EE303 - Problem Set

Problem 1

Determine the value of R_P in the circuit of Fig. 9.69 such that $I_1 = I_{REF}/2$. With this choice of R_P, does I_1 change if the threshold voltage of both transistors increases by ΔV?

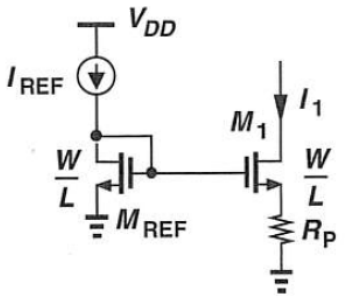
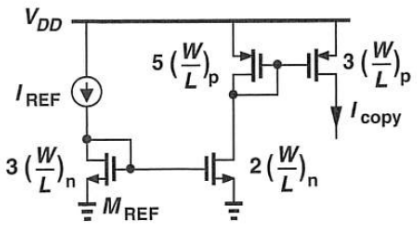


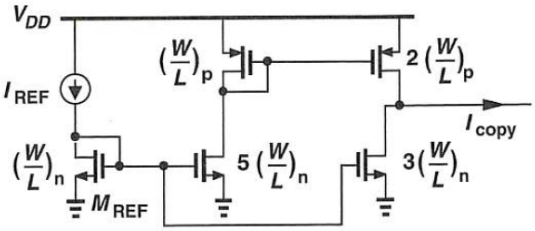
Figure 9.69

Problem 2

Calculate I_{copy} in each of the circuits shown in Fig. 9.71. Assume all of the transistors operate in saturation.



(a)



(b)

Figure 9.71

Problem 3

. The current mirror shown in Fig. 9.77 must deliver $I_1 = 0.5$ mA to a circuit with a total power budget of 2 mW. Assuming $V_A = \infty$ and $\beta \gg 1$, determine the required value of I_{REF} and the relative sizes of Q_{REF} and Q_1.

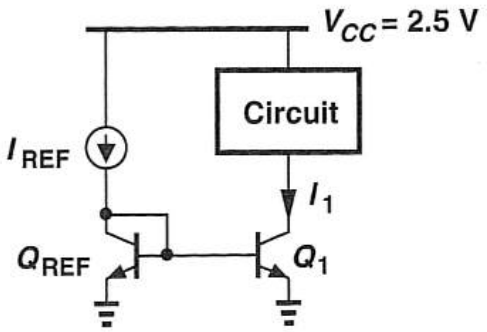


Figure 9.77