For the CMOS circuits shown in Figs. a,b,c,d,e determine (by hand) operating modes (cut-off, triode or active/saturation) for all transistors. Find all labeled DC voltages and currents. Verify the assumptions you made and show your work. For each of the circuits, put your results in a table showing operating modes of the devices and a table that shows the calculated DC voltages and currents. A solution obtained by computer simulation will not be accepted.

All devices have the same parameters; NMOS transistors: $\mu_n C_{ox} = 90 \mu A/V^2$, $V_{th} = 0.8V$; PMOS transistors: $\mu_p C_{ox} = 30 \mu A/V^2$, $V_{tp} = -0.9V$. For both NMOS and PMOS devices, channel-length modulation and body effects can be neglected, $\lambda \approx 0$, $\gamma \approx 0$. The DC voltage sources $V_{DD}$, $V_{SS}$ and current sources $I$ are ideal.

All devices have the same parameters; NMOS transistors: $\mu_n C_{ox} = 90 \mu A/V^2$, $V_{th} = 0.8V$; PMOS transistors: $\mu_p C_{ox} = 30 \mu A/V^2$, $V_{tp} = -0.9V$. For both NMOS and PMOS devices, channel-length modulation and body effects can be neglected, $\lambda \approx 0$, $\gamma \approx 0$. The DC voltage sources $V_{DD}$, $V_{SS}$ and current sources $I$ are ideal.