6-5

1. Show that the wave funciton $\Psi(x,t) = A\sin(kx - \omega t)$ does not satisfy the time-dependent Schrodinger equation.
2. Show that $\Psi(x,t) = A\cos(kx - \omega t)$ + iA sin(k x - omega t) satisfies the time-dependent Schrodinger equation.

Solution:

6-9

A particle is in a infinit spalar well of width L. Calculate the ground-state energy if:

1. The particle is a protomo and $L = 0.1$ nm. a typical size for a molecule;
2. the particle is a proton and $L = 1$fm, a typical size for a nucleus.

Solution:

6-12

A mass of 10^-6 g is moving with a speed of about 10^-1cm/s in a box of length 1cm. Treating this as a one-dimensional infinite square well, calculate the approximate value of the quantum number n

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Solution:

6-16

The wavelength of light emitted by a ruby laser is 694.3nm. Assuming that the emission of a photon of this wavelength accompanies the transition of an electro from the $n = 2$ level to the $n = 1$ level of an infinite square well, compute L for the well.

Solution: