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2.626 Fundamentals of Photovoltaics
Fall 2008

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2.626 – Fundamentals of Photovoltaics

Concept Quiz #3 – September 30, 2008

Question #1:

The ideal diode equation is: $I = I_0 \left(e^{\frac{qV_A}{k_B T}} - 1 \right)$, where V_A is the applied voltage.

- Explain the meaning of the term I_0 :
- Why does the current increase exponentially in forward bias?
- What term would you add if the diode were under illumination?

Question #2:

Consider a pn homojunction where $[N_A]=[N_D]$. Circle the appropriate answer:

- a) If $V_A = 0$:

$$J_{\text{drift}} > J_{\text{diff}}$$

$$J_{\text{drift}} < J_{\text{diff}}$$

$$J_{\text{drift}} = J_{\text{diff}}$$

- b) If $V_A > 0$:

$$J_{\text{drift}} > J_{\text{diff}}$$

$$J_{\text{drift}} < J_{\text{diff}}$$

$$J_{\text{drift}} = J_{\text{diff}}$$

- c) If $V_A < 0$:

$$J_{\text{drift}} > J_{\text{diff}}$$

$$J_{\text{drift}} < J_{\text{diff}}$$

$$J_{\text{drift}} = J_{\text{diff}}$$