2171011

End Semester Examination 2024

Name of the Course: BCA
Semester:4
Name of the Course: **Computer Based Numerical and Statistical Techniques**
Course Code: TBC 405

Time: 3 Hours
MM: 100

Note:
(i) All questions are compulsory.
(ii) Answer any two sub questions among a, b, c in each main question.
(iii) Total marks in each question are twenty.
(iv) Each sub question carries ten marks.

Q.1	**(10 × 2 = 20 Marks)**		
a)	Find the root of the equation $x^3-5x+1=0$ using the secant method.	CO1	
b)	Find a real root of the equation $\cos x=3x-1$ and correct up to three decimal places using the iteration method.		
c)	Find the root of the equation $x\log_{10}x = 1.2$ using the false position Method.		
Q.2	**(10 × 2 = 20 Marks)**		
a)	Solve the system of linear equations by Gauss elimination method. $x+2y+z=3$ $2x+3y+3z=10$ $3x-y+2z=13$	CO2	
b)	From the following table find the number of students who obtain less than 45 marks		
c)	Find the value of f(41) by applying Gauss's forward from the following data		
Q.3	**(10 × 2 = 20 Marks)**		
a)	Evaluate $\int_0^6 \frac{1}{1+x^2} dx$ by trapezoidal rule, where the interval of integration is subdivided into six equal parts.	CO3	

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

X	30	35	40	45	50
F(x)	3678.2	2995.1	2400.1	1876.2	1416.3

b) Using Taylor's series find the solution of the differential equation xy'=x-y,y(2)=2 at x=2.1 correct to five decimal places.

c) Find the solution of the differential equation.

$$\frac{dy}{dx} = y - x$$

given $y(0) = 2$ using Runge Kutta method at $x = 0.2$.

Q.4 **(10 × 2 = 20 Marks)**

a) Using the method of least square to fit the non-linear curve of the form $y = ae^{bx}$ to the following data- CO4

x	0	2	4
y	5.013	10	31.52

b) Fit a second-degree parabola for the following data-

X	0.0	1.0	2.0	3.0	4.0
Y	1.0	4.0	10.0	17.0	30.0

c) The following table given age(x) in years of cars and annual maintenance cost (y) in hundred rupees.

X	1	3	5	7	9
Y	15	18	21	23	22

Estimate the maintenance cost for a 4 year old car after finding the regression equation

Q.5

a) Write a short note on- CO5

1. Components of time series
2. Frequency Distribution

b) Compute the 4 yearly moving averages and calculate the trend values from the following data:

X	1991	1992	1993	1994	1995	1996	1997	1998
Y	36	43	43	34	44	54	34	24

c) Explain various Models and methods used for forecasting.