(Pages : 4) M – 5440

Reg. No. : .....

Name : .....

Second Semester M.Sc. Degree Examination, November 2021

Physics

PH 223 : COMPUTER SCIENCE AND NUMERICAL TECHNIQUES

(2020 Admission)

Time : 3 Hours Max. Marks : 75

PART – A

Answer any **five** questions, each question carries **3** marks:

1. Briefly discuss about RAM, ROM and cache memories
2. Briefly discuss about different addressing modes of 8085 microprocessor
3. Interpret the following 8085 commands

   LXI H, 1256H

   MOV A,M

   ADD C
4. What is tuples in Python language
5. Distinguish between C++ classes and objects with a situation where each can be used.

P.T.O.

6. How single and two-dimensional arrays are declared in C++ with one example each

7. Briefly discuss the steps involved in Gauss-Jordan method of finding the inverse of a matrix.

8. Write a short note on central difference interpolation formula.

(5 × 3 = 15 Marks)

PART – B

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

9. (a) Discuss with a schematic diagram about functional description of intel microprocessor 8085 narrate the functionalities. **9**

(b) Discuss about addressing modes of 8085 microprocessor **6**

OR

10. (a) Briefly discuss about computer architecture, memory and I/O devices **(4+5)**

(b) Write a short note on computer networks. **6**

11. (a) Discuss the following with reference to the C++ language: conditional statements, switch statements, nested loop with one example along with C commands. **(3+3+3)**

(b) Write a C-program for reading a set of 10 data from an input file and check whether the number is a prime number and save the prime numbers to another file. **6**

OR

12. (a) Discuss about classes and objects in C++ language with examples. **8**

(b) Write a C++ program for evaluating cos(x) using series expansion with an accuracy better than 10^{-6}. **7**

13. (a) Derive the general quadrature formula and obtain Simpson's 3/8 rule. **9**

(b) Compute the integral with Simpson's 3/8 rule. **6**

$$\int_0^1 \frac{1}{1+x^2}\,dx.$$

OR

14. (a) (i) Discuss Runge-Kutta methods for finding numerical solution of ordinary differential equation. **6**

(ii) Discuss the steps involved in numerical solution of higher order differential equations. **2**

(b) Solve the differential equation $\frac{dx}{dy} = -y$ with condition $y(0) = 1$ for $y(0.01)$ with $h = 0.01$ using 4^{th} order Runge–Kutta method. **7**

PART – C

Answer any **three** questions, each question carries **5** marks.

15. Write a Python program for summing natural numbers from 1000 and 2000 to a file.

16. Write an assembly language program for adding two 8-bit binary numbers kept in the memory location 1500 H, 1600 H and save the result at 1700 H.

17. Write a C++ program for reading the parameters of a quadratic equation solve it and save the results to another file.

18. Write a C++ program for reading a 3 x 3 matrix and write its transpose to another file.

19. From the set of values given, find the value of $\log^{10}(\pi)$ using the Newton's forward interpolation formula.

X	log x
3.141	0.497068
3.143	0.497344
3.145	0.497621
3.147	0.497897
3.149	0.498173

20. Use Lagrange interpolation formula to find the value of y at x=4.5, from the following data.

(3 x 15 = 45 Marks)
