ELECTRONICS DEVICES AND CIRCUITS

SECTION - C

TRANSISTORS

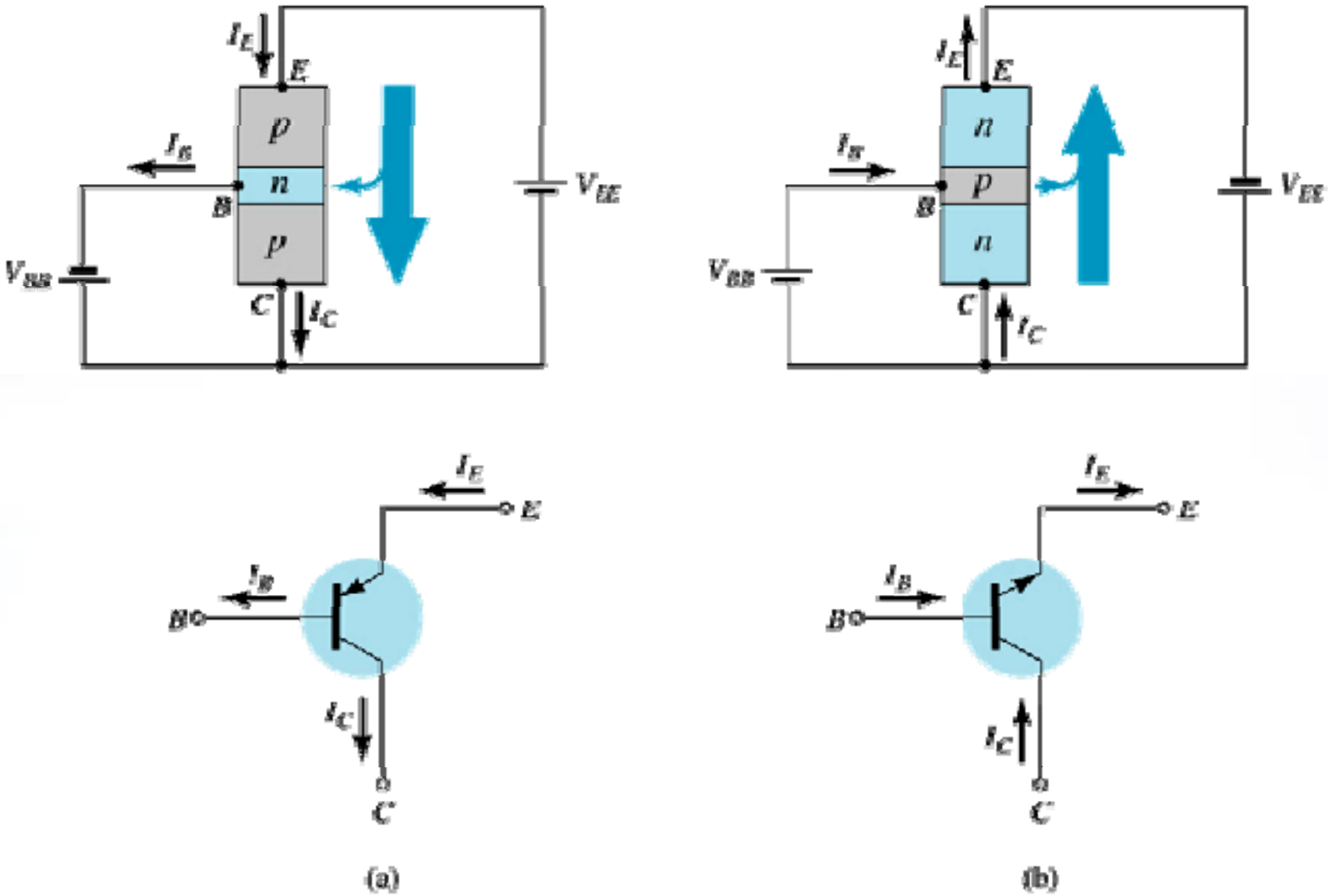
OBJECTIVE

BJT

CC Configuration

Common – Collector Configuration

- Also called emitter-follower (EF).
- It is called common-emitter configuration since both the signal source and the load share the collector terminal as a common connection point.
- The output voltage is obtained at emitter terminal.
- The input characteristic of common-collector configuration is similar with common-emitter. configuration.
- Common-collector circuit configuration is provided with the load resistor connected from emitter to ground.
- It is used primarily for impedance-matching purpose since it has high input impedance and low output impedance.



Notation and symbols used with the common-collector configuration: (a) pnp transistor ; (b) npn transistor.

- **For the common-collector configuration, the output characteristics are a plot of I_E vs V_{CE} for a range of values of I_B.**

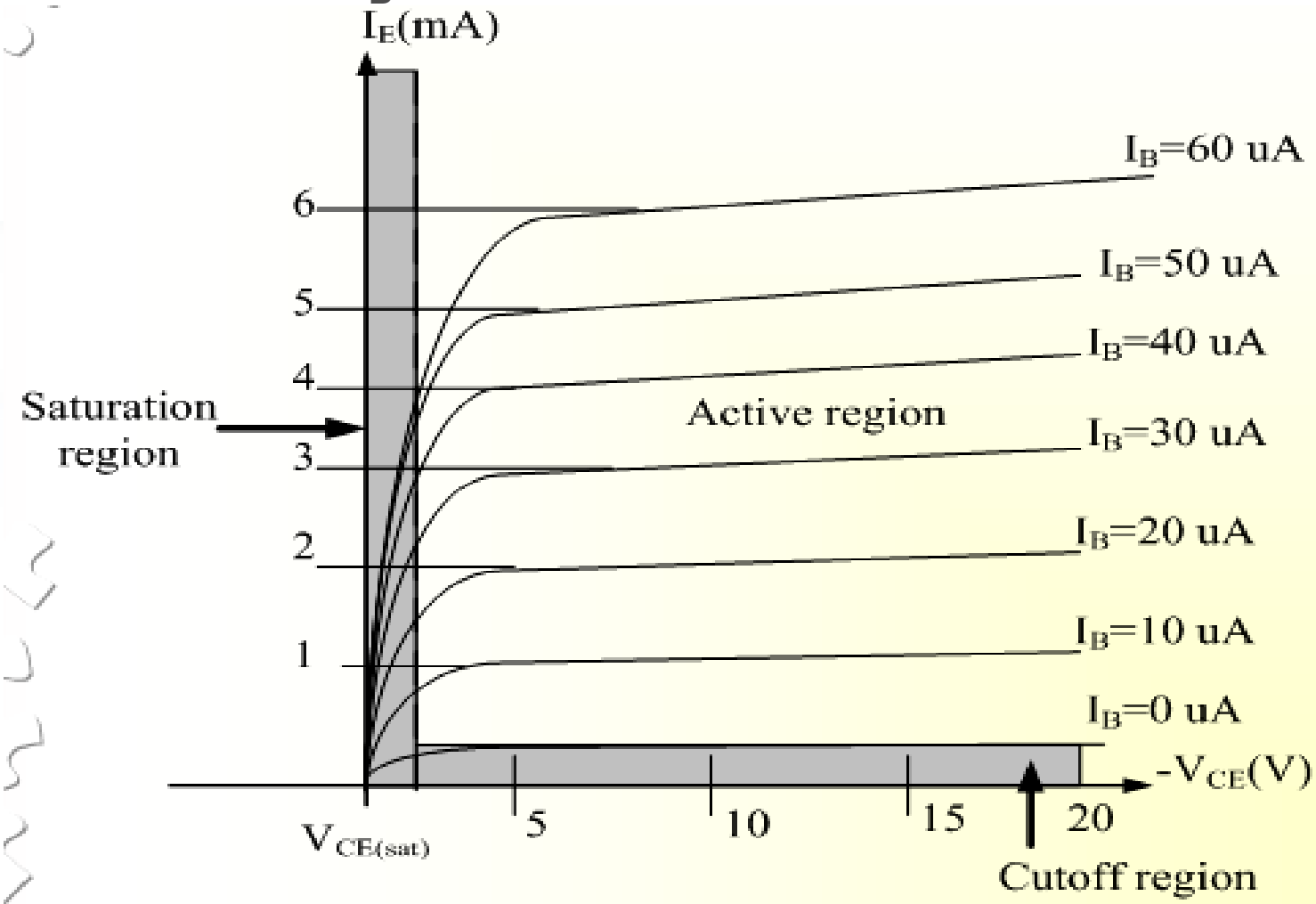


Fig 4.9 : Output characteristic in CC configuration for npn transistor

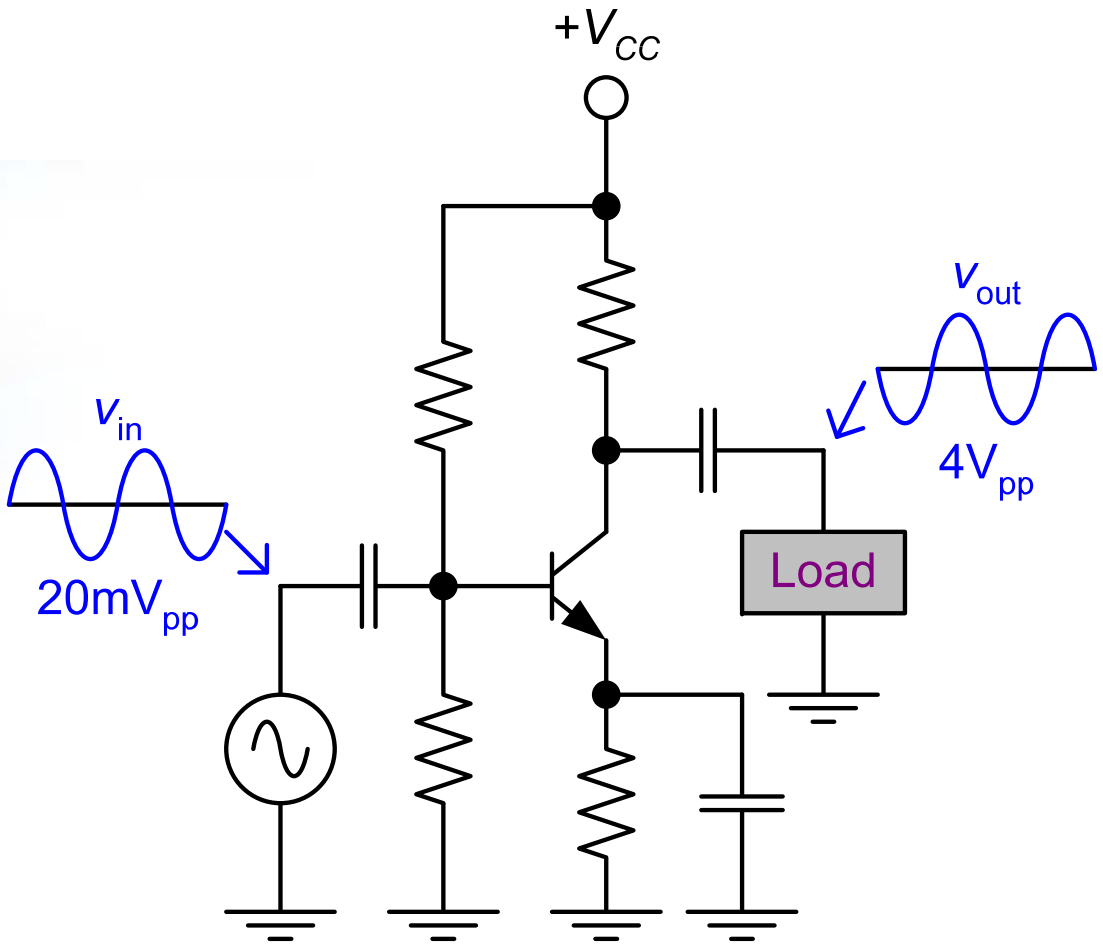
BJT Amplifier Configurations

- Common-emitter (CE) amplifier
- Common-collector (CC) amplifier
- Common-base (CB) amplifier

Property ranges.

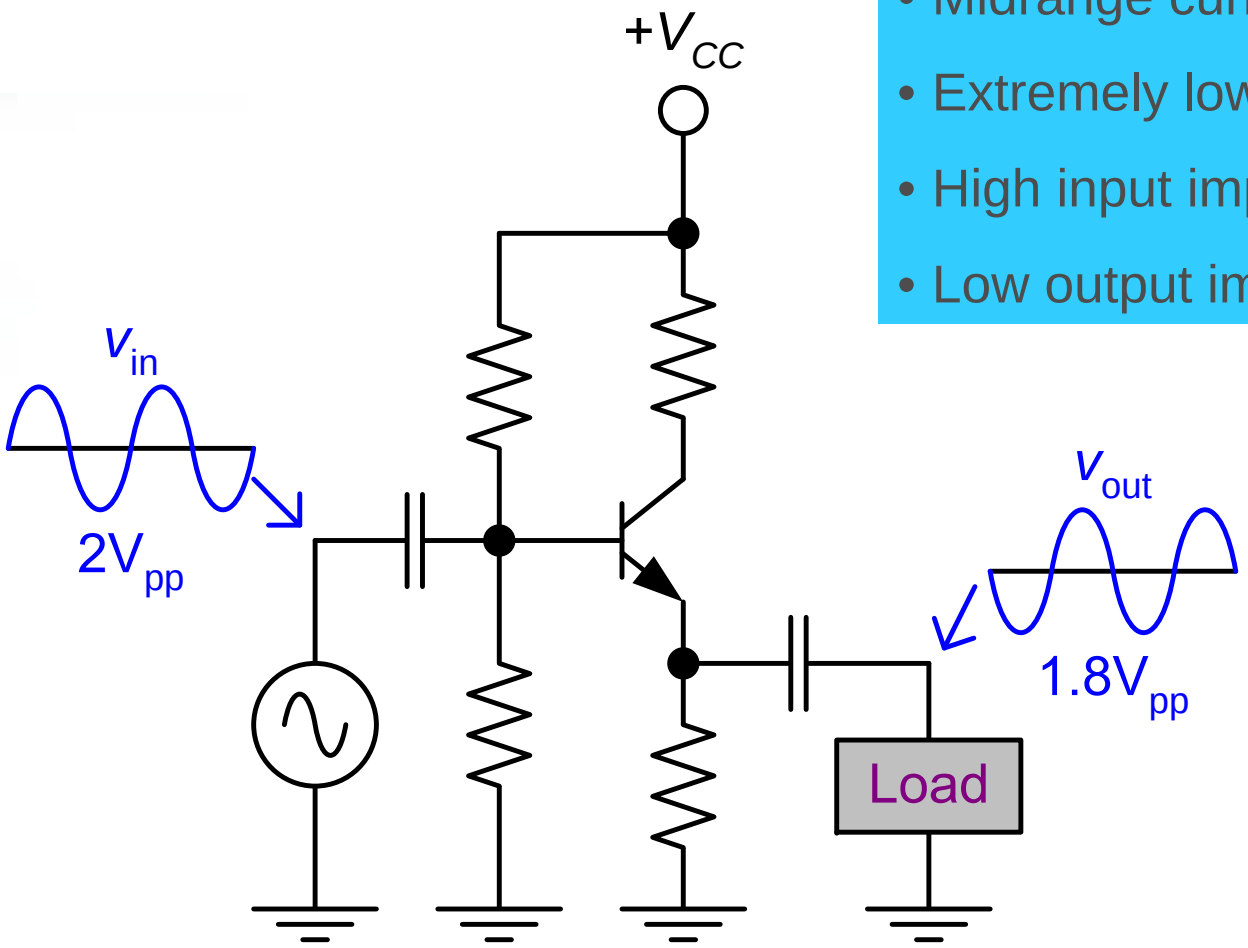
Property	Low	Midrange	High
Gain	< 100	100-1000	>1000
Impedance	<1kΩ	1kΩ-10kΩ	>10kΩ

Common-emitter (CE) amplifier.



- Midrange values of voltage and current gain.
- High power gain
- Midrange input impedance
- Midrange output impedance

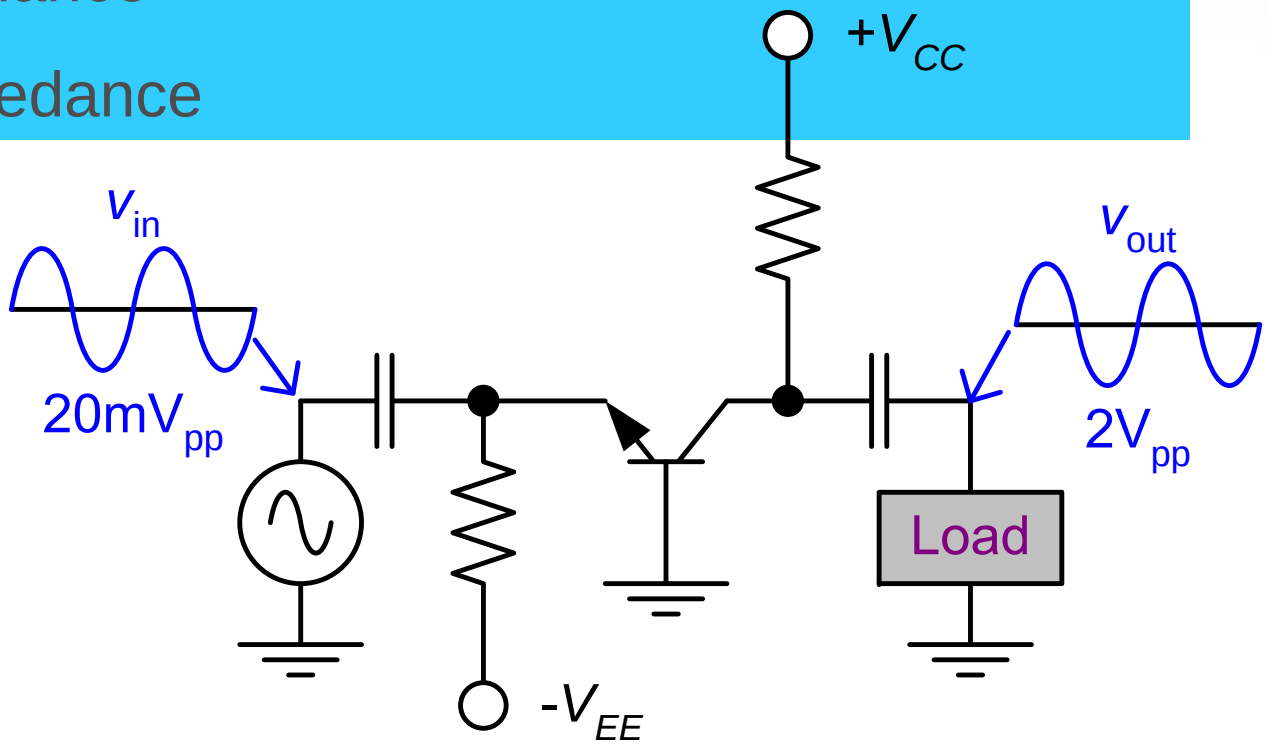
Common-collector (CC) amplifier.



- Midrange current gain.
- Extremely low voltage gain
- High input impedance
- Low output impedance

Common-base (CB) amplifier.

- Midrange voltage gain
- Extremely low current gain (slightly less than 1)
- Low input impedance
- High output impedance



A comparison of CE, CC, and CB circuit characteristics.

Type	A_v	A_i	A_p	Z_{in}	Z_{out}
CE	Midrange	Midrange	High	Midrange	Midrange
CC	< 1	Midrange	$\cong A_i$	High	Low
CB	Midrange	< 1	$\cong A_v$	Low	High

$$\left(A_p = A_v A_i\right)$$

BJT Terminal Connections

Type	Emitter	Base	Collector
CE	Common	Input	Output
CC	Output	Input	Common
CB	Input	Common	Output