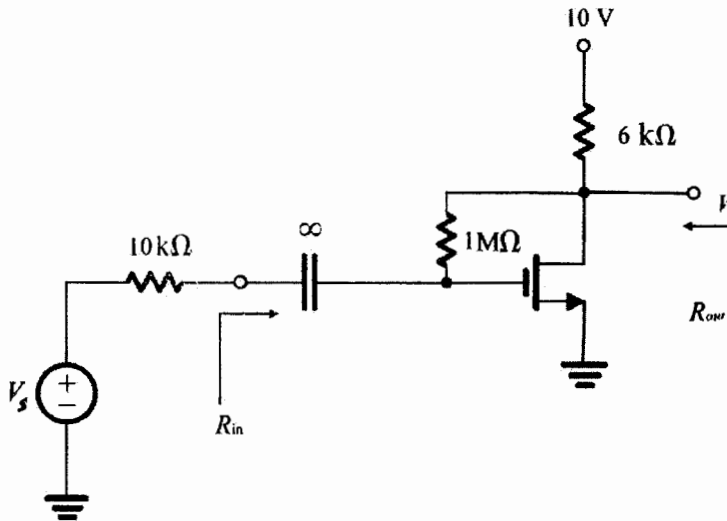
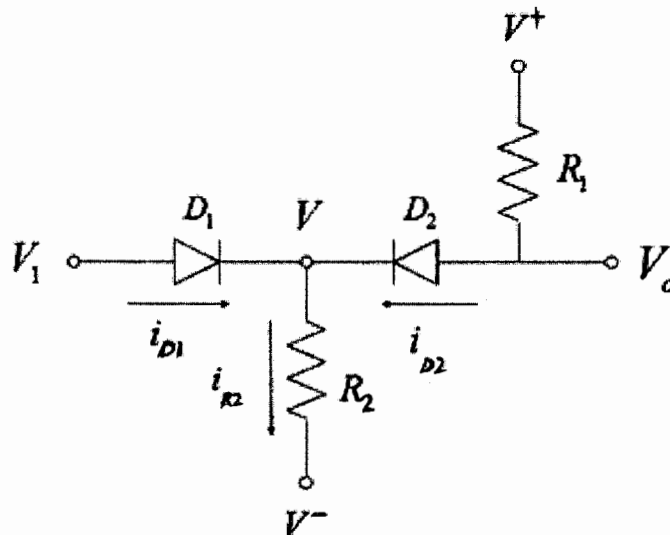


※ 考生請注意：本試題可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。請依題號順序作答。

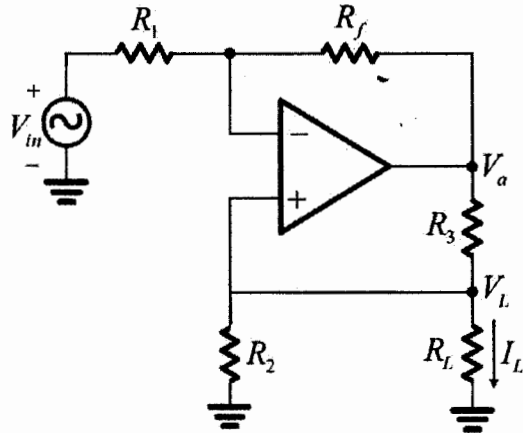
1. For $V_i = 1\text{ V}$, $k_n'W/L = 2\text{ mA/V}^2$. (a) Find the DC drain current of the transistor. (5 pt.) (b) Find the voltage gain V_o/V_s . (5 pt.) (c) Find the input resistance R_{in} . (5 pt.) (d) Find the output resistance R_{out} . (5 pt.)



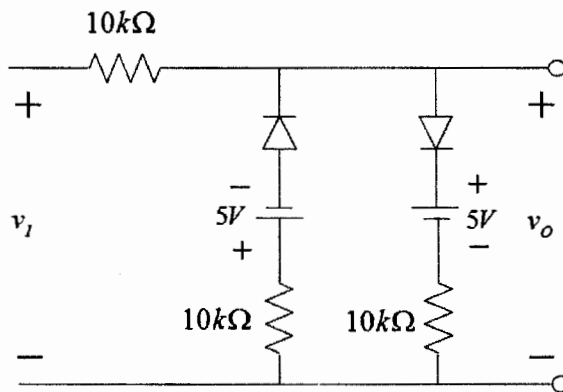
2. In the circuit shown below, assume the circuit parameters are: $R_1 = 5\text{ k}\Omega$, $R_2 = 10\text{ k}\Omega$, $V^+ = 5\text{ V}$, $V^- = -5\text{ V}$, and the diode turn-on voltage $V_{D0} = 0.7\text{ V}$. (a) Determine V_o , i_{D1} , i_{D2} , for $V_1 = 0\text{ V}$. (10 pt.) (b) Determine V_o , i_{D1} , i_{D2} , for $V_1 = 4\text{ V}$. (10 pt.)



3. The Op-Amp is ideal. Assume $R_2 R_f = R_1 R_3$, find the current I_L in the load resistor R_L . (20 pt.)



4. Assuming the diodes are ideal, plot the transfer characteristic v_o versus v_i . (20 pt.)



5. The amplifier is biased with a current source I and has very high β . (a) Find the DC voltage at the collector, V_C . (5 pt.) (b) Find the value of g_m . (5 pt.) (c) Find the voltage gain v_c / v_i . (10 pt.)

