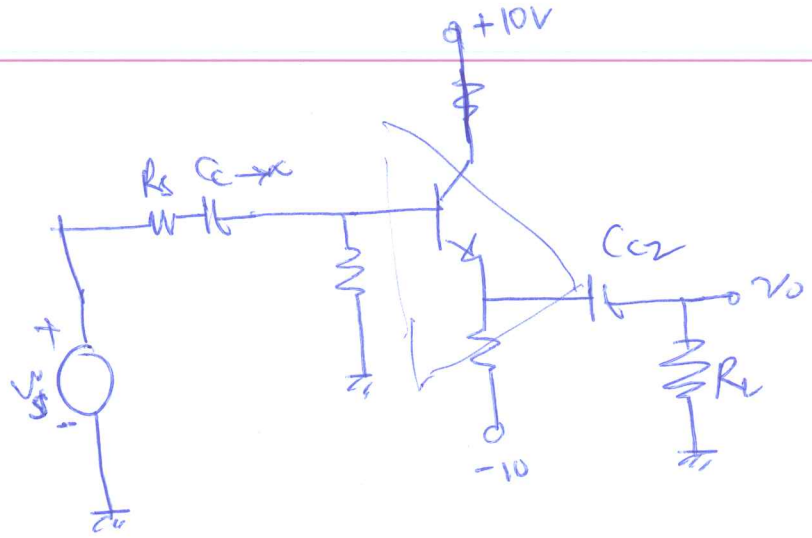
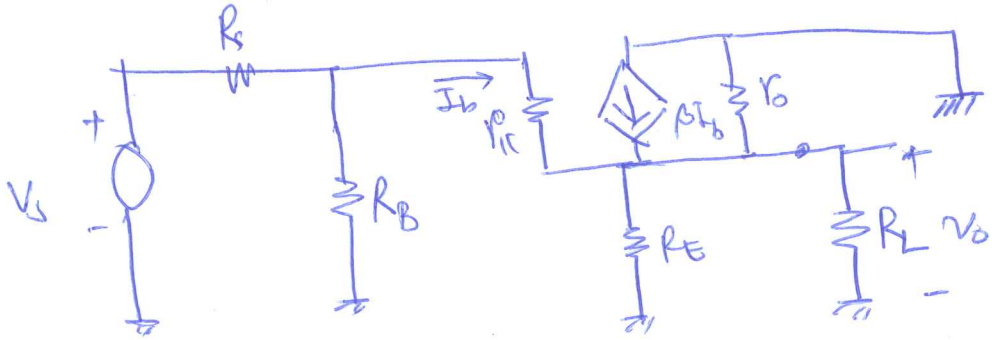
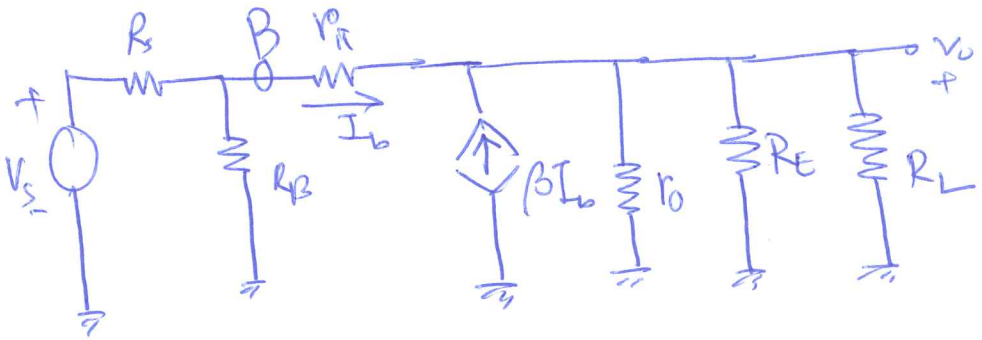
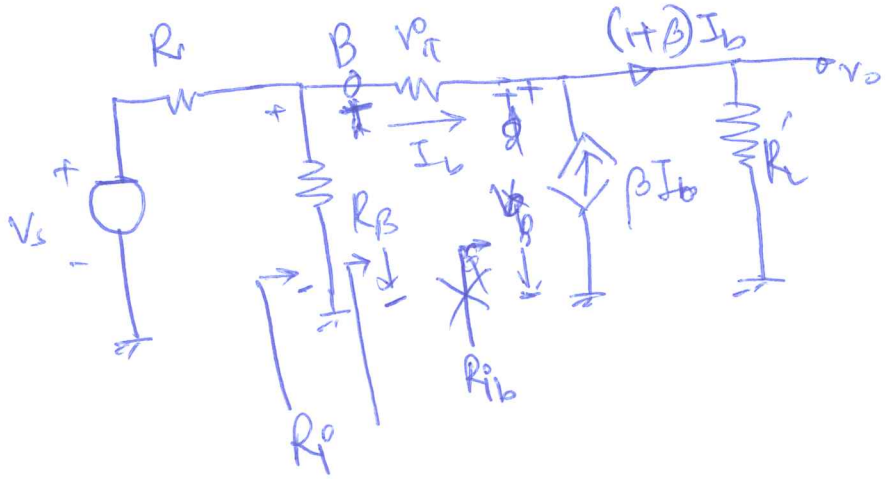
Emitter follower.



$$A_{V_s} = \left.\frac{V_o}{V_s}\right|_{max}$$







$$R_L' = r_o \| R_E \| R_L$$

$$A_{V_A} = \frac{v_o}{v_b}$$

$$v_o = (1+\beta) I_b R_L'$$

$$v_b = r_\pi I_b + (1+\beta) I_b R_L' = \left[r_\pi + (1+\beta) R_L' \right] I_b$$

$$\therefore A_{V_A} = \frac{v_o}{v_b} = \frac{(1+\beta) I_b R_L'}{\left[r_\pi + (1+\beta) R_L' \right] I_b} = \frac{(1+\beta) R_L'}{r_\pi + (1+\beta) R_L'}$$

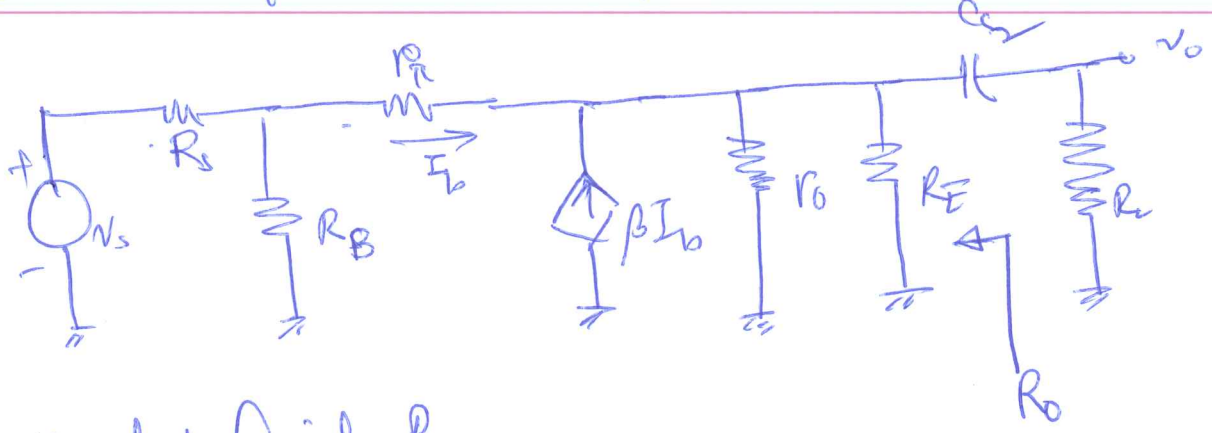
$$R_{ib} = \frac{v_b}{I_b} = r_\pi + (1+\beta) R_L' \longrightarrow$$

$$R_i = R_{ib} \| R_E$$

$$A_V = A_{V_A} \times \frac{v_b}{v_s} = A_{V_A} \times \frac{R_i}{R_i + R_s}$$

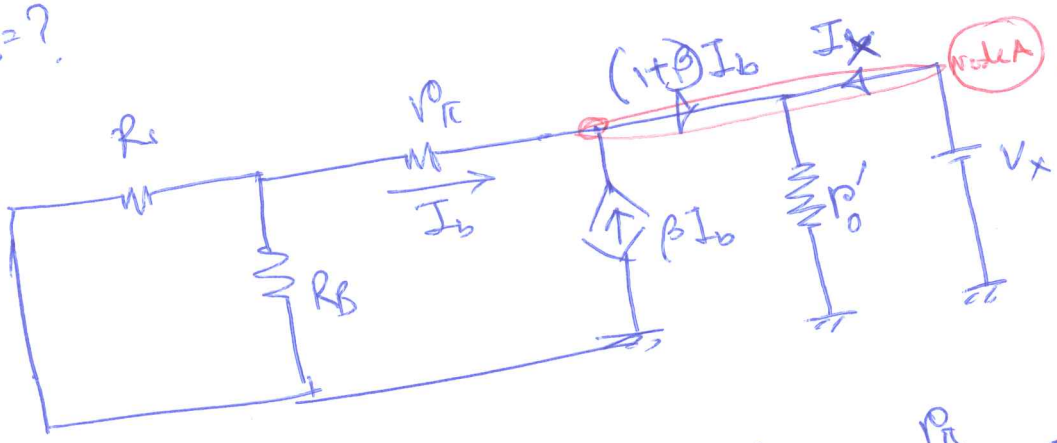
$$\therefore A_V = \frac{(1+\beta) R_L'}{r_\pi + (1+\beta) R_L'} \cdot \frac{R_i}{R_i + R_s} \longleftarrow$$

Effect of output Coupling Capacitor effect.

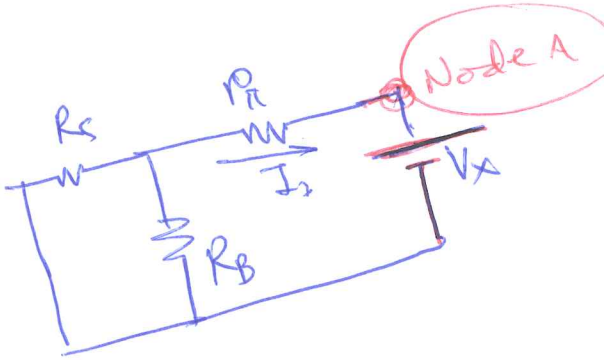


Need to find R_o

$R_o = ?$



$V_s = 0$



$$I_x = \frac{V_x}{r_o'} - (1+\beta) I_b$$

$$I_b = -\frac{V_x}{r_\pi + R_s \| R_B}$$

$$\therefore I_x = \frac{V_x}{r_o'} + \frac{(1+\beta) V_x}{r_\pi + R_s \| R_B}$$

$$\frac{1}{R_o} = \frac{I_x}{V_x} = \frac{1}{r_o'} + \frac{1}{\frac{r_\pi + R_s \| R_B}{(1+\beta)}}$$

$$\therefore \quad R_0 = r_o' \left\| \left(\frac{r_\pi + R_S \| R_B}{(1+\beta)} \right) \right.$$

$$= r_o \| R_E \left\| \left(\frac{r_\pi + R_S \| R_B}{(1+\beta)} \right) \right.$$

$$\therefore \quad \tau_s = [R_0 + R_L] C_{C_2}$$