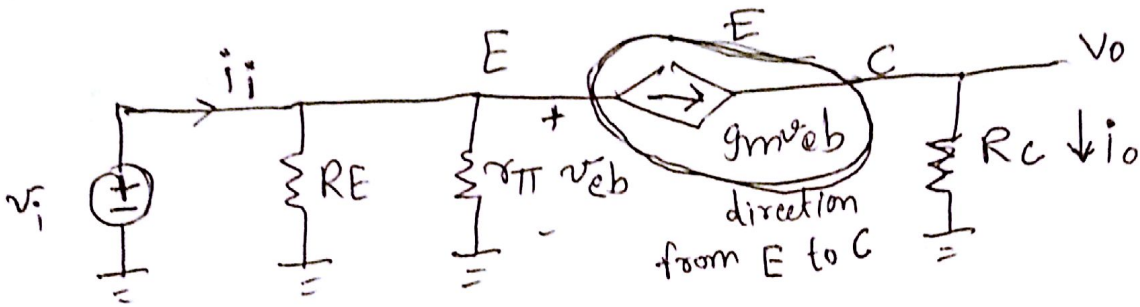
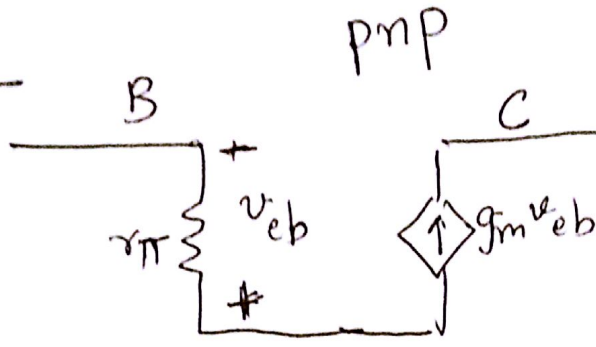
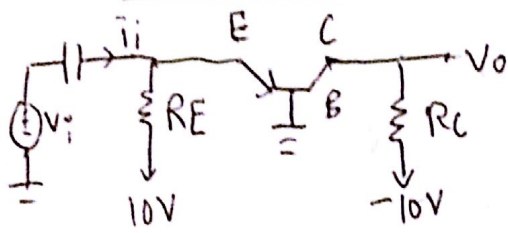


* CB Configuration



$$i_o = \frac{v_o}{R_C}, \quad g_m v_{eb} = i_o$$

$$v_i = v_{eb}, \quad i_i - g_m v_{eb} = \frac{v_{eb}}{(r_{\pi} \parallel R_E)}$$

$$i_i = v_{eb} \left[\frac{1}{(R_E \parallel r_{\pi})} + g_m \right]$$

$$= \frac{i_o}{g_m} \left[\frac{1}{R_E \parallel r_{\pi}} + g_m \right]$$

$$\frac{g_m}{\left(\frac{1}{R_E \parallel r_{\pi}} \right) + g_m} = \frac{i_o}{i_i} = A_i = \text{current gain}$$

generally $\frac{1}{R_E \parallel r_{\pi}} \ll g_m$

$$\Rightarrow A_i \approx g_m / g_m \approx 1$$

$$v_i = v_{eb} = \frac{i_o}{g_m} = \frac{g_m v_{eb}}{g_m} = \frac{v_o}{R_C g_m}$$

$$\Rightarrow \frac{v_o}{v_i} = g_m R_C$$

(+ve gain unlike CE configuration)