Fundamentals of Nanoelectronics, I: The New Perspective

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L1.5 Quiz

Answers

1.5. Ballistic (B) Conductance

1.5a. The time it takes an electron to cross a conductor of length L in the ballistic regime is proportional to

(a) $\sim L$

(b) $\sim L^2$

(c) $\sim L^3$

(d) $\sim 1/L$

(e) $\sim \ell n\, L$

1.5b. The ballistic conductance G_B per unit area A is related to the density of states per unit length (D/L) and the average electron velocity $\bar{n}(E)$ by the relation

(a) $\frac{G_B}{A} = q^2 \frac{D}{2AL}$

(b) $\frac{G_B}{A} = \frac{\bar{n}L}{2q^2 DA}$

(c) $\frac{G_B}{A} = q^2 \frac{D}{AL}\frac{\bar{n}}{2}$

(d) $\frac{G_B}{A} = \frac{q^2\, \bar{n}L}{2DA}$

(e) none of the above