Roll No.							

25-PH-43-B

M.Sc. IV SEMESTER [MAIN/ATKT] EXAMINATION MAY - JUNE 2025

PHYSICS

Paper - III

[Computational Methods and Programming]

[Max. Marks : 75] *[Time : 3:00 Hrs.]* *[Min. Marks : 26]*

Note : Candidate should write his/her Roll Number at the prescribed space on the question paper.
Student should not write anything on question paper.
Attempt all five questions. Each question carries an internal choice.
Each question carries **15 marks.**

Q. 1 a) What do you mean by Operators ? Explain its type with examples.

b) Explain different manipulation function with example.

OR

a) Explain string manipulation functions role strlen( ) , strcpy( ), stremp( ) etc.

b) Explain formal arguments and actual arguments.

Q. 2 a) Explain Eigen vectors of Matrix.

b) Solve Sin $x = 1 + x^3$ using Newton Raphson Method.

OR

a) Find a real root of Wall's equation using false position

$f(x) = x^3 - 2x - 5 = 0$

b) Use Newton Raphson method to find a root of the equation -

$x^3 - 3x - 5 = 0$

Q. 3 a) Use Largange's interpolation formula to find f(10), if following values of x and y are given -

x :	5	6	9	11
y :	12	13	14	16

b) Find a straight line to the following data -

x :	71	68	73	69	67	65	66	67
y :	69	72	70	70	68	67	68	64

OR

a) From the following table find the number of students who obtain less than 45 marks -

Marks	No. of Students
30-40	31
40-50	42
50-60	51
60-70	35
70-80	31

b) Construct forward, backward and divided difference table for following data

x :	1931	1941	1951	1961	1971	1981
y :	12	15	20	27	39	52

Q. 4 a) Evaluate $I = \int_0^1 \frac{1}{1+x}\, dx$

Correct to three decimals places using by both the trapezoidal and Simpson's rule with h = 0.05, 0.25, 0.125

b) Given $\frac{dy}{dx} = y - x$ where y (0) = 2,

find y(0.1) and y(0.2) correct to four decimal places using by Runge Kutta second order formula.

OR

a) Given $\frac{dy}{dx} = 1 + y^2$, where y = 0 when x = 0, find y(0.2), y(0.4) and y(0.6) using Runge Kutta second order formula.

b) Calculate $\int_0^{\pi/2} e^{\sin x}\, dx$ correct to four decimal places by Simpson's 3/8 rule taking h = $\pi/6$

Q. 5 Write short notes on following (**any two**) -

i) Explain difference between while and do while loop with example.

ii) Eigen value and Eigen vectors of matrices.

iii) Find the inverse of matrix - $A = \begin{pmatrix} 0 & 2 & 4 \\ 2 & 4 & 6 \\ 0 & 2 & 2 \end{pmatrix}$

by Gauss - elimination method.

iv) Simpson Rules.