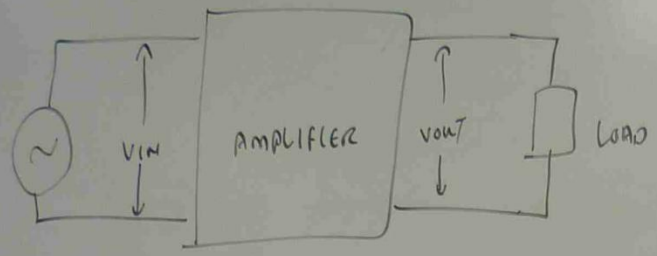
IN PUT

OUTPUT.



IN PUT AND OUT PUT CONNECTION TO AMPLIFIER.

GAIN

AN AMPLIFIER CAN PRODUCE A GAIN IN THE SIGNAL VOLTAGE, CURRENT AND POWER

$$A_V = \frac{V_{OUT}}{V_{IN}}$$

A_V = VOLTAGE GAIN

V_{IN} = INPUT VOLTAGE

V_{OUT} = OUTPUT VOLTAGE

$$A_I = \frac{I_{OUT}}{I_{IN}}$$

$$A_P = \frac{P_{OUT}}{P_{IN}}$$

GAIN IN d.B (DECIBEL) UNIT

POWER GAIN IN dB

$$dB = 10 \log \frac{P_{OUT}}{P_{IN}}$$

VOLTAGE GAIN IN dB

$$dB = 20 \log \frac{V_{OUT}}{V_{IN}}$$

CURRENT GAIN IN dB

$$dB = 20 \log \frac{I_{OUT}}{I_{IN}}$$

Ph AN AMPLIFIER DEVELOPS 10W FOR AN INPUT POWER OF 1mW CALCULATE THE POWER GAIN OF AMPLIFIER IN dB.

$$dB = 10 \log \frac{P_{OUT}}{P_{IN}} = 10 \log \frac{10}{1 \times 10^{-3}} = 10 \log 10 \times 10^{3}$$

$$= 10 \log 10^{4} = 10 \times 4 \log 10 = 40 \text{ dB}$$

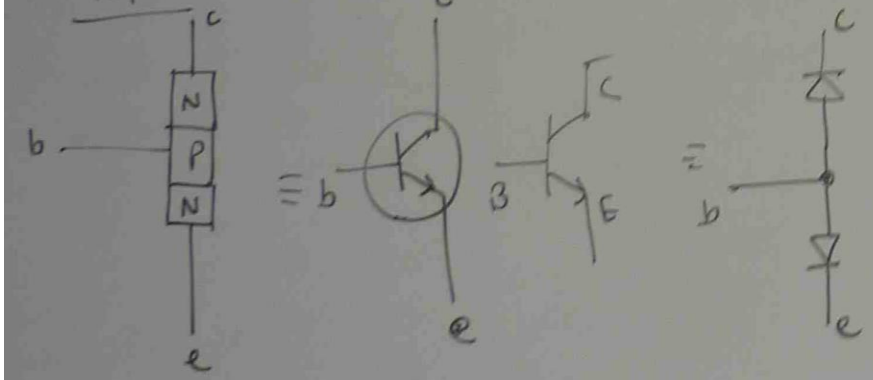
Ph AN AMPLIFIER FED WITH 50mV SIGNAL PRODUCES A 2V OUTPUT. CALCULATHE THE GAIN.

$$A_V = \frac{V_{OUT}}{V_{IN}} = \frac{2}{50 \times 10^{-3}} = \frac{2000}{50} = 40$$

BIPOLAR JUNCTION TRANSISTORS

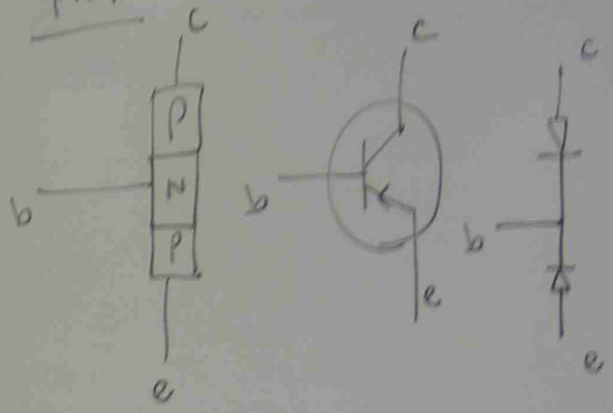
BJT- BIPLOR JUNCTION TRANSISTOR

NPN

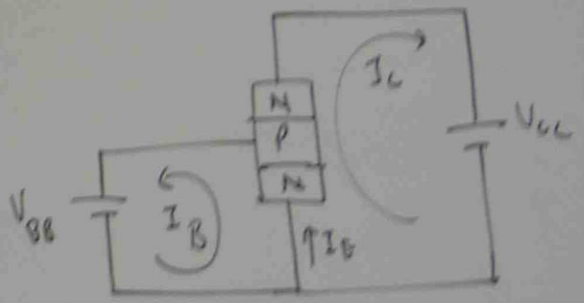


CONSTRUCTION

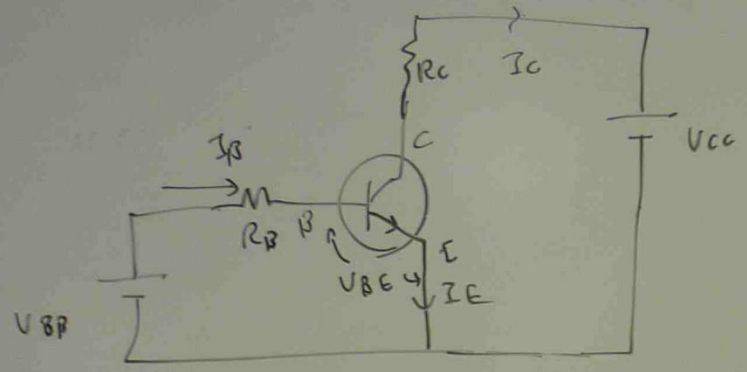
PNP



TRANSISTOR OPERATION



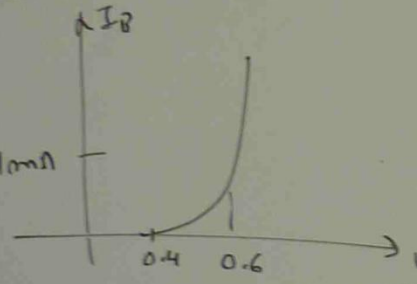
$$I_E = I_C + I_B$$

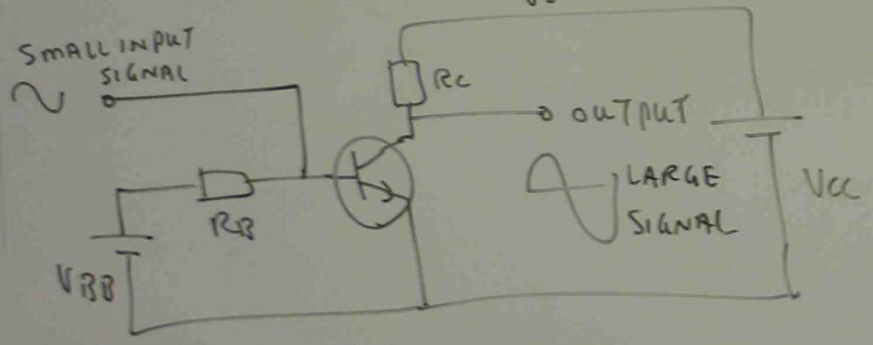


$$\alpha = \frac{I_C}{I_E}$$

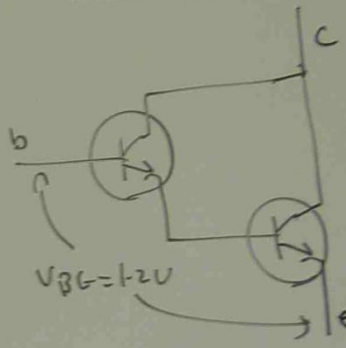
$$\beta = \frac{I_C}{I_B}$$

TRANSISTOR BIASING DIAGRAM

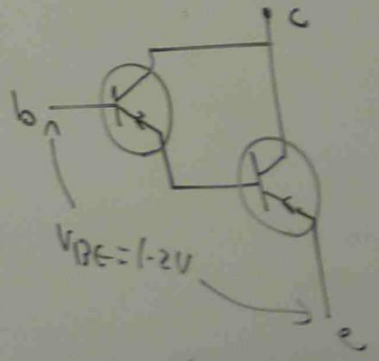




DARLINGTON PAIR



NPN DARLINGTON PAIR



PNP DARLINGTON PAIR

CLASS A

- THIS TYPE OF AMPLIFIER PRODUCES AN OUTPUT OVER THE FULL CYCLE 360° OF INPUT CYCLE

CLASS B

PRODUCE AN OUTPUT FOR ONLY ½ OF INPUT CYCLE 180°

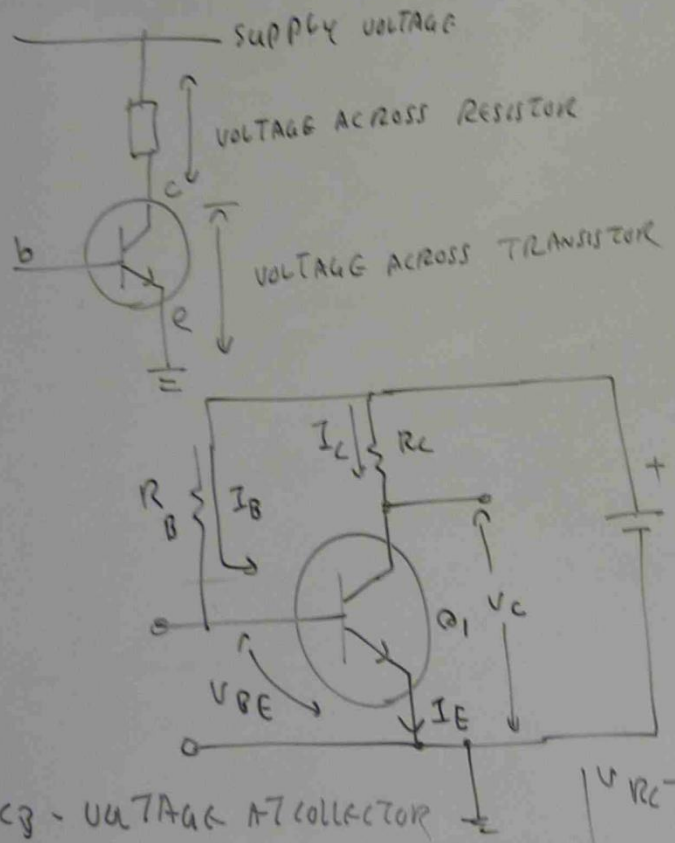
CLASS A B

THIS TYPE COMPARISE BETWEEN CLASS A & B

CLASS C

THE TRANSISTOR CONDUCTS FOR LESS THAN 180° OF INPUT WAVE FORM.

TRANSISTOR BIASING CIRCUITS



V_{CB} - VOLTAGE AT COLLECTOR RESPECT TO BASE

V_{BE} - VOLTAGE AT BASE RESPECT TO EMITTER

V_{RE} - VOLTAGE ACROSS EMITTER RESISTOR

V_{RB} - VOLTAGE ACROSS BASE RESISTOR

V_{CC} - SUPPLY VOLTAGE

V_{RC} - VOLTAGE ACROSS COLLECTOR RESISTOR

V_{BE} - VOLTAGE ACROSS BASE RESPECT TO EMITTER

I_C - COLLECTOR CURRENT

I_B - BASE CURRENT

I_E - EMITTER CURRENT.

$$I_B = \frac{V_C - 0.6}{R_B}$$

$$I_C = \beta I_B$$

$$I_E = I_C$$

$V_E = 0\ V$

$V_B = 0.6\ V$

$$V_C = V_{CC} - I_C R_C$$