Chapter 6-8

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Questions

1. Express the wave function as an integral of finding a particle in all of space.

2. State the expected form of Schrodinger's equation.

3. Derive the time independent Schrodinger Equation

4. What is the Hamiltonian

5. Arrive at the expression of momentum as an operator

6. Derive the time independent Schrodinger Equation

7. State Schrodinger's equation in Three Dimensions

8. Use the time dependent Schrodinger's equation to express the wave function as a second order differential equation of the form

$$f'' + x^2 f = 0$$

9. State Heisenberg's Uncertainty Relation

10. Arrive at the Time-Energy Uncertainty Relation

11. Wave function at the presence of a barrier. Consider some potential barrier in Region II. Region I is before the potential barrier and Region III is after the potential barrier.
State the Schrodinger Equation in each Region and the form of the wave function.

12. Solve for the reflection and transmission coefficient.

13. Consider a beam of electrons traveling to the right along the x-axis with energy E. The potential energy is $V = 0$ for $x < 0$, but as $x = 0$ there is a potential step, and the potential energy increases to V_0 for $x > 0$. Assuming $E > V_0$ (a) calculate the reflection and transmission coefficients, and (b) show that flux is conserved.