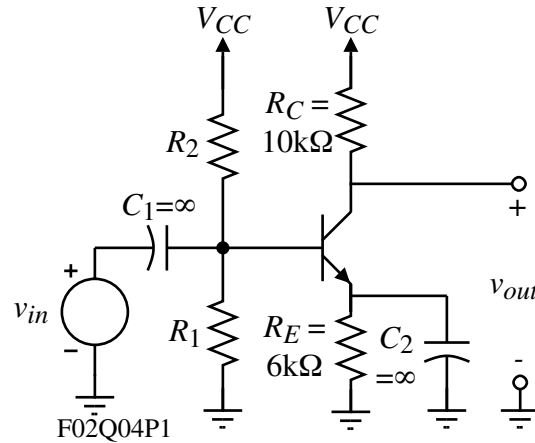


Homework Assignment No. 5

Due on Monday , February 9, 2004

Problems in () refer to the first edition of the text.

1.) An NPN BJT common-emitter inverting amplifier is shown. Assume the parameters of the transistor are $\beta_F = 100$, $V_T = 25\text{mV}$, and $V_A = 100\text{V}$. (a.) If $I_C = 0.5\text{mA}$ and $V_{CE} = 3\text{V}$, find the small signal model parameter values for g_m , r_{π} and r_o . (b.) Find an algebraic expression for the small signal voltage gain, v_{out}/v_{in} . (c.) Numerically evaluate the small signal voltage gain, v_{out}/v_{in} .



2.) Problem 13.102 (13.91) of the text.

3.) Problem 13.111 (13.100) of the text. [$A_v = -4.60 \text{ V/V}$]

4.) Problem 13.118 (13.108) of the text.

5.) A PMOS common-drain amplifier is shown. Assume the parameters of the transistor are $k_F = 0.5\text{mA/V}^2$, $V_{TP} = -1\text{V}$, and $\lambda = 0$. (a.) If $I_{SD} = 0.5\text{mA}$, find the small signal model parameter values for g_m and r_o . (b.) Find an algebraic expression for the small signal input resistance, R_{in} , the output resistance, R_{out} , and the voltage gain, v_{out}/v_{in} . (c.) Numerically evaluate the small signal input resistance, R_{in} , the output resistance, R_{out} , and the voltage gain, v_{out}/v_{in} .

