C 83074

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Name....................................

Reg. No................................

SECOND SEMESTER M.A./M.Sc./M.Com. DEGREE EXAMINATION JUNE 2020

(CBCSS)

Physics

PHY 2C 08—COMPUTATIONAL PHYSICS

(2019 Admissions)

Time : Three Hours

Maximum : 30 Weightage

Section A

Answer all questions.
Each question carries weightage 1.

1. How is memory managed in Python?

2. Sort out the main features of Python programming language.

3. What are Python libraries ? Name a few of them.

4. In Python what is pickling and un-pickling ?

5. Explain the term curve fitting.

6. Write Newton's backward interpolation formula.

7. How will you convert a string to number in Python ?

8. Given S = '012345678', write a Python code to remove the first and last two elements and to reverse the order of digits.

(8 × 1 = 8 weightage)

Section B

Answer any two questions
Each question carries weightage 5.

9. Write a program a program which will take initial velocity and angle of projection as input and computes the trajectory using Euler's method and to give a graphical output of the trajectory.

10. Explain the method of least squares curve fitting. Illustrate it with example how to fit a straight line to a set of tabulated values.

Turn over

11. Write short notes on Shooting Method and Numerov's Method in Numerical analysis.

12. What is interpolation ? Discuss the various types of finite difference operators. Construct a forward difference table for the following data :

X :	0.26	0.28	0.30	0.32	0.34
Y :	0.3453	0.4447	0.5439	0.6431	0.7425

$(2 \times 5 = 10$ weightage)

Section C

Answer any four questions.
Each question carries weightage 3.

13. Write a Python program to print the Fibonacci numbers up to n terms where n is given by the user.

14. Write a Python Program to evaluate a definite integral with n subdivisions using Simpsons rule.

15. Compute the Integral $\int_0^2 \sqrt{x}\,dx$ using trapezoidal method.

16. Find the approximate value of $\int_0^1 \frac{dx}{1+x}$ using Simpson's rule and obtain a bound for the errors.

17. Write a python program to study the motion of a freely falling particle under gravity.

18. Find the value of π using a Python Programme.

19. Write a program to polynomial evaluation of Bessel function :

$$J_n(x) = \sum_{s=0}^{\infty} \frac{(-1)^s}{s!(n+s)!} \left(\frac{x}{2}\right)^{2s+n}.$$

$(4 \times 3 = 12$ weightage)