

## 6-5

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

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## 6-9

A particle is in a infinite potential well of width  $L$ . Calculate the ground-state energy if:

1. The particle is a proton 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.
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Solution:

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## 6-12

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

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Solution:

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## 6-16

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

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Solution: