

B.Sc. Semester - V
NOV - 2014
Physics Paper : 501
Subject Code : 4294
[Classical Mechanics, Mathematical Physics]

Time: 2:30 Hours

Total Marks: 70

Q - 1 (A) Define Conservative system. Derive Lagrangian equation for conservative holonomic system. 11

(B) Explain generalized coordinate. 03

OR

Q - 1 (A) Explain generalized potential. Obtain Lagrangian L and its equation for moving charge in an electromagnetic field. 09

(B) Discuss the application of Atwood's machine. 05

Q - 2 (A) Explain Rayleigh's dissipation function and its physical interpretation. 06

(B) Explain different types of constraints with examples. 08

OR

Q - 2 (A) Derive Euler's equation of first kind. 09

(B) Discuss parallel L-C-R problem. 05

Q - 3 (A) Discuss Brachistochrone problem. 09

(B) Show that shortest distance between any two points in a plane is a straight line. 05

OR

Q - 3 (A) Prove that Lagrangian, Hamilton and Newtonian formulations are equivalent. 12

(B) Explain configuration space. 02

Q - 4 (A) Define geodesic. Derive equation of great circle. 10

(B) Derive equation of motion of a particle using polar coordinates. 04

OR

Q - 4 (A) Derive Hamilton's equation of motion. 09

(B) Derive Helmholtz equation and time dependent equation for wave equation. 05

Q - 5 (A) Derive Laplacian operator in spherical polar coordinate system. 05

(B) Derive Helmholtz equation in Cartesian coordinate system. 09

OR

Q - 5 (A) Derive Helmholtz equation in spherical polar coordinate system. 12

(B) Obtain Helmholtz equation for Schrodinger equation. 02