

Bachelor of Computer Application (BCA) 2nd Semester
(Batch 2023-26) (CBGS)

**NUMERICAL METHODS & STATISTICAL
TECHNIQUES**

Paper-III

Time Allowed—3 Hours]

[Maximum Marks—75

Note :— Attempt **FIVE** questions in all, selecting at least **ONE** question from each section. The fifth question may be attempted from any section. All questions carry equal marks.

SECTION—A

1. (a) Solve the following nonlinear equations by false position method correct to three decimal places
 $f(x) = x^3 + x - 1 = 0.$ 7.5
- (b) Find real root of equation correct to three decimal places using Bisection method : $f(x) = x^3 - x - 1 = 0.$ 7.5
2. (a) Solve the following linear equations by Gauss elimination method :
$$\begin{aligned} 5x - y - 2z &= 142 \\ x - 3y - 2z &= -30 \\ 2x - y - 3z &= -5. \end{aligned}$$
 7.5

- (b) Solve the following linear equations by Gauss Jordan method :

$$x + 4y - z = -5$$

$$x + y - 6z = -12$$

$$3x - y - z = 4.$$

7.5

SECTION—B

3. (a) Evaluate $\int_1^3 \frac{dx}{x}$ using Trapezoidal rule. Take $n = 8$.

7.5

- (b) Evaluate $\int_0^1 \frac{x}{10+x^3} dx$ using Simpson $\frac{1}{3}$ rule. Take $n = 4$.

7.5

4. (a) Prepare divided difference table for the following data :

X	1	3	6	10	11
Y	3	31	223	1011	1343

7.5

- (b) Use Lagrange method. Find $f(9)$ from the following data :

X	5	7	11	13	17
Y	150	392	1422	2366	5202

7.5

SECTION—C

5. (a) Find the coefficient of correlation :

X	23	27	28	28	28	30	30	33	35	38
Y	18	20	22	27	21	29	27	29	28	29

7.5

- (b) Calculate standard deviation :

X	5	10	15	20	25	30	35
F	2	7	11	15	10	4	1

7.5

6. (a) Calculate median of the following data :

X	0-5	5-10	10-15	15-20	20-25
F	7	18	25	30	20

7.5

- (b) Calculate mean of the following data :

X	5-15	15-25	25-35	35-45	45-55	55-65
F	8	10	14	20	16	12

7.5

SECTION—D

7. (a) Fit a straight line to the following data :

X	1	3	4	6	8	9	11	14
Y	1	2	4	4	5	7	8	9

7.5

- (b) Fit a curve of the form $y = a + bx^2$:

X	-1	0	1	2
Y	2	5	3	0

7.5

8. (a) Fit a curve of the form $y = ax^2 + bx$ for the following data :

X	1	2	3	4	5	6	7	8
Y	1	1.2	1.8	2.5	3.6	4.7	6.6	9.1

7.5

- (b) Fit a curve of the form $y = a + bx + cx^2$:

X	2	4	6	8	10
Y	3.07	12.85	31.47	57.38	91.29

7.5