

U.G. 5th Semester Examination - 2021**COMPUTER SCIENCE****[HONOURS]****Discipline Specific Elective (DSE)****Course Code : COM.SC-H-DSE-P-502****[PRACTICAL]**

Full Marks : 75

Time : 4 Hours

*The figures in the right-hand margin indicate marks.***Marks Allotment :****Notebook : 5 Marks****Semester End Practical : 70 Marks****(Experiment : 60 Marks, Viva : 10 Marks)***Use C/C++ to write the **one** of the following codes and that to be allotted on lottery basis.*

- Write a program to integrate the following tabulate below:

x	-0.6	-0.5	-0.4	-0.3	-0.2	-0.1	0	0.1
f(x)	4	2	3	8	4	-2	2	3

- Using Bisection method, find a root of the following equation $x^2 - 4x - 36 = 0$. The result must be correct upto 5 decimal places. Show all the iterations in a tabular form.

- Consider the following system of linear equations:

$$9x_1 + 6x_2 + 4x_3 = 20$$

$$x_1 + 10x_2 + 4x_3 = 6$$

$$2x_1 - x_2 + 10x_3 = -15$$

Now solve them using Gauss Siedel method.

- Using Regula-Falsi method, find a root of the following equation $x^2 - 4x - 36 = 0$. The result must be correct upto 5 decimal places. Show all the iterations in a tabular form.
- Using Secant method, find a root of the following equation $x^3 + x - 3 = 0$. The result must be correct upto 5 decimal places. Show all the iterations in a tabular form.
- Using Newton-Raphson, find a root of the following equation $x^3 + x - 3 = 0$. The result must be correct upto 5 decimal places. Show all the iterations in a tabular form.
- Write a program to compute the inverse of the following matrix by Gauss elimination method.

$$\begin{bmatrix} 1 & 7 & 2 & 0 \\ 4 & -6 & 0 & -1 \\ 3 & -2 & -2 & 1 \\ 0 & 2 & 9 & 4 \end{bmatrix}$$

[Turn Over]

8. Consider the following system of linear equations:

$$x_1 + x_2 + x_3 = 3$$

$$2x_1 + 3x_2 + x_3 = 6$$

$$x_1 - x_2 - x_3 = -3$$

Now solve them using Gauss elimination method.

9. Using Bisection method, find a root of the following equation $x^3 - 4x + 1 = 0$. The result must be correct upto 5 decimal places. Show all the iterations in a tabular form.

10. Consider the following system of linear equations:

$$x_1 + x_2 + x_3 = 3$$

$$2x_1 + 3x_2 + x_3 = 6$$

$$x_1 - x_2 - x_3 = -3$$

Now solve them using Gauss Jordan method.

11. Using Newton-Raphson, find a root of the following equation $f(x) = x^3 - 7x^2 + 8x - 3 = 0$. The result must be correct upto 5 decimal places. Show all the iterations in a tabular form.
12. Given $dy/dx = x + y^2$, $y(0) = 1$, find $y(0.2)$ where step size $h = 0.1$ using Runge Kutta method of order four(K4).
13. Solve by Taylor's series method the equation $y' = \log x + \log y$ for $y(1.1)$ and $y(1.2)$, given $y(1) = 2$.

14. Using Euler's method find an approximate value of y corresponding to $x = 1$, given that $dy/dx = x + y$ and $y = 1$ when $x = 0$. You can take $h = 0.1$.
15. Apply the Runge- Kutta forth order method to find an approximate value of y when $x = 0.2$ given that $dy/dx = x + y$ and $y = 1$ when $x = 0$.
