

**Problem 4:** Determine the region of operation (*e.g.*, Cutoff, Linear, Blown-up, Triode, Ohmic, Resistive, Saturation, Forward-Active, Reverse-Active, etc.) for each transistor below. For the NMOS and PMOS transistors, assume:  $L = 0.1\mu\text{m}$ ,  $|V_{t_0}| = 0.5\text{V}$ ,  $|\gamma| = 0.5\text{V}^{0.5}$ ,  $\phi_f = 0.3\text{V}$ ,  $\mathcal{E}_c = 1.5 \times 10^6\text{V/m}$ , and  $\mu C_{OX} = 200\mu\text{A/V}^2$ .

