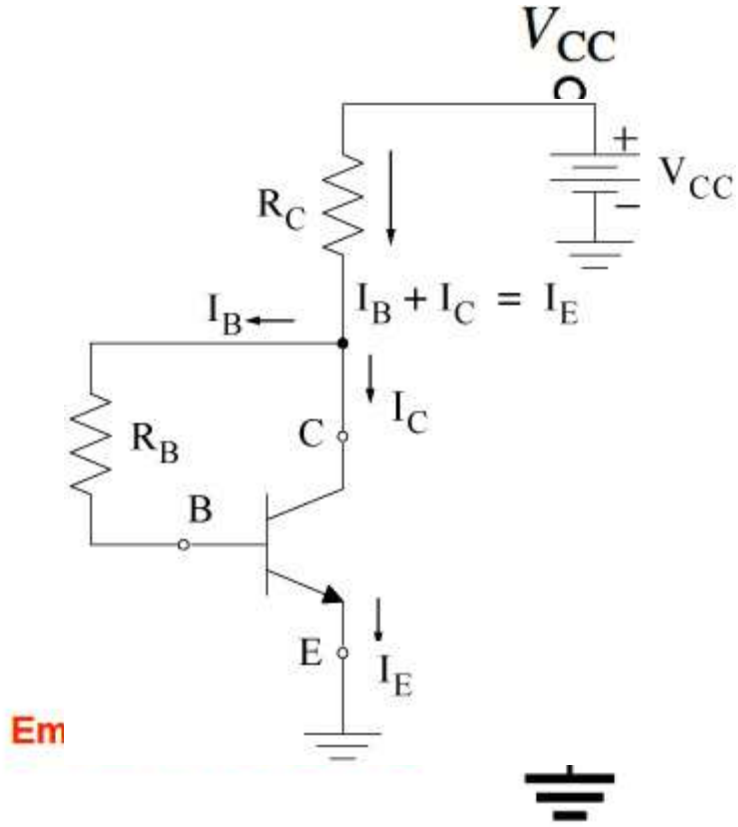
II YEAR / III SEMESTER

Unit I- **BIASING OF DISCRETE BJT,FET**

Topic : , Self bias and problems

Self-Bias

The fixed bias arrangement discussed in the previous section is thermally unstable. If the temperature of the transistor rises for any reason (due to a rise in ambient temperature or due to current flow through it), the collector current will increase. This increase in current also causes the DC quiescent point to move away from its desired position (level). This reaction to temperature is undesirable because it affects amplifier gain (the number of times of amplification) and could result in distortion, as we will see later in this chapter. A better method of biasing, known as *self-bias* is obtained by inserting the bias resistor directly between the base and collector, as shown in Figure 3.28.



Em

Figure 3.28: NPN transistor amplifier with self-bias

By tying the collector to the base in this manner, feedback voltage can be fed from the collector to the base to develop forward bias. Now, if an increase of temperature causes an increase in collector current, the collector voltage V_C will fall because of the increase of voltage produced across the collector resistor R_L. This drop in V_C will be fed back to the base and will result in a decrease in the base current. The decrease in base current will oppose the original increase in collector current and tend to stabilize it. The exact opposite effect is produced when the collector current decreases.

From Figure 3.28,

$$R_C I_E + R_B I_B + V_{BE} = V_{CC}$$

$$R_C I_E + R_B \frac{1}{\beta + 1} I_E + V_{BE} = V_{CC} \quad (3.23)$$

$$I_E = \frac{V_{CC} - V_{BE}}{R_C + R_B/(\beta + 1)}$$

Any Query????

Thank you……