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

Total No. of Questions : 11

M.Sc.(Physics) (2018 Onwards Batch) (Sem.–1)

COMPUTATIONAL PHYSICS

Subject Code : MSPH-415-18

M.Code : 75126

Date of Examination : 17-01-2023

Time : 3 Hrs. **Max. Marks : 70**

INSTRUCTIONS TO CANDIDATES :

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

SECTION-A

1. Answer briefly :

a) What are the advantages of high level language in Physics?

b) What is the shortcoming of Taylor's series method?

c) What is a finite difference method?

d) Write any two sources of error which are encountered while solving mathematical problem.

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

f) State different methods that Scan solve second order boundary value problems.

g) What is the difference between ‘while and do-while loop’?

h) What is the function of a loop?

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

j) What is Scilab programming? Is it case sensitive?

SECTION-B

2. Find the minimization property of natural cubic splines.

3. Sove boundary value problem $\frac{d^2y}{dx^2} - y = 0,\ y(0) = 0, y(2) = 3.6268$ by finite difference method with $h = 0.5$. Find the value of $y(0.1)$.

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

5. Discuss different mathematical operators on vectors in SCILAB.

6. Write a program in C++ to create two 3 × 3 matrices and find their sum.

7. Differentiate between structure and array.

8. Explain different advantages of C++ language over other conventional programming languages by giving suitable examples.

SECTION-C

9. Use Simpson's 1 /3 rule with $h = 1$, evaluate the integral $I = \int_3^7 x^2 \log x\, dx$.

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

11. 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.