

Reg. No. : 63120176005

Name : Anoop M. S

Second Semester M.Sc. Degree Examination, March 2022

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

PHNS 523/PHSP 523 : 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. Write a short note on operating system.
2. Write a short note on registers in microprocessor 8085.
3. Interpret the following microprocessor 8085 commands.  
MVI A, 08H  
SUB A  
JNC 1600 H
4. Briefly discuss about Python objects.
5. Distinguish between C++ classes and objects with a situation each where it can be used.
6. Explain briefly about built-in and user define functions in C++ with one example for each.

P.T.O.



7. Discuss about numerical integration using Simpson's 1/3 rule.
8. Write a short note on Gauss's forward interpolation formula.

(5 × 3 = 15 Marks)

PART – B

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

9. (a) Briefly discuss about interrupts of microprocessor 8085. 9
- (b) Discuss about how memory interfacing in 8085. 6

OR

10. (a) Write a short note on computer data communication and computer networks. 4+5
- (b) Briefly discuss about Python file input and output functions one example for each. 6
11. (a) Discuss the method of file handling in C++ language with examples. 8
- (b) Write a C++ program for reading the name and total marks of 10 students from a file and rank them according to the marks scored and save it to another file. 7

OR

12. (a) Discuss briefly about arrays and storage classes in C++ language with examples. 4+4
- (b) Write a C++ program for reading a 3 × 3 matrix from a file and writing its transpose to another file. 7

13. (a) Derive the general quadrature formula and obtain Simpson's 1/3 rule. 9
- (b) Compute the integral with Simpson's 1/3 rule and find the error in the evaluation. 4+2

$$\int_0^{\pi/2} \sin(x) dx$$

OR

14. (a) Discuss Runge-Kutta methods for finding numerical solution of ordinary differential equation. How higher order differential equations are solved using RK method with an example. 5+2

- (b) Solve the differential equation  $\frac{dy}{dx} = -y$  with condition  $y(0) = 1$  for  $y(0.01)$  with  $h = 0.01$  using 4<sup>th</sup> order Runge-Kutta method. The exact solution is  $y = e^{-x}$ . 8

(3 × 15 = 45 Marks)

PART-C

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

15. Write a Python program for finding the sum of two  $3 \times 3$  matrices.
16. Write an assembly language program for adding and subtracting an 8-bit binary numbers kept in the memory location 1600 H from 1500 H and save the result at 1700 and 1701 H.
17. Write a C++ program for reading a  $3 \times 3$  matrix from a file and do row operations to make the first diagonal element to be unity and all the elements below it to be zero.
18. Write a C++ program for writing the prime numbers between 1000 and 2000 to a file.



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

x	log x
3.100	0.491362
3.141	0.497068
3.142	0.497206
3.145	0.497621
3.200	0.505150

20. Find the inverse of the given matrix using Gauss Jordan method.

$$\begin{pmatrix} 3 & 4 & 1 \\ 2 & 4 & -2 \\ 2 & -3 & 2 \end{pmatrix}$$

(3 × 5 = 15 Marks)