Roll No. ....

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PA-912-O

M. Sc. Examination, Dec. 2013

(First Semester)

PHYSICS

Paper II

(Classical Mechanics)

Time : Three Hours]   [Maximum Marks : 42

Note :– Attempt all the questions.

SECTION - A   7x1=7
(Objective Type Questions)

1. (i) In the normal co-ordinate of the system each of the new co-ordinates involving .... resonant frequencies :

     (a) One

     (b) Two

     (c) Three

     (d) Four

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(ii) A force is one which depends only on the distance from a fixed point :

     (a) Newtonian force

     (b) Central force

     (c) Frictional force

     (d) None of these

(iii) Constraint in the case of rigid body is :

     (a) Dynamic constraint

     (b) Scleronomous constraint

     (c) Pheonomous constraint

     (d) Static constraint

(iv) Kepler law is related with :

     (a) Gravitational force

     (b) Attraction force

     (c) Planetary motion

     (d) Star motion

(v) Suspension galvanometer at its zero position represent the state of :

     (a) Unstable equilibrium

     (b) Stable equilibrium

(c) Neutral equilibrium

(d) None of these

(vi) Momentum of photon having energy E will be :

(a) EC^2

(b) E/C

(c) EC

(d) E^2C

(vii) The four velocity is :

(a) A time like vector of constant magnitude

(b) A time like vector of varying magnitude

(c) A time like vector of neutral magnitude

(d) None of these

SECTION - B　　　5x2=10
(Short Answer Type Questions)

2. Explain the conservation of angular momentum.

OR

Explain D'Almberts principle in generalized coordinates.

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3. What is Rutherford scattering?

OR

Explain the physical significance of Hamiltonian.

4. Write equation of motion.

OR

Explain Corialis force and its one application.

5. Write short note on symmetry of space and time.

OR

Explain covariant Hamiltonian.

6. Explain simple algebaric properties of Poisson's brackets.

OR

Explain Lagrangian formulation of the conservation theorems in brief.

SECTION - C　　　5x5=25
(Long Answer Type Questions)

7. Deduce Hamilton's principle from D'Alemberts principle.

OR

Explain the Generalized moments.

8. Explain equation of canonical transformation.

OR

Explain Kepler problem and inverse central force field.

9. Explain Eigen frequencies and general motion.

OR

Describe application to coupled pendulum and linear bistable molecule.

10. Show that four velocity, four acceleration and four force are invariant under Lorentz transformation.

OR

Explain symmetries of space and time in Galilion transformation.

11. Write short notes on any **two** :

    (a)   Invariance under Galilion transformation.

    (b)   Explain 4 momentum and four force.

    (c)   Reduction to the equivalent one body problem.

    (d)   Rotatory co-ordinates system.

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