DOON UNIVERSITY, DEHRADUN
Final Semester Examination, Ist Semester, 2023
Academic Year 2023-24 (Odd Semester)
School of Physical Science, Department of Physics
Programme Name – Integrated M.Sc.
Course Code: PHG-101-Mechanics I

Time Allowed 2.00 Hours   *Maximum Marks: 50*

SECTION: A :(Very Short Answer Type Questions)   **(Total marks- 12)**

Q1. Explain what 'Physics' is.   (2)

Q2. What are the fundamental forces of nature? How many types of fundamental forces present in nature?   (2)

Q3. How many types of co-ordinate system exist (name)?   (2)

Q4. What is simple harmonic motion? Write down formula for time period for simple harmonic oscillator.   (2)

Q5. Write down the dimension of Force and energy.   (2)

Q6. Name the methods used to solve differential equations.   (2)

SECTION: B

(Short Answer Type Questions)   **(Total marks- 16)**

Solve these

   Q1. $(y^2 - xy)dx + x^2 dy = 0$ (6)

   Q2. $m^2 - 7m + 12 = 0$ (4)

   Q3. $(D^2 + 1)^2 = 0$ (6)

SECTION: C   **(Long Answer Type Questions)**

                                                                           (2*11 = 22)

Q1. Derive the equation of Simple Harmonic Motion and find out its solution. Also discuss the oscillation of a fluid column and find its frequency and time period.

Q2. Solve this by reducible Homogeneous method

$$\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}$$