Enrollment No: _____ Exam Seat No:_____

C. U. SHAH UNIVERSITY

Summer Examination-2022

Subject Name : Classical Mechanics

Subject Code : 5SC01CLM1 **Branch: M.Sc. (Physics)**

Semester : 1 **Date : 22/04/2022** **Time : 11:00 To 02:00** **Marks : 70**

Instructions:

(1) Use of Programmable calculator and any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

SECTION – I

Q-1 Attempt the Following questions (07)

a. Give the law of conservation of angular momentum. 01
b. What do you mean by Constraints? 01
c. Name the time dependent and time independent constraints. 01
d. What do you mean by Degree of Freedom? 01
e. Define Virtual displacement. 01
f. What do you mean by Legendre dual transformation? 01
g. Give the Hamilton's equation of motion. 01

Q-2 (14)

Write a note on constraints and its types with suitable examples.

OR

Q-2 (14)

Write a note on Generalized coordinates and give its examples.

Q-3 (14)

Write a note on Hamilton's principle equation and explain it.

OR

Q-3 (14)

Write a note on Hamilton's equation of motion and explain the properties of Hamilton's and Hamilton's equation of motion.

SECTION – II

Q-4 Attempt the Following questions (07)

a. What do you mean by Generating function? 01
b. Write the expression for Poisson bracket. 01
c. When univariant transformation is happened in canonical transformation. 01

	d.	When canonical transformation are invariant?	01
	e.	Solve the bracket [u,u].	01
	f.	When normal modes are seen?	01
	g.	Give some examples where small oscillations theory is applicable.	01

Q-5 (14)

Write a note on generating function and derive its all forms.

OR

Q-5 Attempt all questions (14)

a. Solve lagrangian of spherical pendulum. 08

b. Write a note on Poisson's bracket. 06

Q-6 (14)

Explain in detail the Hamilton-Jacobi theory.

OR

Q-6 Attempt all Questions (14)

a. Solve the lagrangian using Atwood's machine. 08

b. Write a note on significance of Hamilton's principle. 06