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Q What is the Basic postulates of Quantum mechanics:-

There are some unique sets of rules which provides Mathematical language to quantum mechanics. Those are known as postulates of quantum mechanism

These are as follows:-

(1) The state of a micro-system is described in terms of a function of position co-ordination & time called wave function (ψ)

(2) Their corresponds a quantum mechanical operator to every observable quantities (i.e., position, momentum, energy etc)

Physical quantities		Operators
(1) Position		x (cartesian co-ordinates), r (spherical ")
(2) Momentum		$h/2\pi i \cdot d/dx$
(3) kinetic energy		$-h^2/8\pi^2 m \cdot \nabla^2$
(4) Potential energy		V
(5) Total energy		$-h^2/8\pi^2 m \cdot \nabla^2 + V$

(3) The possible values of any physical quantities of a system (position, energy, momentum etc) are given by the eigen value 'a' in the operator eq^n as —

$$\hat{A} \cdot \psi = a \cdot \psi$$

where, $\hat{A}$ = operator

ψ = Eigenfunction of operator 'A'

a = Eigen value

The eigen function of the operator may be real or, complex. The eigen value must be real.

Schrodinger eq^n as an eigen value eq^n is written as —

$$\hat{H}\cdot\psi = E\cdot\psi$$

(4) The expected or average values of a physical quantity $(\bar{M})$ of a system M, whose state function ψ is given by —

$$\bar{M} = \frac{\int \psi^* \hat{M} \psi \cdot d\tau}{\int \psi^* \psi \, d\tau}$$

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If ψ is normalised, $\hat{M}$ is the operator of M

If ψ is an eigen function of $\hat{M}$ with the eigen value m then

$$\bar{M} = \int \frac{\psi^* \hat{M} \psi \, d\tau}{\psi^* \psi \cdot d\tau}$$

$$\bar{M} = \frac{\int \psi^* m \psi \cdot d\tau}{\int \psi^* \psi \cdot d\tau}$$

If $M = m$.

It means that observable quantity $\bar{M}$ has precisely the same values as the eigen value m.

(5) The time dependent Schrodinger eq^n is given as —

$$\hat{H}\psi = \frac{ih}{2\pi} \cdot \frac{d\psi}{dt}$$ since, this is a partial differential eq^n involving both position & time variable. It can be solved