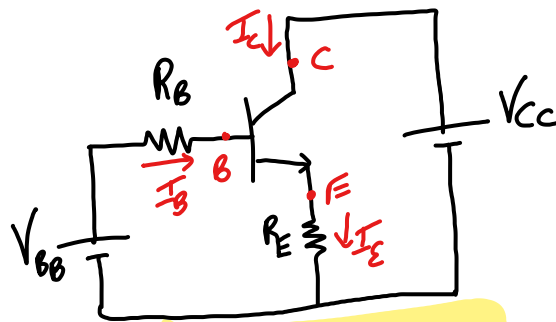
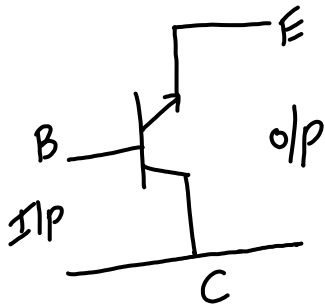


# Common Collector configuration

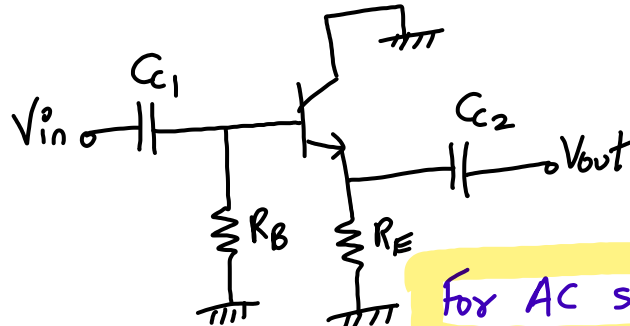
12/11/23



B-E  $J^n$  is F.B  
B-C  $J^n$  is R.B

For DC signal

I/P side	O/P side
$I_B$	$I_E$
$V_{CB}$	$V_{CE}$
I/P chr	O/P chr
$V_{CB}$ vs $I_B$	$V_{CE}$ vs $I_E$



For AC signal

① Input characteristics ( $V_{CB}$  vs  $I_B$ )  
@  $V_{CE}$  constant

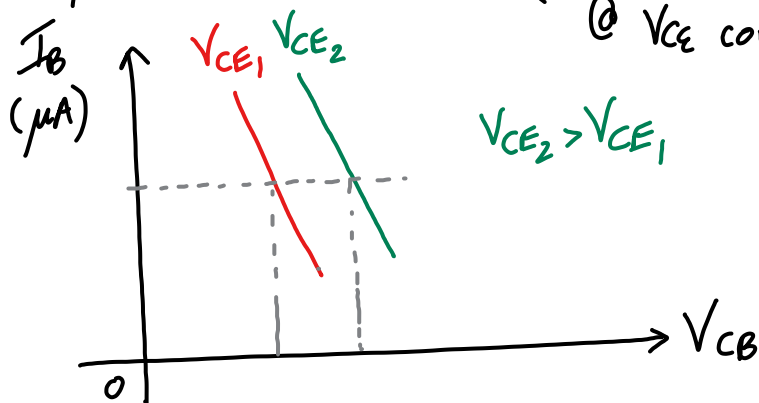


fig 2: Input characteristics of npn bjt in CC configuration

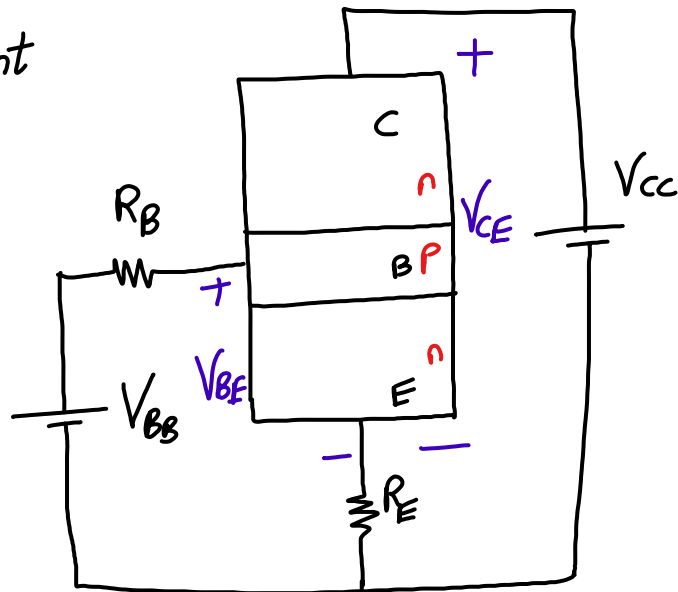


fig 1

② As  $V_{CB}$  ↑ ses →  $I_B$  ↓ ses ? why ?

a)  $V_{CE} = V_{CB} + \frac{V_{BE}}{L_{fixed}}$

DL - Depletion layer

b) As  $V_{CE}$  ↑ ses →  $V_{CB}$  ↑ ses

c) As  $V_{CB}$  ↑ ses → width of BC DL ↑ ses → effective base width reduces

d) i.e. Probability of recombination of EHP in base reduces  
↓  
(e<sup>-</sup>-hole pair)

e) i.e.  $I_B$  ↓ses

i.e. As  $V_{CB}$  ↑ses →  $I_B$  ↓ses

③ For fixed value of  $V_{CB}$  ;  $V_{CE} = \underbrace{V_{CB}}_{\text{fixed}} + V_{BE}$

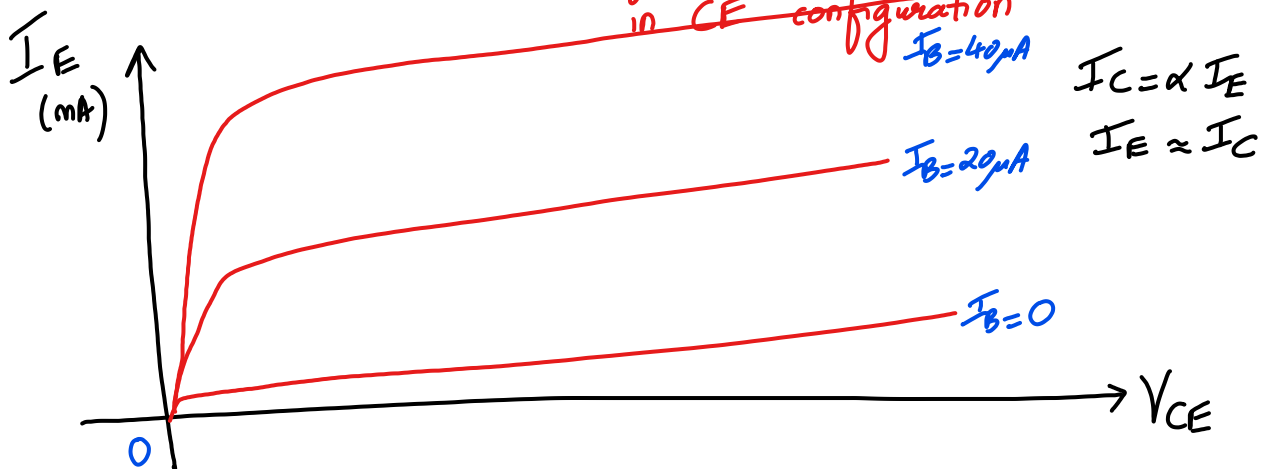
i.e. As  $V_{CE}$  ↑ses →  $V_{BE}$  ↑ → more e<sup>-</sup>s pushed towards base region by emitter

↓  
i.e.  $I_B$  ↑ses

④  $\frac{I_E}{I_B} = \gamma \rightarrow \text{gamma}$   
o/p current  
I/p current

⑤ O/p characteristics ( $I_C$  vs  $V_{CE}$  |  $I_B$  constant)

→ It is similar to o/p characteristics of npn bjt in CE configuration



⑥  $I_E = I_C + I_B$  ;  $\gamma = \frac{I_E}{I_B}$  ;  $I_C \approx \beta I_B$

$$\gamma = \frac{I_C + I_B}{I_B}$$

$$\text{i.e. } \delta = \frac{I_c}{I_b} + 1 \approx \beta + 1$$

$$\text{i.e. } \boxed{\delta = 1 + \beta}$$

$$\text{Also, } \delta = \frac{\alpha}{1 - \alpha} + 1 = \frac{1}{1 - \alpha}$$

$$\text{i.e. } \delta = 1 + \beta = \frac{1}{1 - \alpha}$$

⑦ Common collector properties:

- ① High input resistance
- ② Low output resistance
- ③ High current gain ( $= 1 + \beta$ )
- ④ Low voltage gain ( $\approx 1$ )
- ⑤ Low power gain

— x —



















