U.G. 3rd Semester Examination - 2021

PHYSICS

[HONOURS]

Course Code : PHY-H-CC-P-05

(Mathematical Physics-II)

[PRACTICAL]

Full Marks : 20 Time : 2 Hours

The figures in the right-hand margin indicate marks.

Answer any **four** questions: 5×4=20

1. Write a program using Python/ Matlab/ Scilab/ Octave to find the eigen values and Eigen vectors of the matrix

$$\begin{pmatrix} 1 & 1 & 1 & 0 \\ 1 & 1 & 0 & 1 \\ 0 & 1 & 1 & 1 \\ 1 & 0 & 1 & 1 \end{pmatrix}$$

2. Write a program to find and plot Legendre polynomial of degree 2 to 6 using Matlab/Scilab/Matplotlib.

3. Write a program using Python/Matlab/Scilab/Octave to solve the following system of equations using Gauss Elimination Method:

$$x + y + z = 2$$
$$x + 2y + 3z = 5$$
$$2x + 3y + 4z = 11$$

4. Write an algorithim to solve equation of Forced harmonic oscillator by the Runge Kutta second order method.

5. Write an algorithm to solve the equation for the current RC. Circuit with DC source using Euler method.

6. Fit a least square line for the following data. Also find the trend values and show that $\sum\left(Y - \hat{Y}\right) = 0$

Where $\hat{Y}$ = average of Y

X	1	2	3	4	5
Y	2	5	3	8	7

Write the algorithm for this problem.

7. Fit a straight line trend by the method of least square from the following data and find the trend values.

Write a program in Python/Matlab/Scilab/Octave.

Year	1958	1959	1960	1961	1962
Sales	65	95	80	115	105

8. Write an algorithm to solve Laplace equation by the method of modified Euler method.

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