ADE - Assignment - 1

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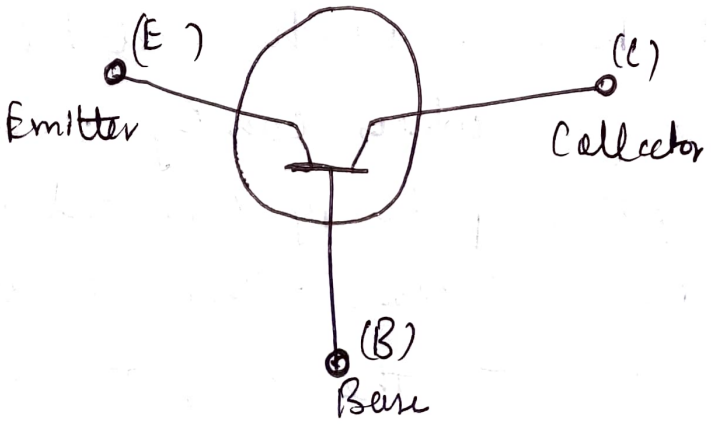
1) Explain the operations of PNP transistor.

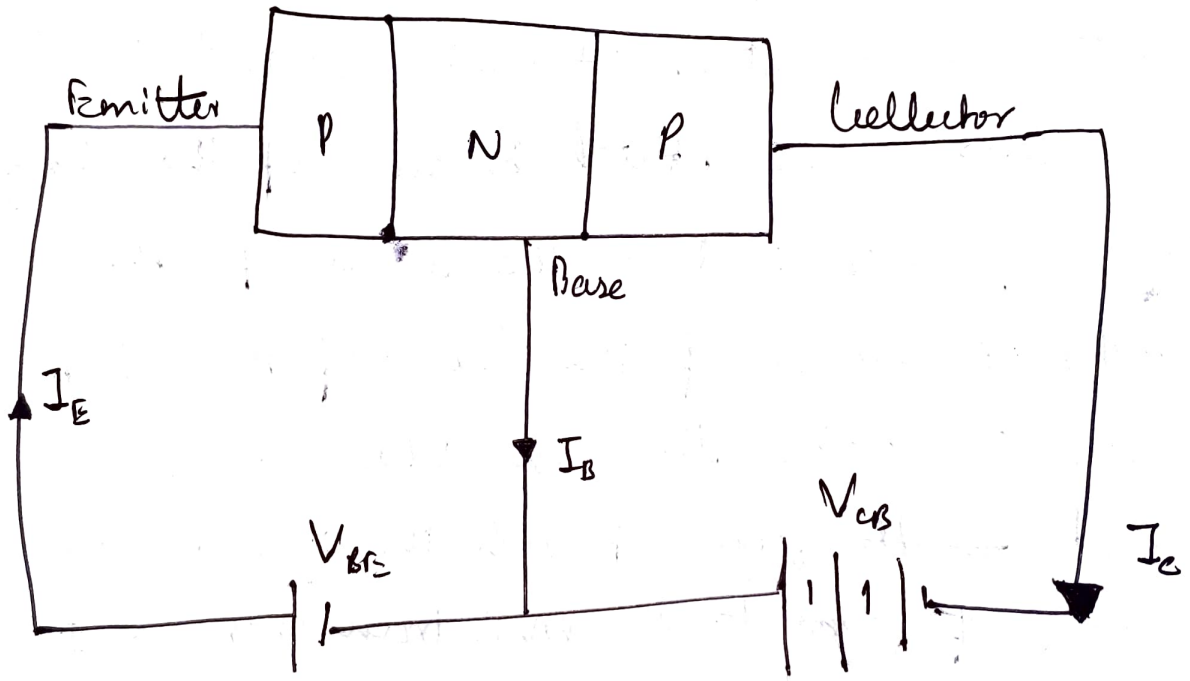
The transistor in which one n-type material is sloped with two p-type material such type of transistors is known as PNP transistors.

It is a current controlled device. The small amount of base current controlled both the emitter and collector current. The holes in the majority carriers of the PNP transistors which constitute the current in it. This current inside the transistor is constituted because of the charging position of holes and in the leads of the transistor is because of the flow of the electrons. The PNP transistors turns on where a small current ~~small~~ flows through the base. The direction of current in PNP transistor is from emitter to collector.



Working

The emitter base junction is connected in forward biased due to which the emitter pushes the holes in the base region. These holes constitute the emitter current. When these electron move into N- type semiconductor material or base, they combine with the electrons and the remaining are moved towards the collector space charge layer. Hence develops the base current.



The collector base region is connected in reverse biased. The holes which collected around the depletion region when coming under the impact of negative polarity collected or attracted by the collector. This develops the collector current. The complete emitter

circuit flows through the collector current I_C.

$$\boxed{I_E = I_B + I_C}$$

(2) $\alpha = \frac{I_C}{I_E}$ $\quad \beta = \frac{I_C}{I_B}$

$$\alpha = \frac{\beta}{\beta+1} \Rightarrow \alpha = \frac{49}{49+1} = \frac{49}{50} = 0.8$$

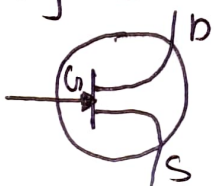
$$I_C = \left(\frac{\beta}{\beta+1}\right) I_E \Rightarrow I_C = \alpha \cdot I_E = 0.8 \times 3mA$$

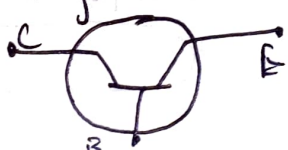
$$= 0.8 \times 3 \times 10^{-3} A$$

$$= 2.4mA.$$

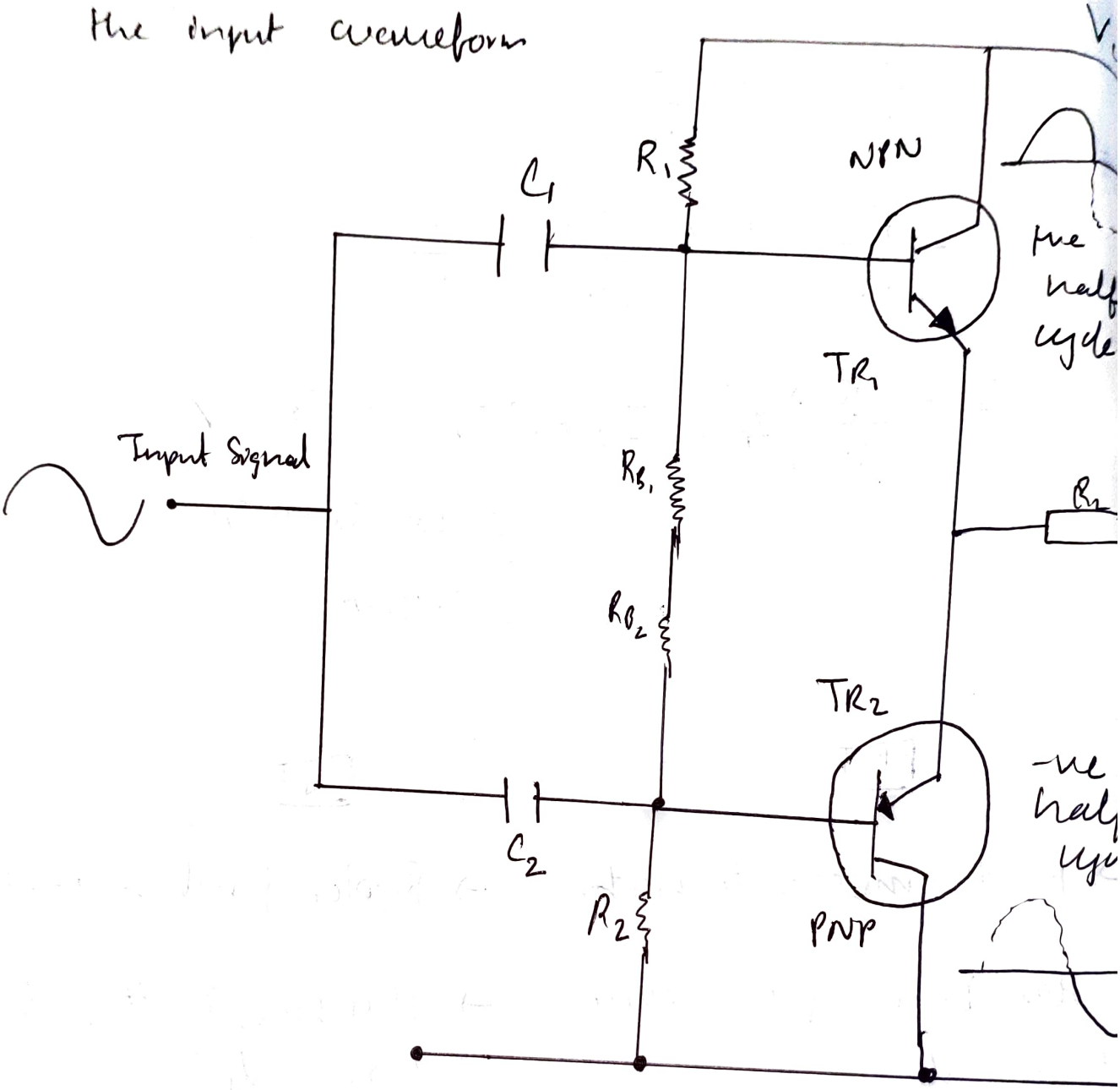
(3)

FET	BJT
→ Field emission transistor	→ Bipolar junction transistor
→ Has Drain, gate, source terminals	→ Has base, emitter, collector terminals
→ Classified as N-type or P-type channel	→ Classified as NPN, PNP transistor
→ Conduction only through the majority charge carriers.	→ Conduction through majority and minority charge carriers

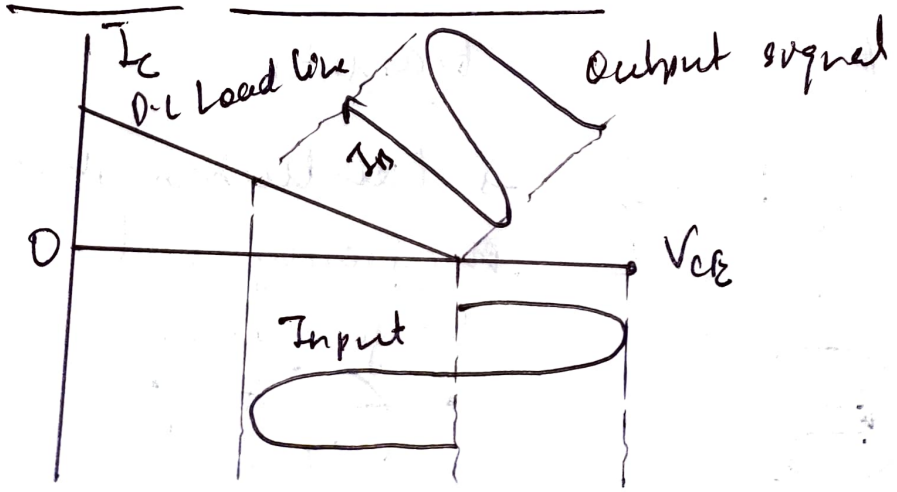




(4) Class B amplifiers use two or more transistors biased in such a way so that each transistor only conducts during one half cycle of the input waveform

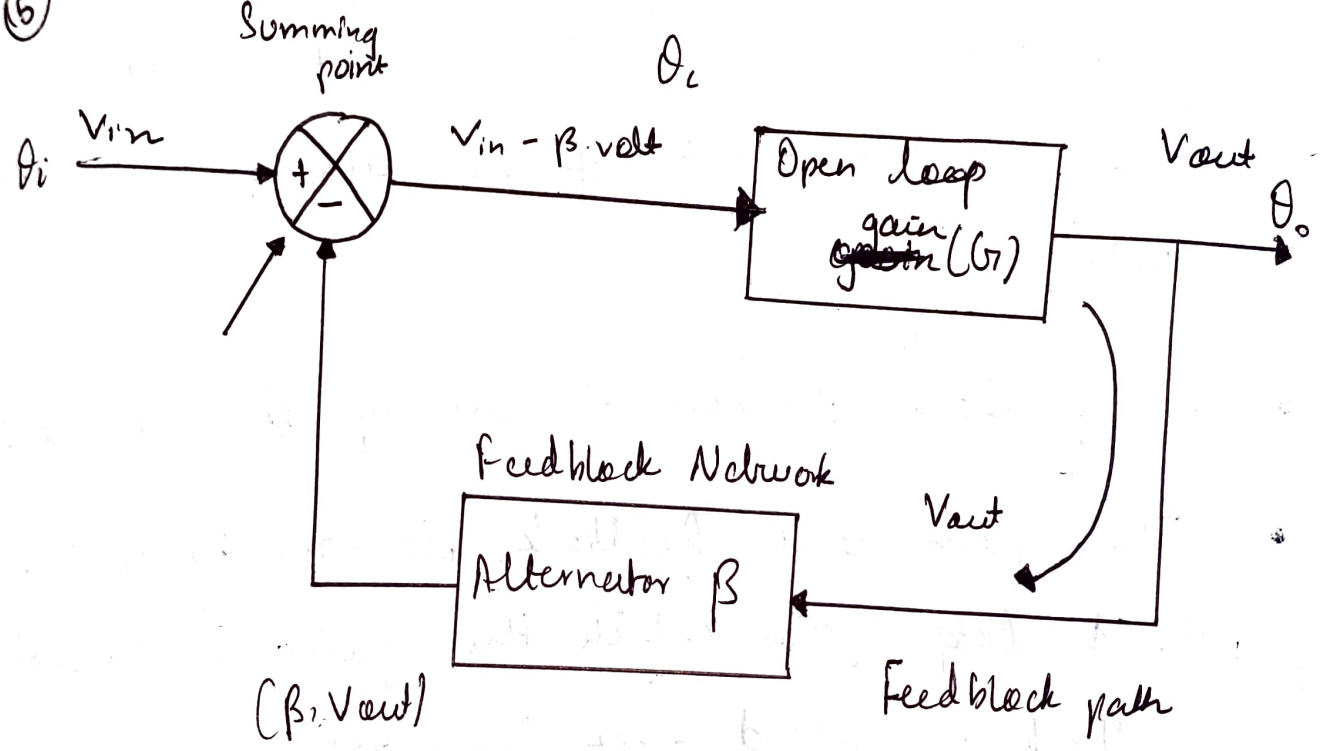


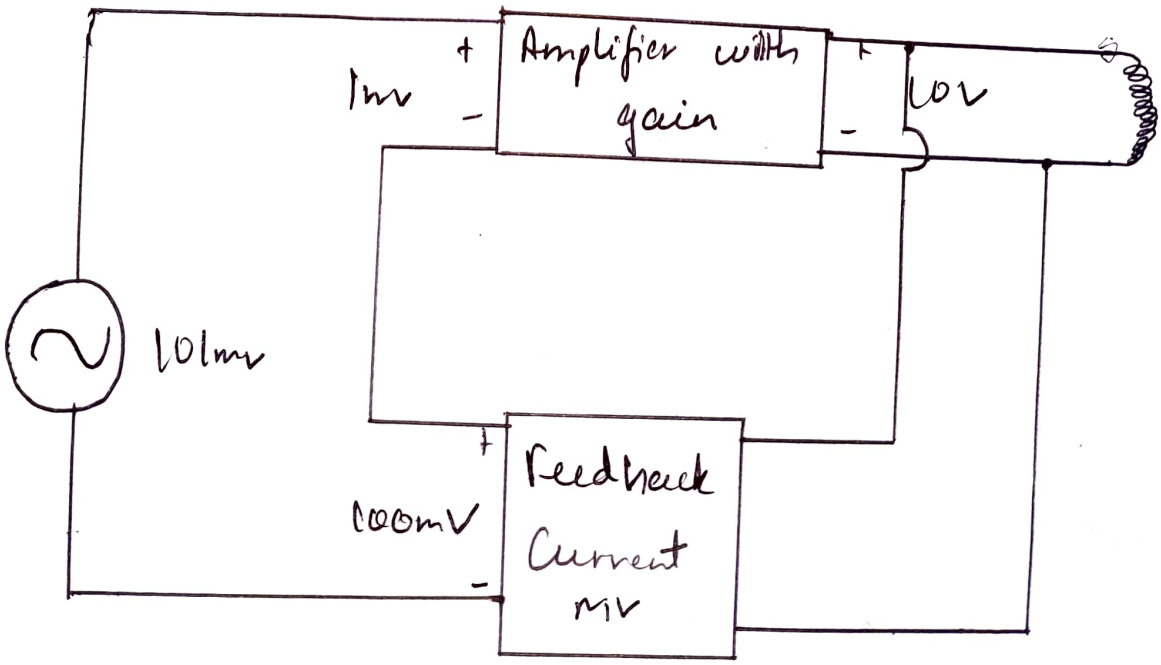
Output Characteristics



The class B amplifier has a big advantage over their class A amplifier counter in that no current flows through the transistors when they are in their quiescent state, therefore no power is dissipated in the output transistors or transformer when there is no signal present unlike class A amplifier.

(5)





- When negative voltage feedback is applied, the gain of the amplifier is reduced. Thus, the gain of above amplifier without feedback is 10,000 whereas with -ve feedback it is only 100.
- When -ve voltage feedback is applied to the amplifier is extremely small. In this case the signal voltage is 101mV and the -ve feedback is 1000mV so that voltage applied at the input of the amplifier is only 1mV.
- The feedback fraction is always less than 1.
- The gain with feedback is sometimes called closed loop gain while the gain without feedback is called open loop gain.