BACHELOR OF SCIENCE (CBCS-2018 COURSE)
T. Y. B. Sc. Sem-V : WINTER :- 2021
SUBJECT: PHYSICS : CLASSICAL MECHANICS

Day : Saturday
Date 29-01-2022

W-18410-2021

Time : 02:00 PM-05:00 PM
Max. Marks: 60

N.B.

1) All questions are **COMPULSORY**.
2) Figures to the **RIGHT** indicate **FULL** marks.

Q 1. Attempt any **Two** of the following. **(12)**

(a) Obtain the motion of charged particle under a constant electric field.
(b) How does two body problem reduces to one body problem?
(c) What are the constraints? Explain its types.

Q 2. Attempt any **Two** of the following. **(12)**

(a) Obtain Hamiltonian equation from Lagrange's equation.
(b) Derive the relation between angular momentum (L) and spin angular momentum (L')
(c) Explain the Corioli's force. What is the effect of Corioli's force on nature?

Q 3. Attempt any **Two** of the following. **(12)**

(a) Using Central force motion, obtain the equation of an orbit.
(b) Derive an expression for Lagrangian equation by using D'alembert's principle
(c) With neat diagram, obtain Lagrangian equations for Atwood's machine.

Q 4. Attempt any **Three** of the following. **(12)**

(a) Derive an expression for principle of virtual work done.
(b) Express the potential energy function 'V' in the form of $\mathbf{F} = -\nabla V$, where $\mathbf{F}$ is conservative.
(c) Derive the Lagrangian equation for simple pendulum.
(d) Explain the effect of Corioli's force on freely falling body.

Q 5. Attempt any **Four** of the following. **(12)**

(a) Write a short note on ignorable coordinates.
(b) Two projectiles are projected with the same velocity. If one is projected at an angle of 30° and the other at 60° with the horizontal. Find the ratio of their maximum heights.
(c) Explain the centre of mass of the system.
(d) State and explain Kepler's laws of motion.
(e) What are the advantages of Lagrangian formulation?
(f) What is meant by phase space? Explain.

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