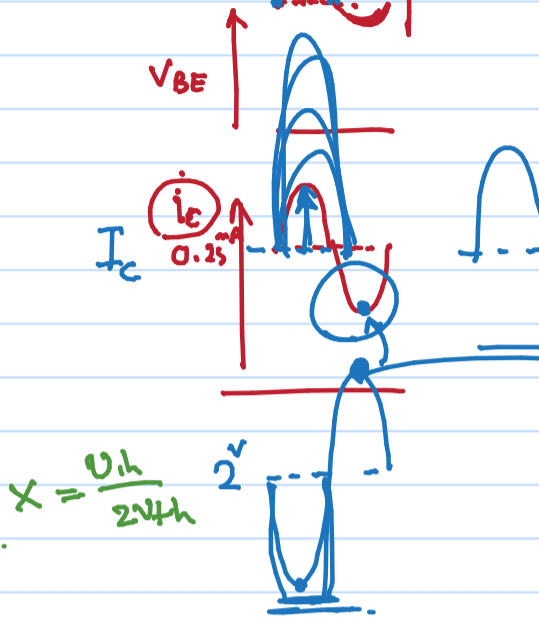
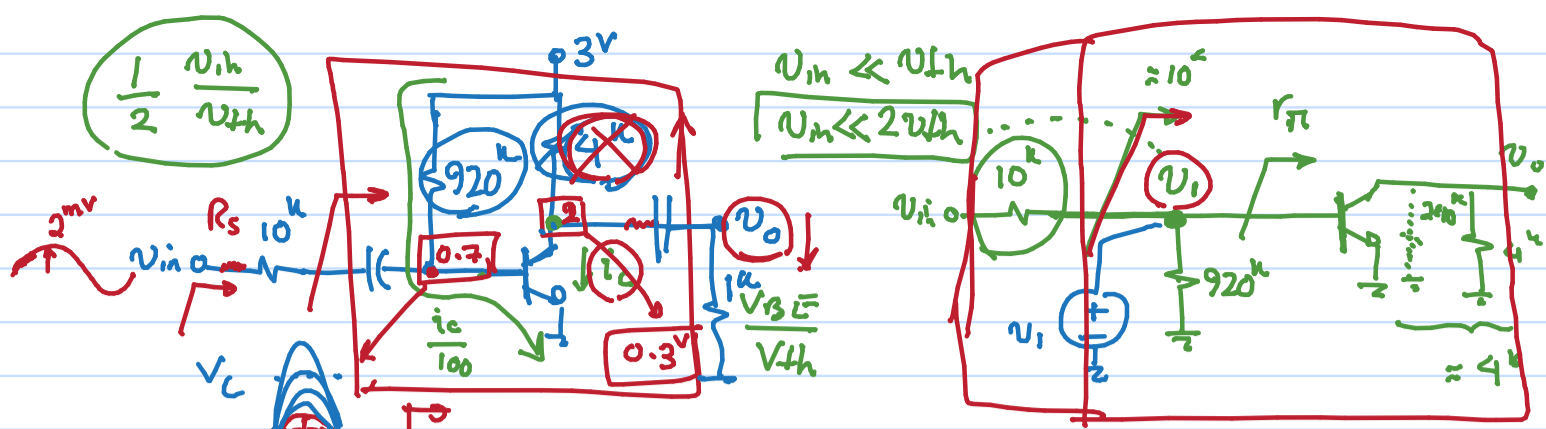


$$i_2 = \frac{6 - 0.7 - \overbrace{0.02 \times 43}^{0.86}}{10^k + 43^k}$$

$$= \frac{4.44}{53}$$

$$= 0.084 \text{ mA}$$

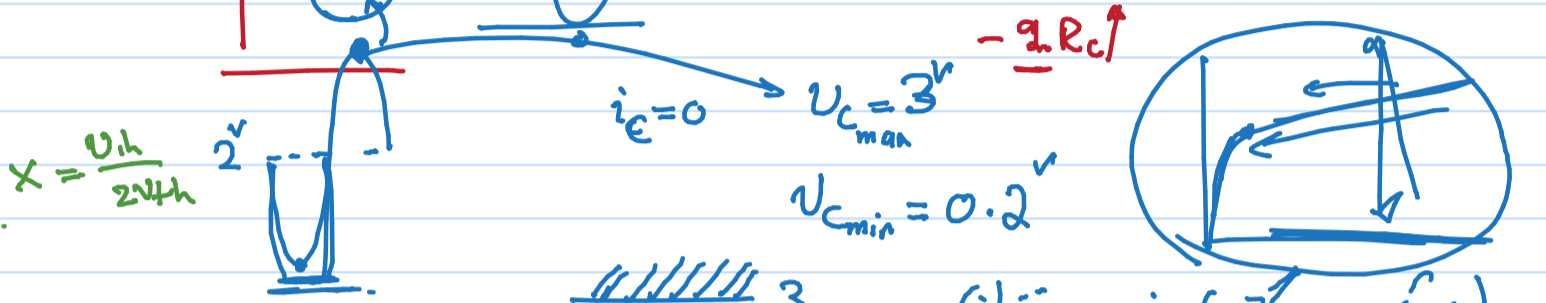


$$i_c = I_{cQ} + i_c > 0$$

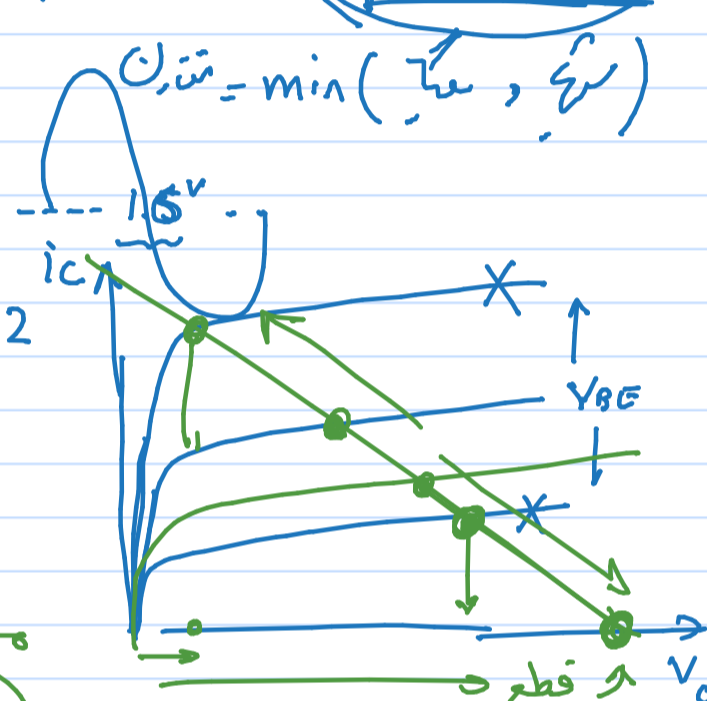
$$\frac{v_o}{v_{in}} = \frac{v_o}{v_i} \times \frac{v_i}{v_{in}} = -20$$

$$\frac{v_i}{v_{in}} = \frac{r_{\pi} \parallel 920k}{r_{\pi} \parallel 920k + 10k} = 1/2$$

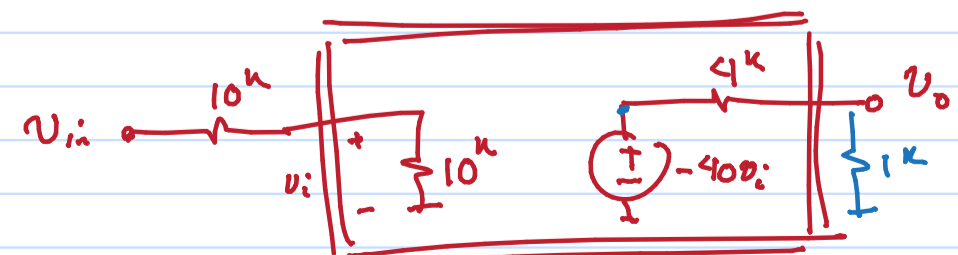
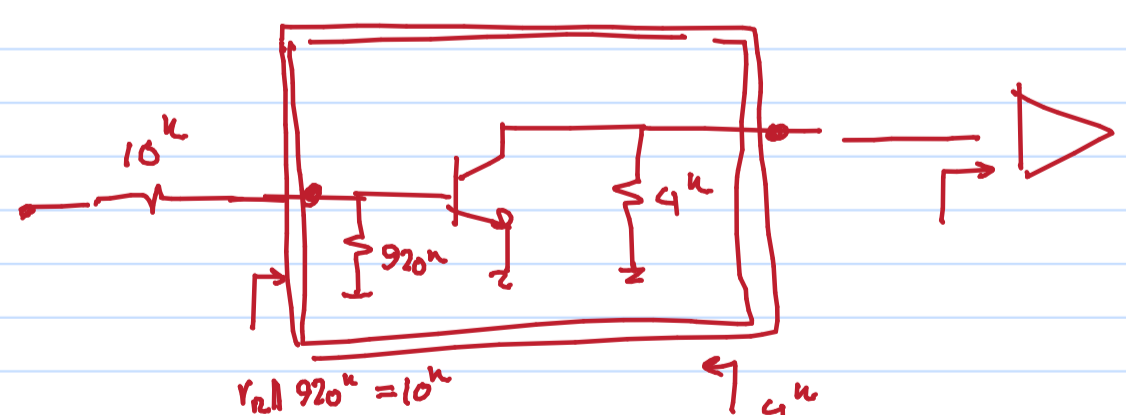
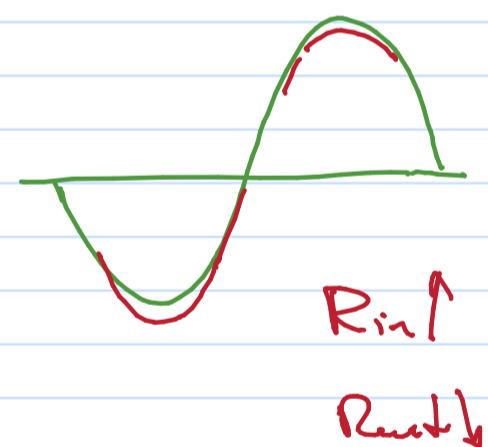
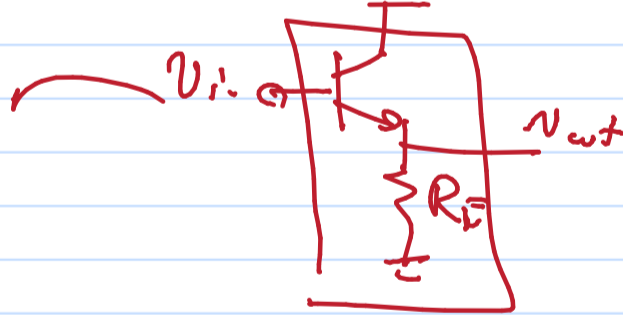
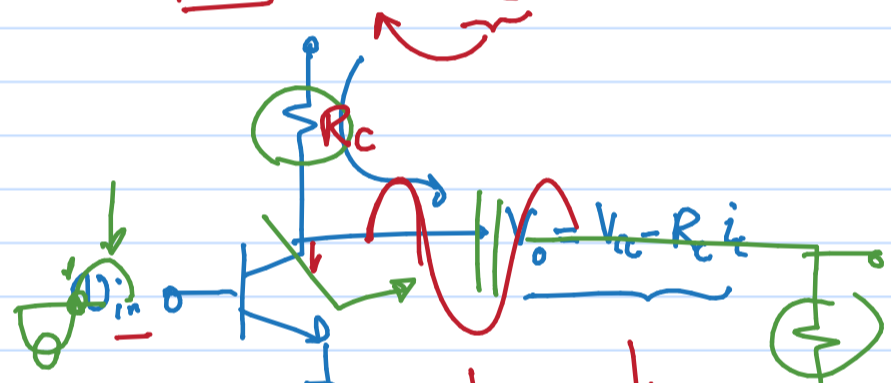
$$\frac{v_o}{v_i} = -g_m (4k \parallel r_o) \approx -g_m 4k = -40$$



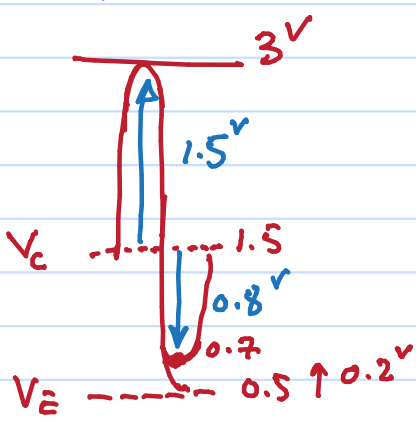
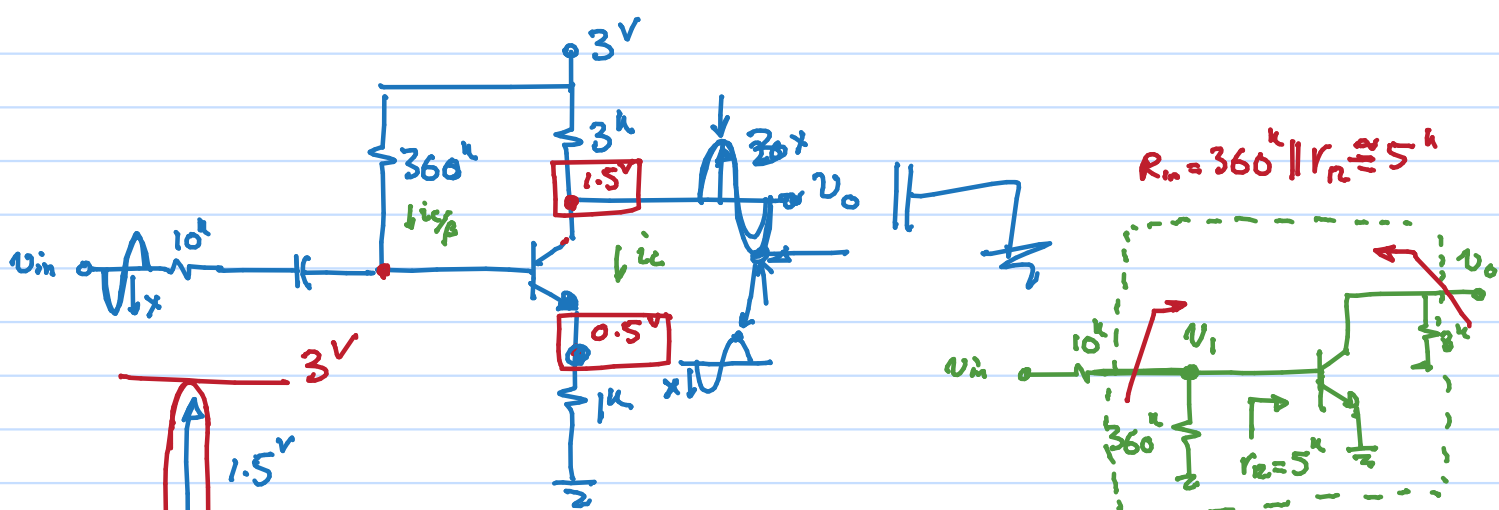
$$R_c = \frac{1.4}{0.25 \text{ mA}} = 5.6k$$



$$e^x \approx 1 + x + \frac{x^2}{2}$$



$$-20 \times \frac{1}{5} = -4$$

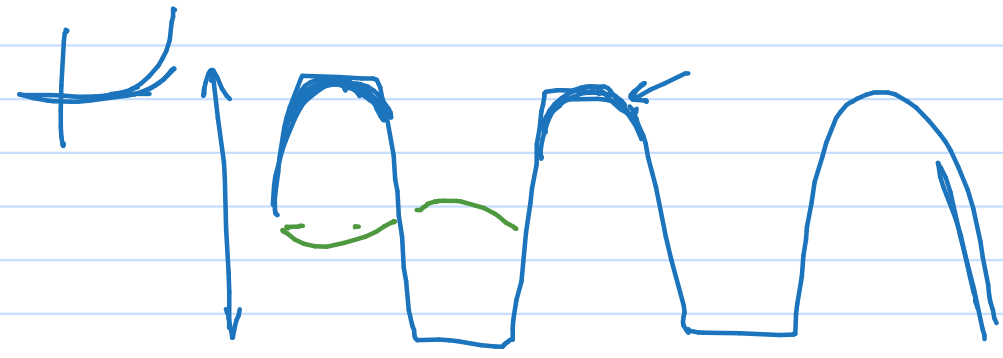


نوبت مقوم =  $0.8V$

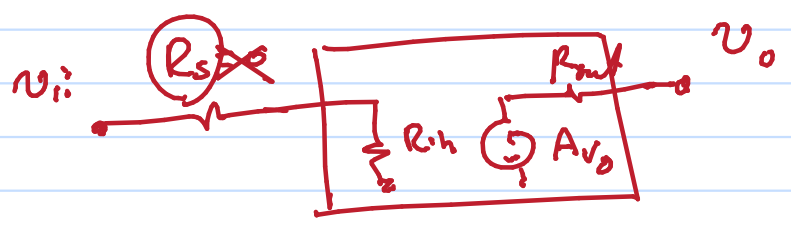
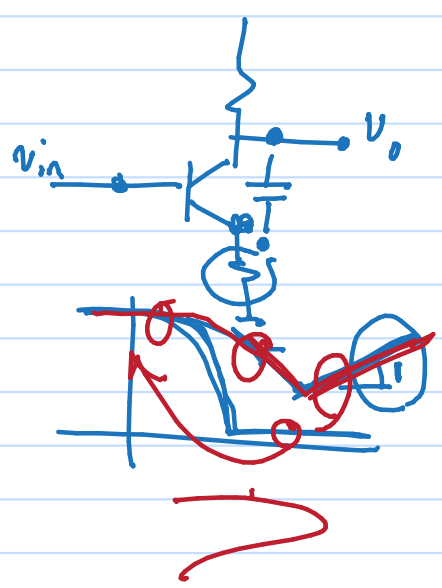
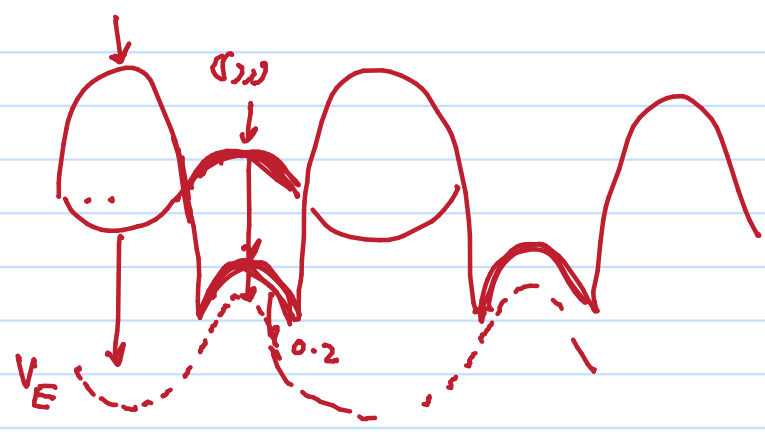
$$\frac{v_i}{v_{in}} = \frac{5^k}{5^k + 10^k} = \frac{1}{3}$$

$$\frac{v_o}{v_i} = -g_m (3^k \parallel r_o) = -60$$

با بورد  $1mV$  خازن



با بورد  $100mV$  خازن



$$\frac{v_o}{v_{in}} = A_{v0}$$

$$\frac{v_o}{v_{in}} \Big|_{R_s} = A_{v0} \times \frac{R_{in}}{R_{in} + R_s}$$