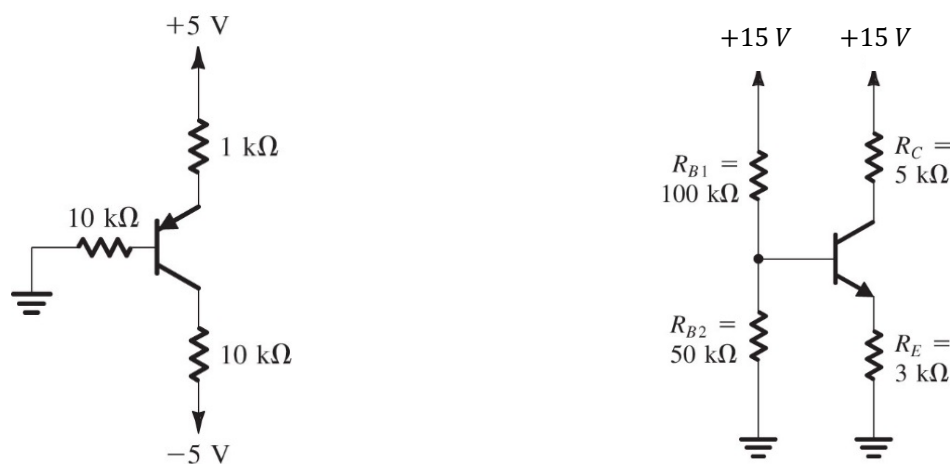


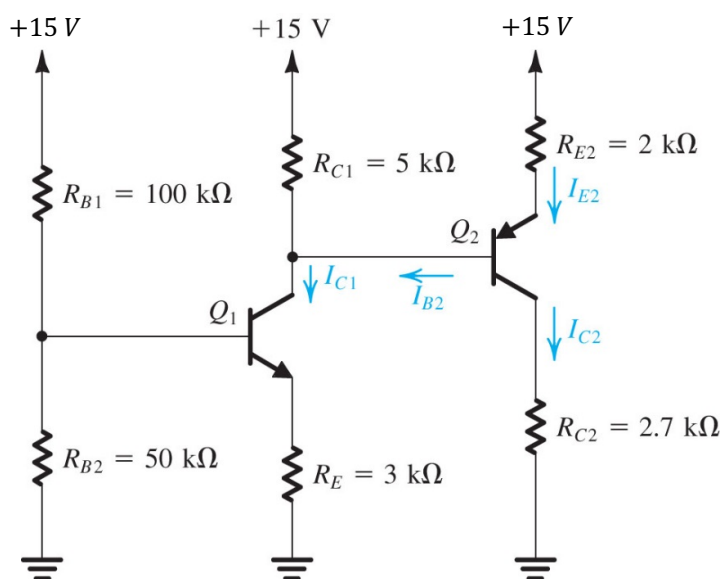
Problem 1.

Determine voltages at all nodes and currents through all branches in the below two BJT circuits. Assume $\beta = 100$, $V_{D0} = 0.7\text{ V}$, $V_{sat} = 0.2\text{ V}$.



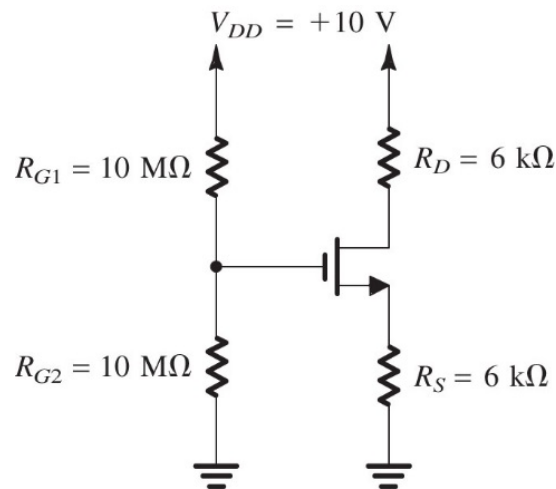
Problem 2.

Determine voltages at all nodes and currents through all branches in the below circuit. Assume $\beta = 100$, $V_{D0} = 0.7\text{ V}$, $V_{sat} = 0.2\text{ V}$.



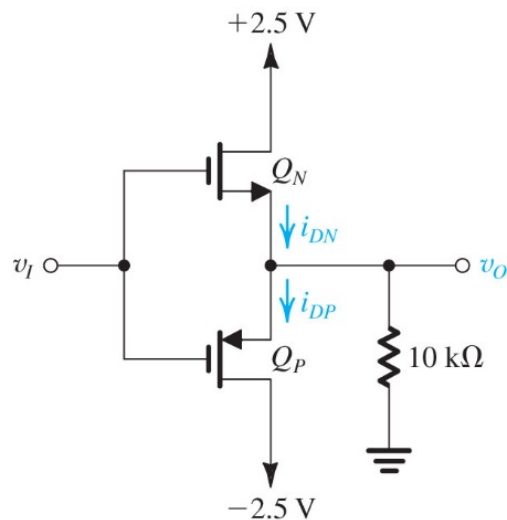
Problem 3.

Find the voltages at all the nodes and the currents through all the branches. $V_t = 1\text{ V}$ and $(\mu_n C_{ox} W/L) = 1\text{ mA/V}^2$, $\lambda = 0$.



Problem 4.

The NMOS and PMOS transistors in the below circuit are matched with $k_n = k_p = 1\text{ mA/V}^2$, and $V_{tn} = -V_{tp} = 1\text{ V}$. Assuming $\lambda = 0$ for both transistors, find the drain currents i_{DN} and i_{DP} . And the voltage v_o for $v_i = 0\text{ V}, +2.5\text{ V}$.



Problem 5.

The NMOS transistors in the below circuit have $V_t = 0.5\text{ V}$ and $\mu_n C_{ox} = 250\text{ }\mu\text{A/V}^2$ $\lambda = 0$, and $L_1 = L_2 = 0.25\text{ }\mu\text{m}$. Find the required values of the gate width for each of Q_1 and Q_2 and the value of R , to obtain the voltage and current values indicated.

