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

Date: 01/10/2019 Time: 11:00 a.m. to 12:15 p.m.
Tuesday Total Marks: 25

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) (05)

(1) The electrostatic forces are very much _____than the gravitational forces in the interaction of atomic and subatomic particles
(a) poor (b) equal
(c) stronger (d) lower

(2) The number of independent variable for a free particle in space are _____
(a) three (b) two
(c) one (d) zero

(3) The generalized coordinates for motion of a particle moving on the surface of a sphere of radius 'a ' are _____
(a) a and θ (b) θ and ϕ
(c) 0 and ϕ (d) a and ϕ

(4) The Lagrange's equations of motion for a system is equivalent to _____ equations of motion
(a) Laplace (b) Poisson
(c) Maxwell's (d) Newton's

(5) The path of the particle will be deflected towards _____ in the southern hemisphere due to the Coriolis acceleration
(a) right (b) up
(c) left (d) down

Q-2 State and prove the Gauss' law for electrostatic fields (05)

OR

Q-2 State and prove the Kepler's third law of planetary motion (05)

Q-3 What is cyclic coordinates? Show that total energy is conserved (05)

OR

Q-3 Construct the Lagrangian of Atwood machine and derive it's equation of motion (05)

Q-4 Derive the expression of angular momentum for rotating body (05)

OR

Q-4 Derive the expression of kinetic energy for rotating body (05)

Q-5 Show that the shortest distance between two points in a plane is a straight line (05)

OR

Q-5 Derive the Hamilton's equation of motion (05)