POSTULATES OF QUANTUM MECHANICS

1. The state of a quantum-mechanical system is completely specified by its wave function $\Psi(r)$. $\Psi^*(r)\Psi(r)\,dxdydz$ is the probability that the particle lies in the volume element dxdydz, located at r. (Note: we are considering the time independent wave function for all our work).

2. To every observable in classical mechanics, there corresponds a linear operator in quantum mechanics.

3. In any measurement of the observable associated with the operator A, the only values that will ever be observed are the eigenvalues a, which satisfy the eigenvalue equation

$$\hat{A}\,\Psi(r) = a\,\Psi(r)$$

4. If a system is in a state described by a normalized wave function Ψ, then the average value (or the expectation value) of the observable corresponding to operator A is given by

$$< a > = \int_{-\infty}^{\infty} \Psi^*\,\hat{A}\,\Psi\,d\tau$$

5. The wave function of a system evolves in time according to the time dependent Schrodinger equation

$$\hat{H}\,\Psi(x, t) = i\hbar\,\frac{d\Psi}{dt}$$