Fundamentals of Nanoelectronics, I: The New Perspective

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L1.9 Quiz

Answers

1.9. Drude Formula

We have discussed two expressions for the conductivity

$$Drude\ formula: \quad \sigma_0 = \frac{q^2 n \tau}{m} \qquad (A)$$

and

$$\sigma(E) = q^2 \frac{D}{AL} \bar{D} \qquad (B)$$

The result in (B) has to be averaged over energy

$$\sigma_0 = \int_{-\infty}^{+\infty} dE \left(-\frac{\partial f_0}{\partial E} \right) \sigma(E)$$

1.9a. In Equation (A), n represents

(a) the total electron density in all bands

(b) the electron density in a band

if the electrochemical potential is located near the bottom of a band

(c) the "hole" density in a band

if the electrochemical potential is located near the top of a band

(d) both (b) and (c)

(e) none of the above

1.9b. In Equation (B), D(E) represents

(a) the density of states

(b) the density of filled states

(c) the density of empty states

(d) product of (b) and (c)

(e) none of the above