

# Analog and Digital Systems (UEE505)

## Lecture #2 Transistor Biasing Circuits-I



THAPAR INSTITUTE  
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(Deemed to be University)

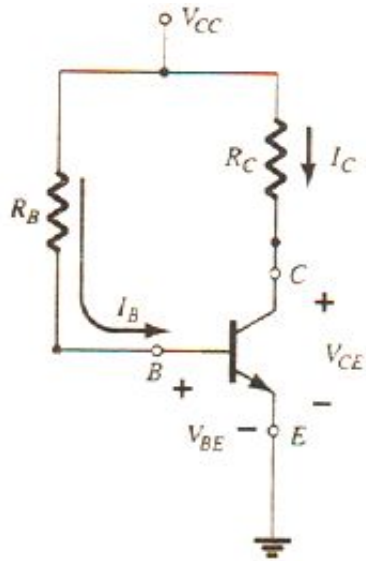
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# Biasing Circuits

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

# Fixed Bias Circuit

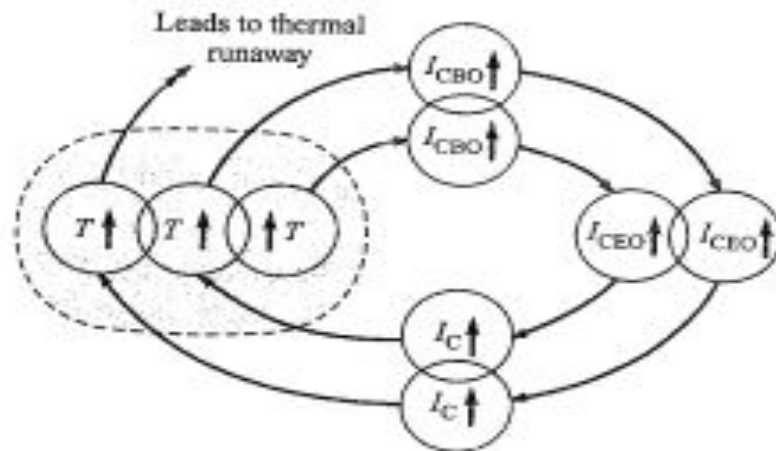
Analysis : Apply KVL to the input as well as to output circuit



**Transistor Saturation Current :**

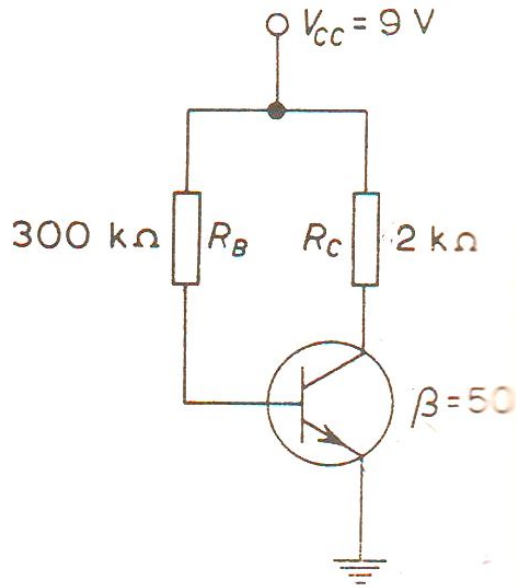
# Fixed Bias Circuit

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

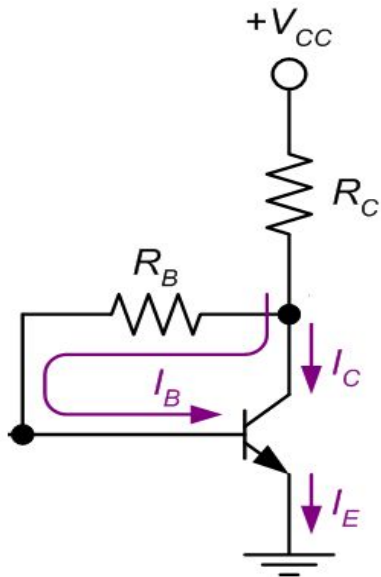


# Example

- Determine the operating point for following circuit:



# Collector to Base Bias circuit

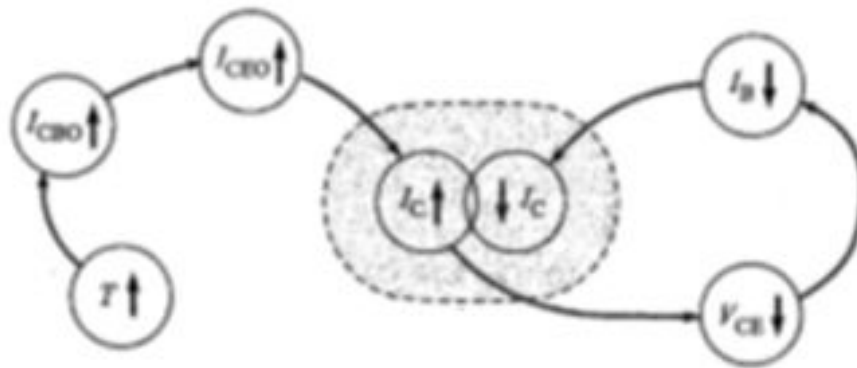


**Analysis : Apply KVL to the input as well as to output circuit**

**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.*