Things You Should Know

Chapters 1 - 2:   **Introduction and Historical Perspective**
                             The Postulates of Quantum Mechanics

Be able to <u>define</u> the following terms (using words, equations, or figures):

Blackbody radiation	Rydberg formula
Photoelectric effect	Bohr's atomic model
The Bohr complementarity principle	Heisenberg uncertainty principle
Wave-Particle duality	Eigenfunction
Eigenvalue	Complete set of functions
Time independent Schrödinger equation	Time dependent Schrödinger equation
Commutator	Orthonormality
Expectation value	Variance

Concepts and Exercises:

1. Be able to convert from units of frequency, energy, wavenumber and wavelength.

2. Know the postulates of quantum mechanics - what they say, what they mean, and how to apply them -- particularly in the case of measurements in quantum mechanical systems.

3. Know general properties of wave functions. For example: the requirements for an acceptable wave function (postulate 1), interpretation of: $\left|\Psi(r,t)\right|^2 = \Psi(r,t)^* \Psi(r,t)$, etc.

4. Know the results of the various theorems we discussed.

5. Be able to determine when there is time dependence in a quantum mechanical system and when there is not.

6. Be familiar with the properties of eigenfunctions, operators, and commutators. You should be able to determine the effect of commutation relationships on measurements in quantum mechanical systems.

7. Know how to solve the quantum mechanical problem of the particle-in-a-box and the particle-on-a-ring. Have a good qualitative understanding of the results (*i.e.*, the wave functions and energies) and their implications.

8. Be able to solve all the exercises.