Electronics II, Exam-1, Spring 2020

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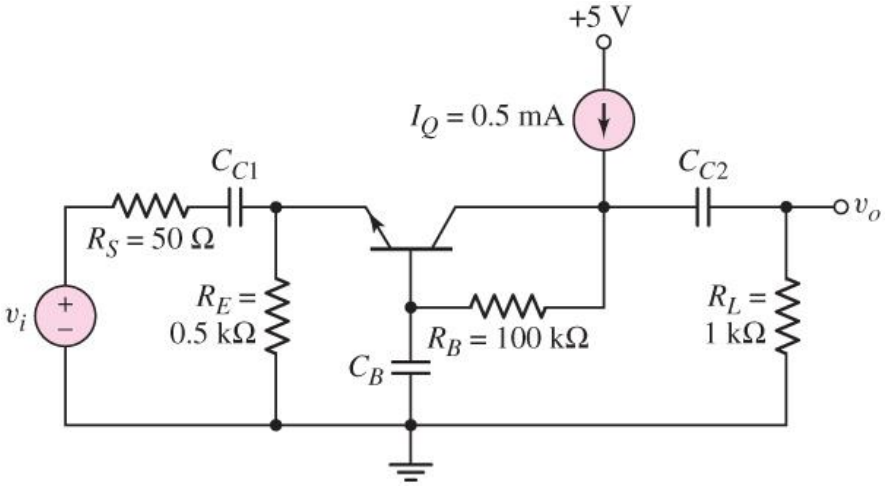
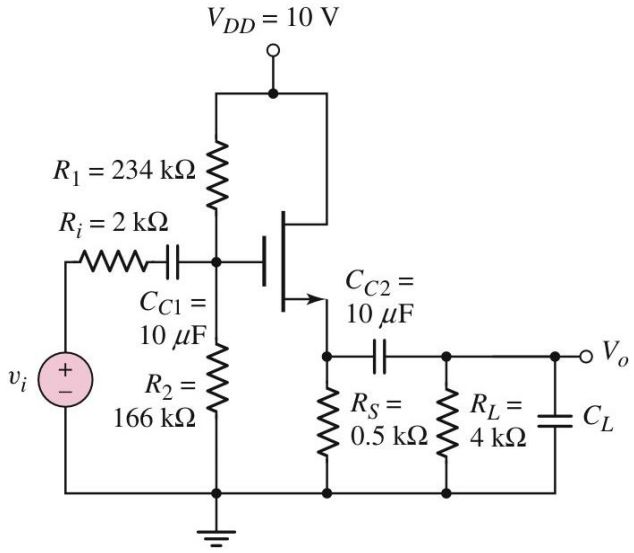
1. (35%) The transistor parameters are $\beta = 100, V_{BE(\text{on})} = 0.7V, V_A = \infty, C_\pi = 10\text{pF}$, and $C_\mu = 1\text{pF}$.
   (a) Determine the upper 3dB frequencies corresponding to the input and output portions of the equivalent circuit. (20%)
   (b) Calculate the midband small-signal voltage gain? (15%)
   (Assume that the signal frequency is sufficiently high such that the outside capacitors connected to the transistor can be treated as short circuits).



2. (35%) Let $K_n = 0.5mA/V^2, V_{TN} = 2V$, and $\lambda = 0$.
   (a) Determine the maximum value of C_L such that the bandwidth is at least 5MHz. (20%)
   (b) What is the magnitude of the small-signal midband voltage gain? (15%)



3. (30%) The transistor parameters are $\beta = 120, V_{BE(\text{on})} = 0.7\text{V}, V_A = \infty, C_\mu = 3\text{pF}$, and $f_T = 250\text{MHz}$. Determine the lower and upper corner 3dB frequencies.