

The following sub-sections relate to MOSFET device operation:

- a) Draw the cross-section of an NMOS transistor in an n-well process (p^- substrate) in strong inversion. Label the depletion regions and the channel. Comment on the terminal voltages associated with the conditions shown in your drawing.
- b) A 1V sine wave at 10kHz, $v_x = 0.5 \sin(\omega t)$, is applied to an NMOS transistor under each of the conditions shown below. You can assume that the threshold voltage and p-n diode voltages are all 0.5V. For each of the cases below:
 - a. Sketch an approximate (qualitative) waveform of the current, i_x , in the driving waveform, v_x
 - b. Explain which terminals (gate, drain, source, bulk) the current (if any) will flow through.

