EPE2165—Exam #1

July 26, 2022

1. (15 points) For the circuits shown in Figure 1, find the output voltage v_o and the diode currents I_{D1} and I_{D2}. Model a conducting diode as a constant voltage drop of 0.7 V.

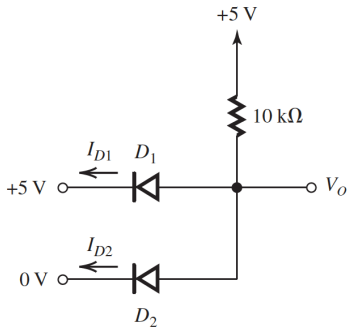

FIGURE 1

2. (15 points) The MOSFET in Figure 2 has $V_t = 0.4V$, $k_n' = 0.4\,\text{mA V}^{-2}$, $\lambda = 0$ and $L = 0.4\,\mu\text{m}$. Find the values of W and R_D to operate it at $I_D = 0.2mA$ and $V_D = 0.6V$

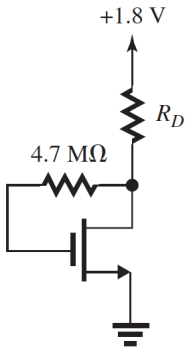

FIGURE 2

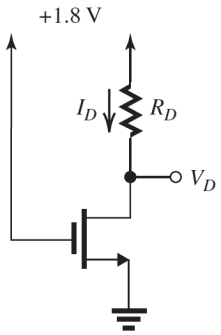

FIGURE 3

3. (20 points) The MOSFTET in Figure 3 has $V_t = 0.5V$, $k_n' = 0.4\,\text{mA V}^{-2}$, $V_A = 10V$ and $W/L = 10$. Find the value of R_D, I_D and the incremental drain-to-source resistance R_{DS} that results in $V_D = 0.1V$