Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 11

M.Sc.(Physics) (2018 Batch) (Sem.–1)

COMPUTATIONAL PHYSICS

Subject Code : MSPH-415-18

Paper ID : [75126]

Time : 3 Hrs. Max. Marks : 70

INSTRUCTION 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 is the need of high level language in Physics?

(b) Distinguish between CPU and ALU.

(c) Explain automatic storage class specifier in C++.

(d) Explain void function.

(e) What is a string in C++?

(f) What are memory devices?

(g) Explain the syntax of *go to* control statement.

(h) What are random numbers?

(i) Discuss two areas of applications of simulation techniques.

(j) Find $y(0.1)$ using Euler's method from $\frac{dy}{dx} = x + y, y(0) = 0.$

SECTION-B

2. Differentiate between structure and array.

3. Explain different data types of C++ language by giving suitable examples.

4. Explain the syntax of following control statements in C++ language with suitable example :

   if; nested if-else; switch.

5. Discuss the importance of preprocessor in C++ language.

6. Evaluate $f'(3)$ from

x	0	1	2	4	5	6
$f(x)$	1	14	15	5	6	19

7. Using RK method, find $y(0.1)$, given that $\frac{dy}{dx} = \frac{y-x}{y+x}$ and $y(0) = 1$.

8. Explain Monte Carlo simulation technique.

SECTION-C

9. (a) Explain the necessity of loops in C++ language. Give the syntax of while, for, do loops.

   (b) Write a program to find sum of digits in a given number.

10. (a) What is an array? Explain the declaration and initialization of one dimensional arrays with example.

    (b) Write a program to calculate the area and volume of a sphere.

11. (a) Using Milne's method, find $y(0.3)$, from the equation $y' = x^2 + y^2 - 2$, using the following data : (–0.1, 1.0900), (0, 1.0000), (0.1, 0.8900) and (0.2, 0.7605).

    (b) Evaluate $I = \int_0^1 \frac{1}{1+x}\,dx$ using Weddle's rule.