18. (a) State and prove Gaussian function.

Or

(b) List out the properties of gamma functions.

19. (a) Find out the eigen values of $A = \begin{bmatrix} 2 & 2 \\ 1 & 3 \end{bmatrix}$.

Or

(b) Explain the relaxation method.

20. (a) State Kirchoff's Law. (Current law).

Or

(b) Explain Monte Carlo Simulation method.

SECTION C — (3 × 10 = 30)

Answer any THREE questions.

21. Give an detailed account on loop functions.

22. State and prove Bessel function.

23. Derive schrodinger equation.

24. Brief explain on Arithmetic Operation with an example.

25. Give a note on Zeros of polynomials.

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S.No. 6984 **P 22 PYE 1 B**

(For candidates admitted from 2022–2023 onwards)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

Physics — Elective

PHYSICS SIMULATIONS WITH PYTHON

Time : Three hours Maximum : 75 marks

SECTION A — (20 marks)

Answer ALL questions.

I. (A) Choose the correct answer: (5 × 1 = 5)

1. Which of the following is not valid variable name in Python?

(a) –Var (b) Var_name

(c) Var | | (d) | | Var

2. Which is the following is an Arithmetic Operator in python?

(a) // (floor division) Operator

(b) & (binary and) Operator

(c) ~ (navigation) Operator

(d) >> (right shift) Operator

3. $\Gamma(n+1) = n!$ can be used for,

(a) n is any integer

(b) n is a positive integer

(c) n is a negative integer

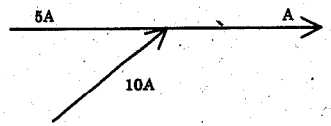
(d) n is any real number

4. If $f(x) = y$ then $f^{-1}(y)$ is equal to,

(a) y (b) x

(c) x^2 (d) None of the above

5. Calculate the current A?



(a) 5 A (b) 10 A

(c) 15 A (d) 20 A

(B) Fill in the blanks: (5 × 1 = 5)

6. _____ Will be the output of the following python code?

(a) >>> $t = (1,2,4,3)$

(b) >>> $t = [1:3]$

7. _____ is the output of the expression, 3*|**3?

8. _____ type of chart is not valid in piechart.

9. _____ is the Nyquist rate and Nyquist internal for the signal $f(t) = rect(200t)$.

10. _____ is the phase difference between the velocity and acceleration in SHM.

II. Answer the following questions: (5 × 2 = 10)

11. Define strings.

12. State Inversion matrix and its equation.

13. Define the function of sine in python.

14. Find the Eigen values for 2 × 2 matrix: $A = \begin{bmatrix} 1 & 8 \\ 2 & 1 \end{bmatrix}$

15. Explain Fast Fourier Transform (FFT).

SECTION B — (5 × 5 = 25)

Answer ALL questions, choosing either (a) or (b).

16. (a) Define expressions and statements.

Or

(b) Distinguish between Tuples and dictionary.

17. (a) Explain the functions of arithmetic operators and types.

Or

(b) Solve the matrix inversion $A = \begin{bmatrix} 4 & 3 \\ 3 & 2 \end{bmatrix}$.