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THIRD SEMESTER UG DEGREE EXAMINATION, NOVEMBER 2025

(CUFYUGP)

PHY3CJ202 /APH3CJ202: COMPUTATIONAL PHYSICS

2024 Admission onwards

Maximum Time :2 Hours | **Maximum Marks :70**

Section A

All Questions can be answered. Each Question carries 3 marks (Ceiling : 24 Marks)

1	Write an algorithm to find the largest among three numbers.
2	Explain the role of eval() in Python with an example.
3	List any three differences between Tuple and List in Python.
4	Write the syntax of the flow of control statements (simple if, if-else, nested if) with example

5	Write the output of the following:
	`x = [2, 4, 6]`
	`print(x*2)`

6	Define discretisation in numerical methods with an example from experiments.
7	State Newton's forward difference interpolation formula.
8	What is the principle behind the least squares method of curve fitting?
9	Mention two limitations of Euler's method for solving ODEs.
10	What is the advantage of Numerov's method?

Section B

All Questions can be answered. Each Question carries 6 marks (Ceiling : 36 Marks)

11	Write an algorithm and corresponding Python program to compute factorial of a number.
12	Using formatted printing in Python, display the following: `Name: Alan, Age: 20, Score: 85.50`
13	Write a Python program to generate 10 random numbers using NumPy and compute their mean and standard deviation.
14	Given the data: (x, y) = (1,1), (2,4), (3,9). Perform Newton's forward interpolation to find y at x = 2.5.
15	Fit a straight line of the form y = ax + b using least squares for the data: (1, 2), (2, 3), (3, 5). Find a and b.
16	Use the trapezoidal rule to approximate $\int_0^1 e^x dx$ using 4 intervals.
17	Apply Euler's method with step size h = 0.1 to solve dy/dx=−2y, y (0) = 1, at x = 0.2.
18	Discuss the Monte-Carlo method of finding the value of π. Develop a python code for it.

Section C	
Answer any ONE .Each Question carries 10 marks (1x10=10 Marks)	
19	Explain different file handling operations in Python with examples. Illustrate with a program that writes and reads student data from a file.
20	Discuss the importance of numerical integration in experimental physics. Compare trapezoidal and Simpson's 1/3 rule with examples.