(Pages : 3) **P – 5271**

Reg. No. : .....

Name : .....

Second Semester M.Sc. Degree Examination, September 2022

Physics

PH 223 : COMPUTER SCIENCE AND NUMERICAL TECHNIQUES

(2020 Admission Onwards)

Time : 3 Hours Max. Marks : 75

PART – A

Answer any **five** questions. Each question carries **3** marks.

1. Explain the terms: bit, word and address bus.
2. What is a list in Python? Discuss any two methods or functions for fist operations.
3. How is microcontroller5 different from microprocessor?
4. What is the difference between structure and class in C++?
5. How data is read from and written to files in C++?
6. Write forward, backward and central difference formula for the first order derivative.
7. Derive Simpson's 1/3 rule from general quadrature formula.
8. Explain how Schrodinger equation (one dimensional) is numerically solved.

(5 × 3 = 15 Marks)

P.T.O.

PART– B

Answer any **three** questions. Each question carries **15** marks.

9. (a) Explain the addressing modes in 8085 microprocessor.

   (b) Explain the different registers in 8085 microprocessor.

10. (a) Discuss various topologies.

    (b) Explain OSI model for computer networks.

11. (a) Discuss how multidimensional arrays are represented in C++ and how it is stored in memory.

    (b) Write a program to print the upper and lower triangles of an $N \times N$ matrix.

12. (a) How are files declared in C++? Explain the basic file operations.

    (b) Explain how arrays are passed as arguments of functions.

13. (a) Explain how Laplace's equation in two dimensions is numerically solved.

    (b) Derive Newton's backward difference interpolation formula.

14. (a) Discuss in brief Euler's method of solving ordinary differential equations.

    (b) Derive Lagrange interpolation formula.

($3 \times 15 = 45$ Marks)

PART – C

Answer any **three** questions. Each question carries **5** marks.

15. Differentiate RAM and ROM.

16. Explain Pin diagram in 8085 microprocessor.

17. Write a C++ program that implements the bisection method for finding the roots of a nonlinear equation.

18. Write a C++ program to find the factorial of an integer.

19. The velocity of a car running on straight road in the intervals of two minutes is given below

Time (Minutes)	0	2	4	6	8	10	12
Velocity (In Km/hr)	0	22	30	27	18	7	0

Apply Simpson's rule to find the distance covered by the car.

20. Derive Gauss's backward formula of interpolation.

($3 \times 5 = 15$ Marks)