

Extra

Vitthalbhai Patel & Rajratna P.T.P.SCIENCE COLLEGE
VALLABH VIDYANAGAR
B.Sc. (Semester - 5)
Subject: Physics
Course: US05CPHY01 (Classical Mechanics)
Internal Examination



Date: 03/10/2017

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

Tuesday

Total Marks: 30

N.B: (i) All the symbol have their usual meanings

(ii) Figures at the right side of questions indicate full marks

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

- (1) The angular momentum is _____ in a central force field
(a) Conserve (b) Non conserve
(c) Zero (d) infinity
- (2) The Lagrangian equations of motion are _____ order differential equations
(a) First (b) second
(c) Forth (d) zero
- (3) The term $\vec{\omega} \times (\vec{\omega} \times \vec{r})$ is called _____
(a) linear acceleration (b) angular acceleration
(c) centripetal acceleration (d) coriolis acceleration

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

- (1) State the Coulomb's inverse square law
(2) Define Holonomic and non-holonomic constraints
(3) Define spherical top and asymmetric top

Q-3 Derive the expressions for gravitational and electrostatic fields and potentials (06)

OR

Q-3 Discuss the motion of a particle in a central force field and prove the conservation laws of linear momentum and total energy (06)

Q-4 Derive the Lagrange's equation of motion for a conservative system from D'Alembert's principle (06)

OR

Q-4 What is cyclic coordinates? Show that total energy is conserved (06)

Q-5 Explain the rotating coordinate system and derive the necessary expressions of velocity and acceleration of the particle (06)

OR

Q-5 Derive the expressions of angular momentum and kinetic energy (06)