VOLTAGE DIVIDER TRANSISTOR BIASING

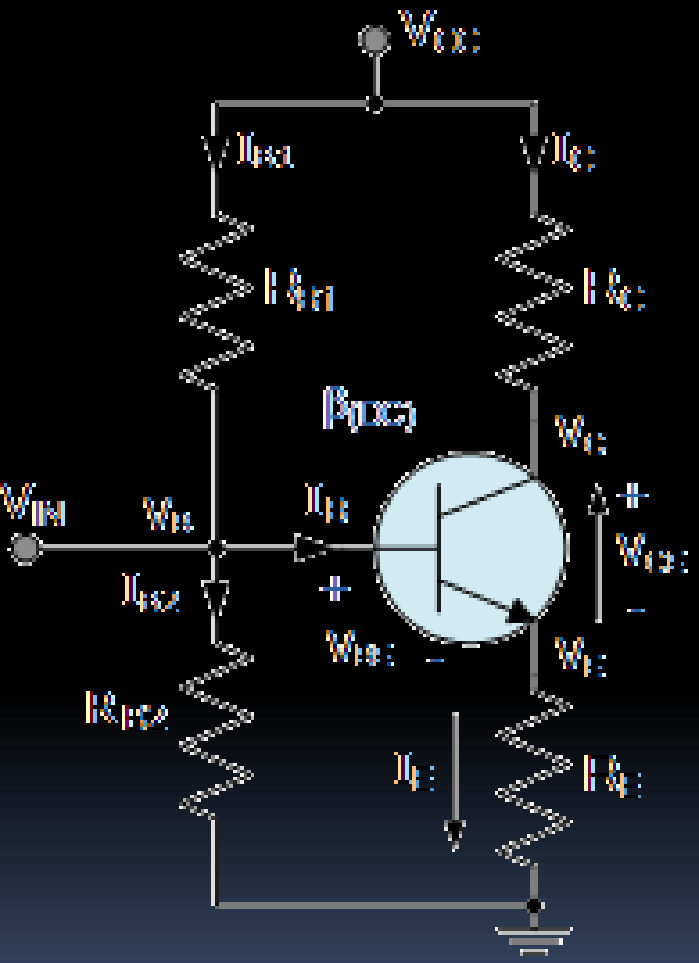
Lecture-37

TDC PART -3
PAPER 6(GROUP B)
Chapter -6

BY:
DR. NAVIN KUMAR
(ASSISTANT PROFESSOR)
(GUEST FACULTY)
Department of Electronics
L.S COLLEGE,BRA Bihar University,Muzaffarpur.

Voltage Divider Transistor Biasing

- This is the common emitter transistor configuration which is biased using a voltage divider network to increase stability. The name of this biasing configuration comes from the fact that the two resistors R_{B1} and R_{B2} form a voltage or potential divider network across the supply with their center point junction connected the transistors base terminal as shown.



$$V_C = V_{CC} - R_C I_C = (V_E + V_{CE})$$

$$V_E = I_E R_E = V_B - V_{BE}$$

$$V_{CE} = V_C - V_E = V_{CC} - (I_C R_C + I_E R_E)$$

$$V_B = V_{BE} + V_E = V_{RB2} = \left(\frac{R_{B2}}{R_{B1}+R_{B2}}\right) V_{CC}$$

$$I_{B2} = \frac{V_B}{R_{B2}}$$

$$I_{B1} = I_B + I_{B2} = \frac{V_{CC} - V_B}{R_{B1}}$$

$$R_B = \frac{R_{B1} \times R_{B2}}{R_{B1}+R_{B2}} \qquad I_B = \frac{V_B - V_{BE}}{R_B + (1+\beta) R_E}$$

$$I_C = \beta_{(DC)}\, I_B$$

$$I_E = I_C + I_B = \frac{V_E}{R_E}$$

USES

- This voltage divider biasing configuration is very efficient and the most widely used transistor biasing method.

WORKINGS

- The emitter diode of the transistor is forward biased by the voltage value developed across resistor R_{B2}.
- voltage divider network biasing makes the transistor circuit independent of changes in beta as the biasing voltages set at the transistors base, emitter, and collector terminals are not dependant on external circuit values.

CALCULATIONS

- To calculate the voltage developed across resistor R_{B2} and therefore the voltage applied to the base terminal we simply use the voltage divider formula for resistors in series.