Essentials of MOSFETs

Lecture 3.4: Flat-band Voltage

Short Problem

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Assume an N-type semiconductor with the following properties

$$N_D = 5.0 \times 10^{17} \text{ cm}^{-3}$$

$$\Phi_M = 4.08 \text{ eV} \qquad \chi_S = 4.05 \text{ eV} \qquad E_G = 1.12 \text{ eV}$$

$$N_C = 3.22 \times 10^{19} \text{ cm}^{-3}$$

$$T = 300 \text{ K}$$

and answer the following question.

1) What is the flat-band voltage of an MOS capacitor with this semiconductor?