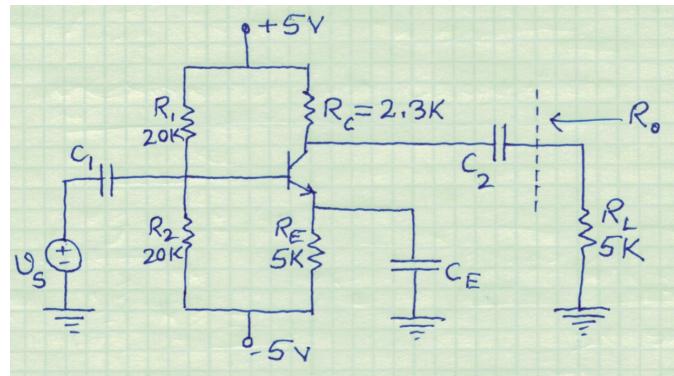
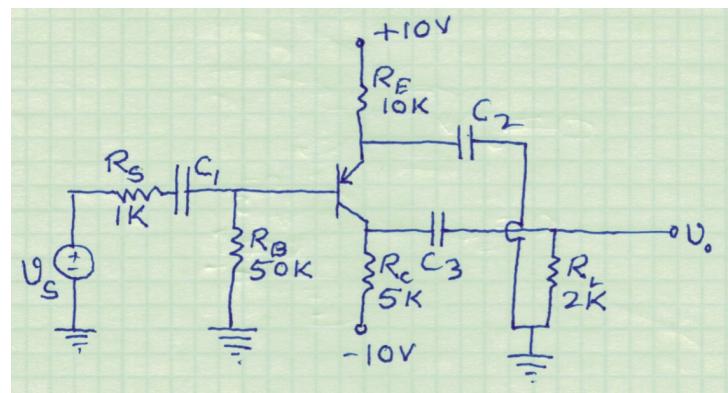


Practice Problem Set #5  
ENEL469

1. Consider the following circuit. Let  $\beta = 125$ ,  $V_{BE(ON)} = 0.7$  V, and  $V_A = 200$  V. Determine the slopes of the dc and ac load line.

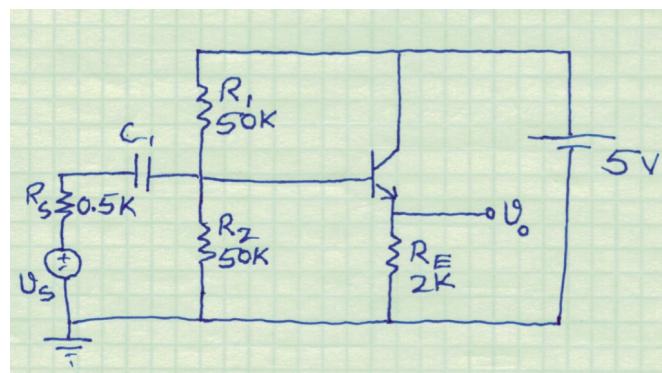


2. Consider the following circuit. Let  $\beta = 150$ ,  $V_{EB(ON)} = 0.7$  V, and  $V_A = \infty$ . Determine  $I_{CQ}$ ,  $I_{BQ}$ ,  $I_{EQ}$ ,  $V_{ECQ}$ ,  $r_\pi$ ,  $g_m$ ,  $r_0$ ,  $v_0$ , the slope of dc load line, and the slope of ac load line.

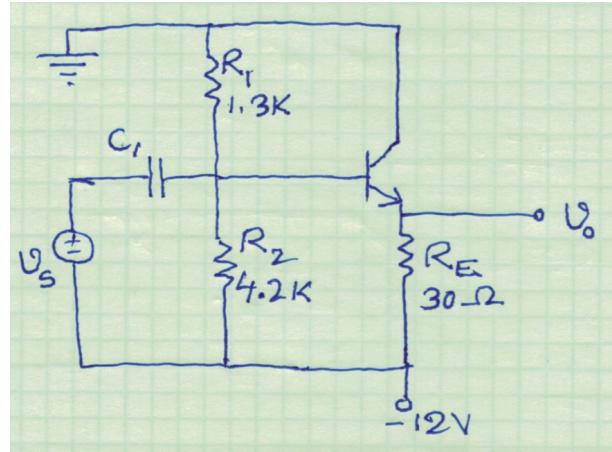


3. Consider the following circuit where  $\beta = 100$ ,  $V_{BE(ON)} = 0.7$  V, and  $V_A = 80$  V. Determine the small-signal voltage gain  $A_v = v_0/v_s$ .

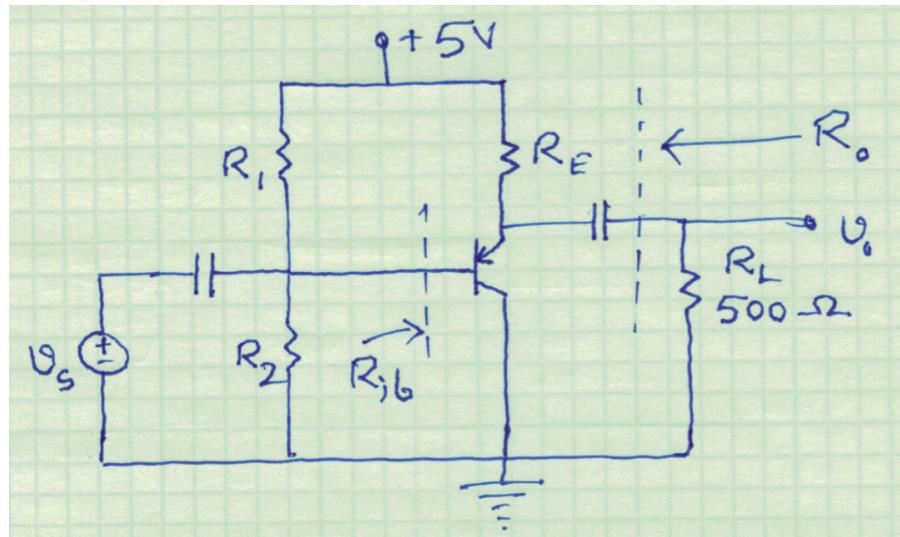
X <sup>not</sup>  
coming  
in quiz



4. Consider the following circuit where  $\beta = 80$ ,  $V_{BE(ON)} = 0.7$  V, and  $V_A = 75$  V (do not ignore  $r_0$ ). (a) Determine the quiescent values  $I_{EQ}$  and  $V_{CEQ}$ . (b) Find the small-signal voltage gain  $A_v = v_o/v_s$ . (c) Determine the input resistance looking into the base of the transistor.



5. Consider the following circuit where  $R_E = 2\text{K}$ ,  $R_1 = R_2 = 50\text{ K}$  and the transistor parameters are  $\beta = 100$ ,  $V_{EB(ON)} = 0.7$  V,  $V_A = 125$  V. (a) Determine the small-signal voltage gain  $A_v = v_o/v_s$ . (b) Find the resistances  $R_{ib}$  and  $R_o$ .



6. For each transistor in the circuit in the following figure, the parameters are:  $\beta = 125$ ,  $V_{BE(ON)} = 0.7$  V, and  $r_0 = \infty$ . Also,  $R_1 = 70$  K,  $R_2 = 6$  K,  $R_{C1} = 5$  K,  $R_{E1} = 0.2$  K, and  $R_{E2} = 1.5$  K. (a) Determine the Q-points of each transistor. (b) Find the overall small-signal voltage gain  $A_v = v_o/v_s$ . (c) Determine the input resistance  $R_i$  and the output resistance  $R_o$ .

