Roll No. | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 09

M.Sc. (Physics) (Sem.–1)

COMPUTATIONAL PHYSICS

Subject Code : MSPH-415-21

M.Code : 91413

Date of Examination : 21-01-23

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

a. State the need of high level language in Physics.

b. What is the use of DATA statement?

c. What are initial value problems?

d. What is the difference between truncation and round off errors?

e. What are cardinal splines? How are they related to cubic splines?

f. State the errors in Newton's forward and backward difference formulae.

g. What is the need of graphic tools in computational physics?

h. What is the function of '*float*' statement?

i. Write down the importance of header files used in C++-program.

j. Is matrix multiplication associative? Give an example.

SECTION-B

2. Discuss the method of Monte Carlo simulations with the help of an example.

3. Find the Langrange interpolating polynomial of degree 2 approximating the function y = ln *x* defined by the following tables of values. Hence determine the value In 2.7

x	**y = lnx**
2	0.69315
2.5	0.91629
3.0	1.09861

4. Find the minimization property of natural cubic splines.

5. Write a program for finding the transpose of a matrix..

6. Discuss different data types of C++ language giving suitable examples

SECTION-C

7. Using Euler's method, solve the following initial-value problems:

$$\frac{dy}{dx} + 2y = 0, \quad y(0) = 1$$

8. Given $\frac{dy}{dx} = y - x$ where $y(0) = 2$, find $y(0.1)$ and $y(0.2)$ correct to four decimal places using Runge-Kutta method.

9. Discuss different graphic tools in detail.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.