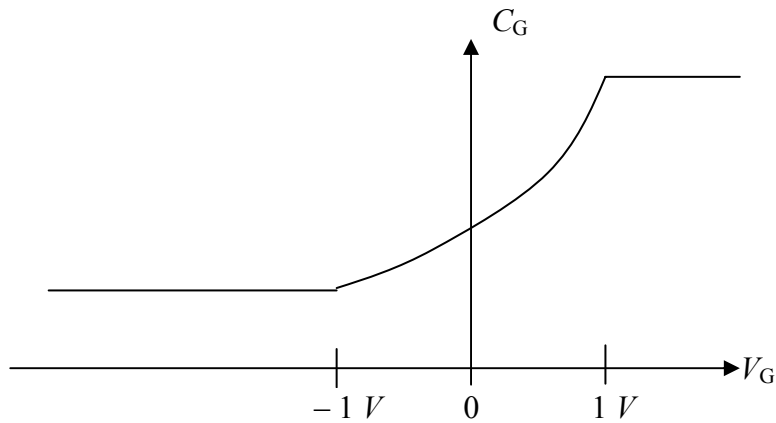


3. Explain why a DRAM cell needs refreshing every few milliseconds.

4. The following $C-V$ curve is taken from a MOS capacitor fabricated on Si. The oxide thickness is $x_{\text{ox}} = 0.1 \mu\text{m}$ and the gate metal is chosen such that ϕ_{ms} is zero.



a. Calculate the net interface charges present in the oxide in C/cm^2 .

b. What will be the threshold voltage, if there were no interface charges?

c. Is the substrate p-type or n-type?

