D 30584 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION NOVEMBER 2022

Physics/Applied Physics

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

(2019 Admission onwards)

Time : Two Hours Maximum : 60 Marks

Section A (Short Answer Type)

Answer **all** *questions in two* **or** *three sentences.*
Each correct answer carries a maximum of 2 *marks.*

1. Define functions in Python.
2. Differentiate between interactive mode and script mode used in Python.
3. Modify the expression print 5 + 3 * 2 to get the result of 16.
4. What is meant by indentation ?
5. Discuss any two functions to create arrays in Python.
6. Write a note on matplotlib module.
7. Write down Forward difference table.
8. Write down Newton's forward interpolation formula.
9. Write down Taylor series expansion of sin x
10. Write a python program to plot cos x using plot().
11. Discuss the accuracy consideration in simulation.
12. Write the significance of computer in numerical methods.

(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 plot a circle using the polar() function.
14. Discuss second order Runge-Kutta method.

Turn over

15. Write a Python program to create a 3 × 3 matrix and find its inverse.

16. Write a program to convert Fahrenheit to Celcius.

17. Find the cubic polynomial which takes the following values

$y(0)=1, y(1)=0, y(2)=1$ and $y(3)=10$. Obtain $y(4)$ using Newton's forward interpolation formula.

18. Write a note on graphical simulation ; take a horizontally thrown projectile as an example.

19. Write a Python program to simulate motion of a freely falling object.

(Ceiling 30)

Section C (Essay Type)

Answer in about **two pages**, *any* **one** *question.*
Each correct answer carries 10 *marks.*

20. Write an essay on different data types in Python.

21. Obtain Trapezoidal rule and Simpson's 1/3 rule for numerical integration.

(1 × 10 = 10 marks)