

D 130251

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Name.....

Reg. No.....

**FIFTH SEMESTER (CBCSS—U.G.) DEGREE EXAMINATION
NOVEMBER 2025**

Physics/Applied Physics

PHY 5B 06/APH 5B 06—COMPUTATIONAL PHYSICS

(2019 Syllabus)

Time : Two Hours

Maximum : 60 Marks

*The symbols used in this question paper have their usual meanings.***Section A (Short Answer Type)***Answer **all** questions in two **or** three sentences.**Each correct answer carries a maximum 2 marks.*

1. Write a python program to input a number and print it.
2. Differentiate *int* variable and *float* variable in python. How one type of variable is changed to the other ?
3. How do you add single line and multiple line comments in python ?
4. What are lists and tuples in python ?
5. Write down Taylor series expansion for a function $f(x)$ around x_0 .
6. Differentiate analytical and numerical solutions ?
7. Write the output of the following in python.
 - (a) `7 / 2`.
 - (b) `7 // 2`.
8. How do you create a two dimensional array using Numpy ? Give an example.

Turn over

9. Write the output of the following commands

```
b = "Hello"
print(b[2:5])
print(b[::-1])
```

10. Write a program, using a function to read angle in radian and convert it into degrees.
11. Write a program to create an array [1, 6, 11, 16.....46] using Numpy.
12. How do you label axes and choose line styles in plots using Matplotlib.

(Ceiling - 20)

Section B (Paragraph / Problem Type)

Answer all questions in a paragraph of about **half a page to one page**, each correct answer carries a maximum of 5 marks.

13. Write a program to count the number of vowels in a string read from input.
14. Using bisection method to find the real root of the equation $x^2 - 6x + 1 = 0$ between 0 and 1.
15. Evaluate $f(15)$, given the following table of values using Newton's forward difference interpolation.

X	:	10	20	30	40	50
$y = f(x)$:	46	66	81	93	101

16. Write a python program to read a decimal number and convert it into binary.
17. Write a program to solve $y' = -\sin(x)$, given $y(0) = 1$. Add code to plot the solution.
18. Evaluate $1 = \int_0^1 \frac{1}{1+x} dx$ using the Trapezoidal rule taking step size $h = 0.125$. Write the algorithm for the method.
19. Write a program to graphically simulate the projectile motion.

(Ceiling - 30)

Section C (Essay Type)

Essays - Answer in about two pages, any one question.

The question carries 10 marks.

20. Explain Least square curve fitting method and obtain the equations for fitting straight lines. Fit a straight line to the following data.

x	:	0.5	1.0	1.5	2.0	2.5	3.0
y	:	15	17	19	14	10	7

21. Given $\frac{dy}{dx} = x^2 - y$, $y(0) = 1$. find $y(0.1)$ correct to 3 decimal places using Euler method and Runge Kutta method. Write programs for both the methods.

(1 × 10 = 10 marks)