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Second Semester M.Sc. Degree Examination, April 2023

Physics with Specialization in Nano Science/Physics with Specialization in Space Physics

PHNS 523/PHSP 523 : 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. What is meant by system bus?
2. What are the categories of instruction sets available in 8085?
3. How is microcontrollers different from microprocessors?
4. What is the difference between structure and class in C++?
5. Explain how two-dimensional arrays are created in C++.
6. Derive central difference formula for the second order derivative.
7. Derive Simpson's 1/3 rule.
8. Explain Euler's method for solving a differential equation.

(5 × 3 = 15 Marks)

P.T.O.

PART – B

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

9. (a) Explain the machine cycle and bus timings of 8085 microprocessor.

   (b) Discuss briefly the registers in 8085.

OR

10. (a) Discuss important computer network topologies.

    (b) Distinguish between RAM, ROM and Cache memory.

11. (a) Discuss the definition of classes and objects in C++. How functions are declared in class?

    (b) Explain switch statements in C++. Give an example.

OR

12. (a) Explain how files are created and accessed in C++.

    (b) Explain the concept of pointers and any two applications with illustrative C++ statements.

13. (a) Write a note on Lagrange's interpolation.

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

OR

14. (a) Explain Runge-Kutta method of second order for solving ordinary differential equations.

    (b) Explain modified Euler's method.

(3 × 15 = 45 Marks)

PART – C

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

15. Write a Python code for displaying all the prime numbers within an interval.

16. Write 8085 assembly program to add two 8 bit numbers stored in memory locations and to store the result in another location.

17. Explain finite difference operators.

18. Write a C++ program with a class for complex numbers and functions to add, multiply and display complex numbers, and to illustrate their use by creating and initialising objects.

19. Find Newton's interpolation polynomial for the following data points (x,y):

    (1,1) (2,5) (3,2)(3.2, 7) and (3.9, 4).

20. Explain Gauss elimination method for solving a system of linear algebraic equations.

(3 × 5 = 15 Marks)