

Assignment 2 Weeks 2-3

Review class notes and Chapters 3 and 4 from the book. If concepts are unclear please make sure to get them clarified during office hours or recitation.

The homework is FOR PRACTICE ONLY

1. Problems 4.5, 4.13, 4.16, 4.21, 4.25 – Old edition

These are problems 4.32, 4.9, 4.19, 4.17, 4.5 in the new edition. However note that the function in problem 4.9 (new edition) is slightly different. [50 points]

2. Consider a particle of mass m in box of length L . The potential energy diagram is sketched on the right. Note that the potential is given by:

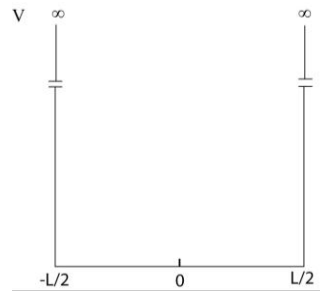
$$V(x) = \infty \text{ for } x \geq L/2, x \leq -L/2 \text{ and}$$

$$V(x) = 0 \text{ for } -L/2 < x < L/2$$

The general solution of Schrodinger's Equation for a particle in a box is:

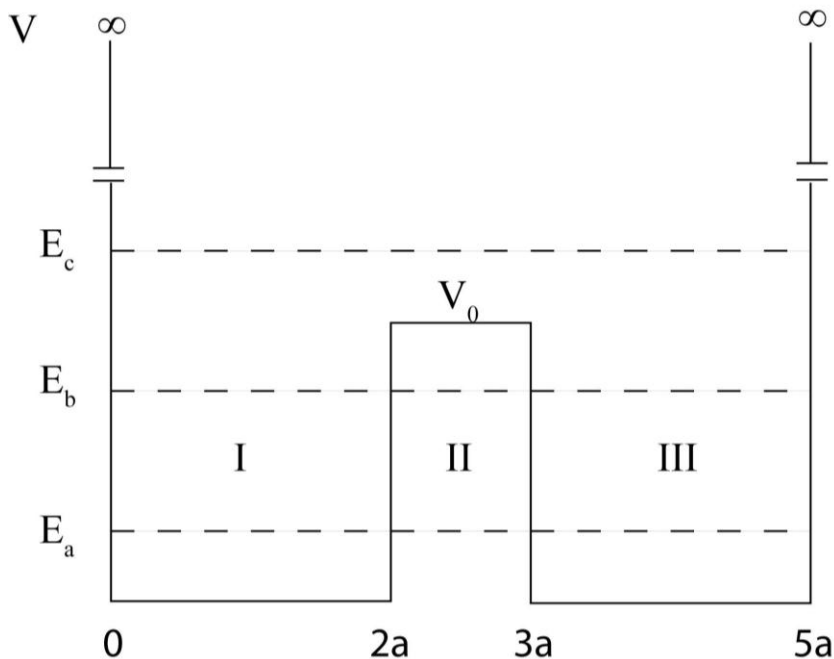
$$\Psi(x) = A \sin(kx) + B \cos(kx) \quad [1]$$

Using Equation 1, determine the wavefunction of the particle trapped in this box with a potential shown on the right. Normalization of final wavefunction is not required [30 points]



(4) For a particle in a Finite Depth Box (Chapter 5, Section 5.1) show that the wavefunction(s) given by Eq. 5.4 are the correct general solution to the Schrodinger's Equation. [10 points]

(5) Sketch the wavefunctions that are appropriate for a particle in this potential energy



surface if the energy of the particle is E_a , E_b , and E_c , respectively. Clearly show relative features (in each region). [10 points]