

V.P. & R.P.T.P.SCIENCE COLLEGE, VALLABH VIDYANAGAR

INTERNAL EXAMINATION

B.Sc. (Semester- 6)

Monday, 12th March 2018

11:00 a.m. to 12:30 p.m.

Subject: PHYSICS

Course: US06CPHY01

Title: Quantum Mechanics



Total Marks:25

Q-1 Multiple Choice Questions (Attempt All) (03)

- (1) The function representing matter waves must be _____
(a) complex (b) real
(c) zero (d) infinity
- (2) The limit of a region-I for a square well potential is _____
(a) $-\alpha < x < 0$ (b) $-\alpha < x < -a$
(c) $-a < x < a$ (d) $a < x < \alpha$
- (3) Energy of an isotropic oscillator is _____
(a) continues (b) discrete
(c) 0 (d) $h\nu$

Q-2 Short Questions (Attempt any Two) (04)

- (1) State the de Broglie hypothesis
- (2) State the physical significance of time independent Schrodinger equation
- (3) Write the radial equation for a particle in central potential

Q-3 Derive the one dimensional Schrodinger equation for a free particle (06)

OR

Q-3 Discuss the normalization and probability interpretation of a wave function (06)

Q-4 Find the solution for a particle in a square well for $E < 0$ (06)

OR

Q-4 Using the admissible solutions derive the expression of energy eigen values for a particle in a square well (06)

Q-5 Derive the dimension less Schrodinger equation for simple harmonic oscillator (06)

OR

Q-5 Set up the Hamiltonian of anisotropic oscillator and derive its energy eigen value (06)