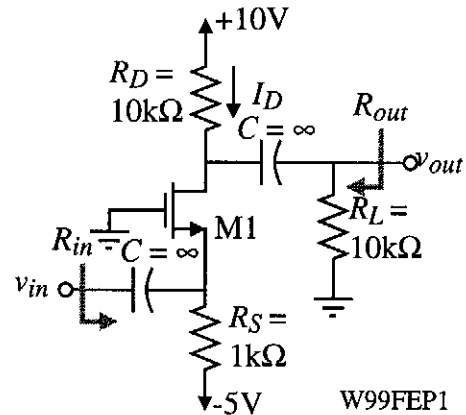


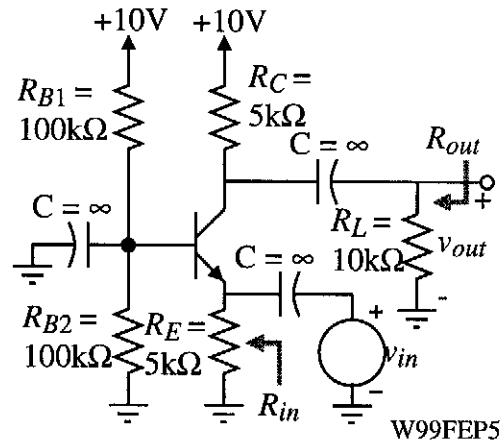
**Homework Assignment No. 7**

Due on Wednesday, February 26, 2003

- 1.) (a.) If  $K = 0.1\text{mA/V}^2$  and  $V_t = 1\text{V}$  for the n-channel MOSFET shown, find the dc value of  $I_D$ ,  $V_{GS}$ , and  $V_{DS}$ . (b.) If the dc value of  $I_D = 1\text{mA}$  (not necessarily the answer above) find the value of the small-signal input resistance,  $R_{in}$ , voltage gain,  $v_{out}/v_{in}$ , and output resistance,  $R_{out}$ .



- 2.) (a.) If  $\beta = 100$  and  $V_T = 25\text{mV}$  of the NPN transistor shown, solve for the dc value of collector current. (b.) If this collector current is 1mA (so if you found  $I_C$  incorrectly, you will not be penalized on the rest of the problem) find the small signal values of the input resistance,  $R_{in}$ , output resistance,  $R_{out}$ , and voltage gain,  $v_{out}/v_{in}$ .



- 3.) Problem 14.29 of the text.  
 4.) Problem 14.31 of the text.  
 5.) Problem 14.33 of the text.