





3. (Do this if time permits). The energy band diagram for an ideal MOS-C is shown below.  $x_{ox} = 0.2 \mu\text{m}$  and  $E_F = E_i$  at the Si-SiO<sub>2</sub> interface. Answer the following.
- Sketch electrostatic potential  $\phi$  inside the semiconductor as a function of position.
  - Roughly sketch  $\mathcal{E}$ -field inside the semiconductor as a function of position.
  - Roughly sketch the electron concentration versus position inside the semiconductor.
  - What is the numerical value of the electron concentration at the Si-SiO<sub>2</sub> interface?
  - $N_D = ?$
  - $\phi_s = ?$
  - $V_G = ?$
  - What is the voltage drop across the oxide?

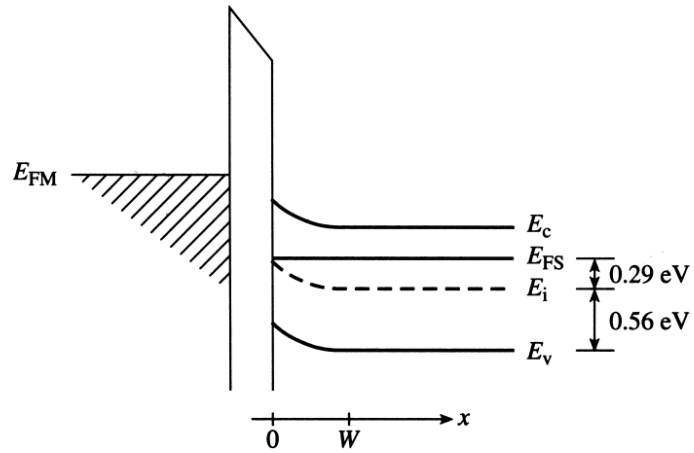


Figure P16.7