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GIET UNIVERSITY, GUNUPUR – 765022
M. Sc. (First Semester) Examinations, February – 2024
22PHPC103 – Computer Programming and Numerical Analysis
(Physics)

Time: 3 hrs

Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

PART – A**(2 x 10 = 20 Marks)**

Q.1. Answer ALL Questions	CO#	Blooms Level
a. State the role of break statement in switch..case control structure.	CO 1	K1
b. State the difference between recursive and iterative process.	CO 1	K1
c. Write the syntax and example on function prototype declaration.	CO 1	K1
d. Write an algorithm for Newton - Raphson's method.	CO2	K1
e. What is the role of numerical method in computer programming?	CO2	K1
f. What is error? Write common ways to express an error.	CO3	K1
g. Define singular matrix with an example.	CO3	K1
h. Define eigen value and eigen vector of a matrix.	CO4	K1
i. What is interpolation?	CO4	K1
j. What is the formula of 1st order Runge- kutta method.	CO4	K2

PART – B**(10 x 5 = 50 Marks)**Answer ANY FIVE questions

	Marks	CO#	Blooms Level												
2. a. Write a program to input values into two matrices A(3x4), B(4x3). Perform matrix multiplication and display the resultant matrix	8	CO1	K2												
b. Write a syntax for 2D array declaration?	2	CO1	K2												
3.a. Write an algorithm and draw flowchart to input a number and check whether it is Armstrong or not	6	CO1	K2												
b. Write the syntax and example on function prototype declaration.	4	CO1	K2												
4. a. Write a program and algorithm to find the numerical integration by Simpson 1/3 method.	8	CO2	K2												
b. Draw a flowchart for simple interest.	2	CO2	K1												
5.a. Solve the system of linear equation by Gauss elimination method.	5	CO3	K2												
$2x - y + 3z = 9$															
$x + y + z = 6$															
$x - y + z = 2$															
b. Find the least square to fit a straight line to following data	5	CO3	K2												
<table border="0" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding-right: 10px;">X</td> <td>0</td><td>5</td><td>10</td><td>15</td><td>20</td> </tr> <tr> <td>Y</td> <td>7</td><td>11</td><td>16</td><td>20</td><td>26</td> </tr> </table>	X	0	5	10	15	20	Y	7	11	16	20	26			
X	0	5	10	15	20										
Y	7	11	16	20	26										
6. a. Find the positive root of the equation $x^3 - 3x - 5 = 0$ by Regula-Falsi method correct up to 4 decimal places.	5	CO3	K2												
b. Find the inverse of a matrix by using Gauss elimination method	5	CO3	K2												

$$\begin{bmatrix} 3 & 5 & 7 \\ 1 & 3 & 2 \\ 9 & 4 & 6 \end{bmatrix}$$

7.a. Find the Eigen value and Eigen vector of matrix 5 CO4 K2

$$\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$$

b. Find the Lagrangian interpolation polynomial of the following data 5 CO4 K2

x	5	6	9	11
F(x)	12	13	14	16

8. a. Evaluate the integral $\int_1^3 \frac{1}{x} dx$ by using Simpson's 1/3 rule 5 CO4 K2

b. Solve the differential equation $\frac{dy}{dx} = 2xy + y$, $y(1) = 2$, taking $h = 0.2$,
Find $y(1.4)$ by using 4th order Runge –Kutta method. 5 CO4 K2

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