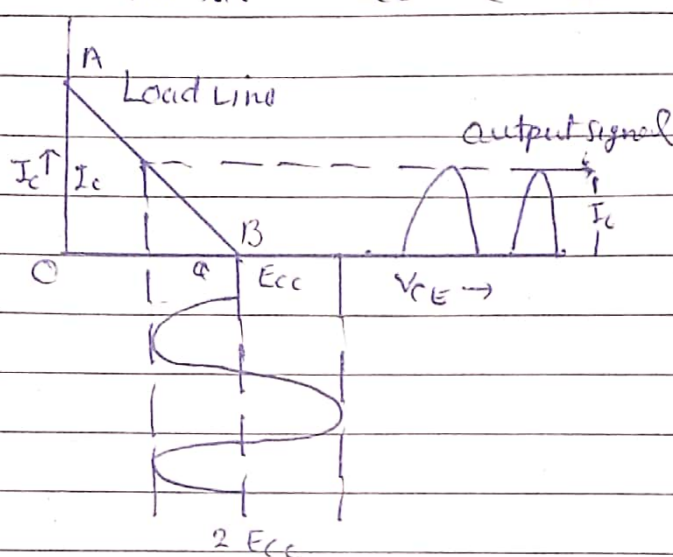


Maximum collector efficiency of Class B power amplifiers.

Total power drawn by the circuit from the applied d.c. source E_{cc} is

$$(P_{in})_{dc} = E_{cc} \times (I_c)_{dc}$$



Class B power amplifier,

$(I_c)_{dc}$ is the average current drawn from the supply during the positive half cycle of input signal.

If I_c is the peak value of collector current the average value of collector current for half cycle is

$$(I_c)_{dc} = \frac{I_c}{\pi}$$

$$(P_{in})_{ac} = \frac{E_{cc} I_c}{\pi}$$

for the output signal in half cycle the peak current is I_c and the peak voltage is E_{cc} therefore for half cycle rms

$$\text{current} = \frac{I_c}{2} \text{ and}$$

$$\text{rms voltage} = \frac{E_{cc}}{2}$$

$$P_{(out)ac} = (E_{cc})_{rms} \times (I_c)_{rms}$$

$$= \frac{E_{cc}}{2} \times \frac{I_c}{2}$$

$$= \frac{E_{cc} I_c}{4}$$

Hence maximum collector efficiency

$$\eta = \frac{P_{(out)ac}}{P_{in dc}}$$

$$\eta = \frac{\frac{1}{4} E_{cc} I_c}{\frac{1}{\pi} E_{cc} I_c}$$

$$= \frac{\pi}{4} \text{ (or } 78.5\% \text{ nearly)}$$