Roll No. _____ **Code No. Q-4398**

FOURTH SEMESTER EXAMINATION 2021-22

M.Sc. PHYSICS

Paper - I

Computational Methods & Programming

Time : 3.00 Hrs. **Max. Marks : 80**

Total No. of Printed Page : 03 **Mini. Marks : 29**

Note: Question paper is divided into three sections. Attempt question of all three section as per direction. Distribution of Marks is given in each section.

Section - 'A'

Very short answer questionss (in few words)

Q.1 Attempt any six question from the following : 6x12=12

(i) Write the definition of transcendental education.

(ii) Write the name of classification of transcendental equation.

(iii) Bisection method is due to which?

(iv) Define spectrum and spectral radius of Eigen value.

(v) Write the definition of forward differences for interpolation.

(vi) Write the definition of curve fitting.

(vii) Write the use of Runge - Kutta's method.

(viii) Write the definition of interpreters.

(ix) Define flow Chart.

(x) Write about non-executable.

Section - 'B'

Short answer questions (in 200 words)

Q.2 Attempt any four questions from the following : 4x5=20

(i) Find a real root of the equation from $x^3 - 9x + 1 = 0$ by the Bisection method.

(ii) Find a real root of the equation $2x = \cos x + 3$ correct to three decimal places by Iteration method.

(iii) Define pivoting method.

(iv) Define about eigen value.

(v) Define about sampling.

(vi) Draw a Flow chart for computing the sum of the digits of a number.

(vii) Describe about built in function.

Section - 'C'

Long answers/Essay type questions.

Q.3 Attempt any four question from the following : 4 x12 - 48

(i) (a) Write the Newton Raphson method for linear equation.

(b) Find a real root of the equation $x^3 - x - 1 = 0$ using Newton Raphson medhod, correct to four decimal places.

(ii) (a) Describe about Iteration method for non linear equation.

(b) Find a real root of the equation.

$$x = 0.2x^2 + 0.8$$
$$y = 0.3xy^2 + 0.7$$

(iii) (a) Write Matrix Inversion method in detail.

(b) Solve the equation by matrix Inversion Method.

$$3x + 2y + z = 3$$
$$2x - 3y - z = 3$$
$$x + 2y + z = 4$$

(iv) (a) Describe about Power method.

(b) Find the eigen value of largest modules and associated eigen vector of the matrix.

$A = \begin{Bmatrix} 2 & 3 & 2 \\ 4 & 3 & 5 \\ 3 & 2 & 9 \end{Bmatrix}$ by

Power method.

(v) (a) Describe about forward difference operator.

(b) Construct a forward difference.

table for following values of x and y

x :	0.1	0.3	0.5	0.7	0.9	1.1	1.3
y :	0.003	0.067	0.148	0.248	0.370	0.518	0.697

(vi) (a) Describe about operating system in detail.

(b) Write about Integer and Floating point arithmetic.

(vii) (a) Write about Assignment in detail.

(b) Describe about sub routines and functions.

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