

Problem W11:

Using the results from Problem 7.2, find the reflection and transmission coefficients for $E = 1.2U$, $E = 2.0U$, and $E = 10.0U$.

Problem W12:

Using Equation (7.9) in the text, find the transmission coefficient for

- (a) electrons with $E = 3 \text{ eV}$ on a barrier 3.5 eV high and 0.5 nm wide.
- (a) electrons with $E = 3 \text{ eV}$ on a barrier 5 eV high and 0.5 nm wide.
- (a) protons with $E = 3 \text{ eV}$ on a barrier 5 eV high and 0.5 nm wide.

Problem W13:

The nuclei ^{210}Po and ^{214}Po ($Z = 84$) both decay by α -emission. For ^{210}Po the α particle has an energy of 5.40 MeV , while for ^{214}Po the energy is 7.83 MeV . Estimate the half-lives of these nuclei assuming the nuclear radius is 9 fm and barrier collision frequency is $10^{20}/\text{sec}$. Compare your results with the measured half-lives listed in Appendix B. (The calculation in example 7.6 is for a different isotope of polonium.)

Problem W14:

Suppose that a particle of mass m is confined to move in the x - y plane in a two-dimensional box with sides of length $L_x = L$ and $L_y = \frac{1}{2}L$. Find the energies of the 6 lowest states.