Vitthalbhai Patel & Rajratna P.T.P.SCIENCE COLLEGE

VALLABH VIDYANAGAR
B.Sc. (Semester - 6)
Subject: Physics, Course: US06CPHY01
Title: Quantum Mechanics
First Internal Test

Date: 10/03/2013   Time – 3:30 p.m to 5:00 p.m

Monday   Total Marks – 30

Q-1   **Short Questions (Attempt any Three)**   **(06)**

   (1)   State the Heisenberg's uncertainty principle
   (2)   What is the boundary condition for normalized wave function?
   (3)   Define stationary states of the wave function
   (4)   What is the condition of the total probability of the wave function
   (5)   Define adjoint and non adjoint operator
   (6)   Define Dirac delta function and write its condition

Q-2   Derive the one dimensional Schrodinger equation for a free particle   **(08)**

OR

Q-2   Discuss Ehrenfest's theorem in detail   **(08)**

Q-3   Discuss the motion of a particle in a square well for bound state   **(08)**
and find the admissible solutions

OR

Q-3   Derive the expression of energy eigen values for a particle in a   **(08)**
square well using the admissible solutions

Q-4   Derive the momentum eigen function using δ-function normalized   **(08)**
method

OR

Q-4   Explain the uncertainty in the quantum mechanical observables   **(08)**
and prove that the product of uncertainty in observables is of the
order of commutator