

Reg. No. :

Name :

Second Semester M.Sc. Degree Examination, July 2019

Physics

Special Paper II

PH 223 : COMPUTER SCIENCE AND NUMERICAL TECHNIQUES

(2014 – 2017 admissions)

Time : 3 Hours

Max. Marks : 75

PART – A

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

- I. (a) What are the types of computers based on data handling techniques? Give example for each.
- (b) What are local variables and global variables in Python?
- (c) What are the different interrupt signals of an 8085 microprocessor?
- (d) What is the difference between fundamental and derived data types in C++? Explain with examples.
- (e) Write the syntax of 'switch' statement and explain its advantages.
- (f) How does the coefficient matrix A in the system $AX=B$ get transformed in Gauss Jordan method?
- (g) Find $\frac{dy}{dx}$ at $x = 0$ using Newton's forward difference interpolation.
- (h) Obtain the standard five point formula to solve the Laplace equation.

(5 × 3 = 15 Marks)

PART – B

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

- II A (a) What are the key features of Python? 8
- (b) What are python modules? Name some commonly used built-in modules in Python? 7

OR

- II B (a) Explain the architecture of 8085 microprocessor 8
- (b) Explain the memory read cycle of 8085 microprocessor with the help of timing diagram 7
- III A (a) Discuss the structure and class formats in C++ programming. 8
- (b) Describe the object concepts in C++ programming 7

OR

- III B (a) Write a C++ program to evaluate $SUM = 1 + (1/2)^2 + (1/3)^2 + (1/4)^2 + \dots$ with 0.0001% accuracy. 9
- (b) Discuss on various types of Storage Classes. 6

- IV A Derive Lagrange's interpolation formula and evaluate $f(3)$ if $f(1)=1, f(2)=4$ and $f(5)=10$. 15

OR

- IV B (a) Differentiate between Euler's method and modified Euler's method. 5
- (b) Using modified Euler's method, find $y(0.1)$ correct to four places. Given that $\frac{dy}{dx} = e^x + y$ and $y(0) = 0$. 10

(3 × 15 = 45 Marks)



PART – C

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

- V. (a) Explain the usage of `help()` and `dir()` function in Python?
- (b) Write down the assembly language program for subtracting 1D from 23H. The answer is to be stored in the memory location 2070H.
- (c) Write a C++ program using function to find the factorial of a given number.
- (d) Write a C++ program to find out the inverse of a matrix.
- (e) Solve the system of equations $x + y + z = 7, 3x + 3y + 4z = 24, 2x + y + 3z = 16$ using Gauss elimination method.
- (f) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ using trapezoidal rule.

(3 × 5 = 15 Marks)

