

Analog and Digital Systems (UEE505)

Lecture #2 Transistor Biasing Circuits-I



THAPAR INSTITUTE
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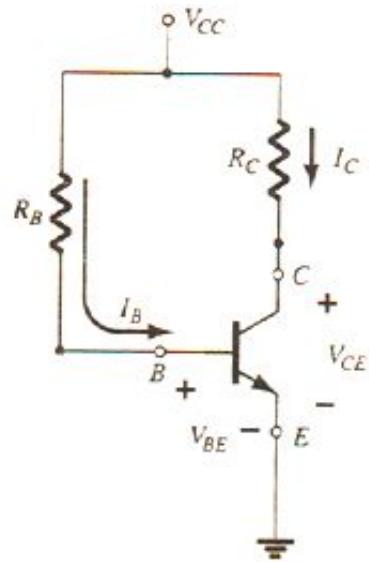
Dept. Of Electrical & Instrumentation Engineering
Thapar Institute of Engineering & Technology Patiala, India

Biassing Circuits

- Fixed Bias Circuit
 - Collector to Base Bias circuit
 - Emitter Stabilized Bias Circuit
 - Voltage Divider Bias Circuit
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- **Transistor Saturation :** *DC collector current must be less than saturated collector current to avoid the transistor saturation.*

Fixed Bias Circuit

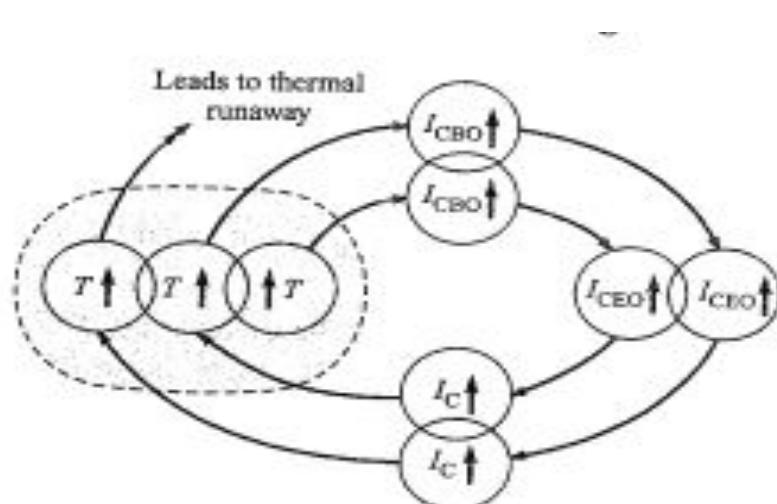
Analysis : Apply KVL to the input as well as to output circuit



Transistor Saturation Current :

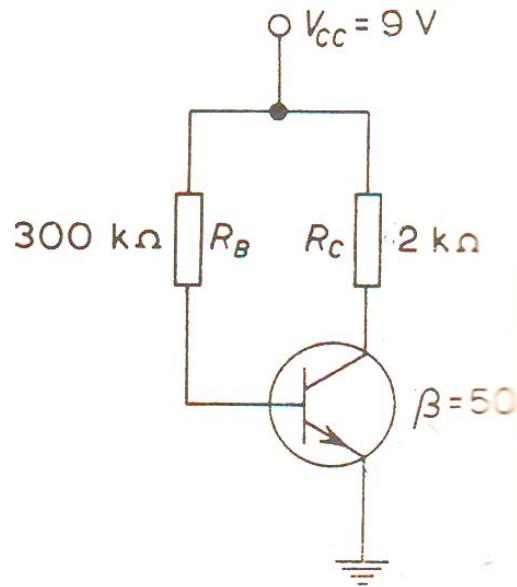
Fixed Bias Circuit

- **Advantage:** Simple circuit
- **Disadvantage:** Poor Stabilization & Good chances of Thermal runaway.

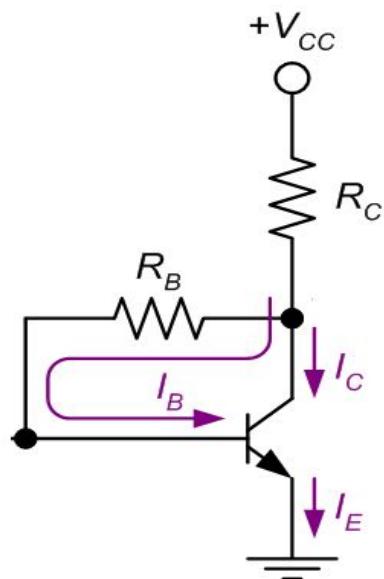


Example

- Determine the operating point for following circuit:



Collector to Base Bias circuit

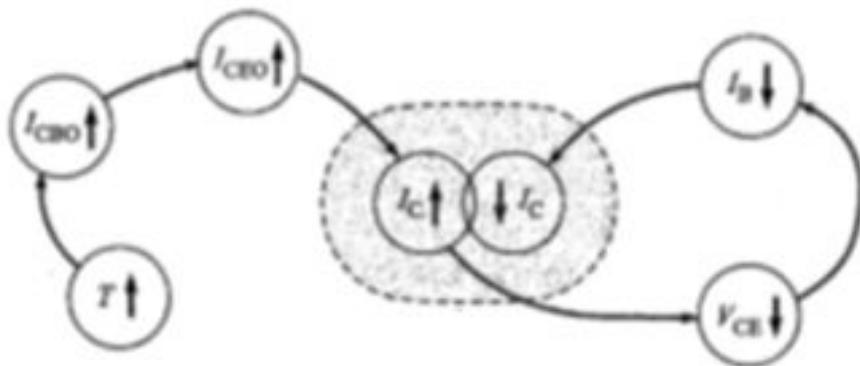


Analysis : Apply KVL to the input as well as to output circuit

Transistor Saturation Current:

Collector to Base Bias circuit

- **Advantage:** Tendency to stabilize the Q point



- **Disadvantage:** Base resistor provide ac feedback due to which voltage gain of amplifier decreases.

Example

- Determine the value of emitter current and collector emitter voltage for the given circuit .Take $R_C = 500\text{ohm}$, $R_B = 500\text{kohm}$, $V_{CC} = 10 \text{ V}$, $\beta = 100$.

References

- Boylestad R. L., Electronic Devices and Circuit Theory, Pearson Education.
- *NN Bhargava, DC Kulshreshtha and SC Gupta, Basic Electronics and Linear Circuits*, McGraw Hills.