(BCA13SK)

(1501-13K)

B.C.A. DEGREE EXAMINATION,
FEBRUARY 2023.

(Regular)

First Year – First Semester

Part – II

Paper I — NUMERICAL AND STATISTICAL METHODS

Time : Three hours Maximum : 75 marks

SECTION A — ($5 \times 5 = 25$ marks)

Answer any FIVE questions.

1. Evaluate $\int_0 x^3\,dx$ by using trapezoidal rule for the following data :

x	0	0.2	0.4	0.6	0.8	1
$y = x^3$	0	0.008	0.064	0.216	0.512	1

2. Construct a backward difference table for the following table

x :	1	2	3	4	5
u :	2	5	10	20	30

3. Explain any three types of matrices with example.

4. If $A = \begin{pmatrix} 1 & 5 & 3 \\ 2 & 4 & 0 \\ 3 & -1 & -5 \end{pmatrix}$ $B = \begin{pmatrix} 2 & -1 & 0 \\ 0 & -2 & 5 \\ 1 & 2 & 0 \end{pmatrix}$ there find $3A - 4B^T$.

5. Solve the equations $x + y + z = 9$, $2x + 5y + 2z = 52$, $2x + y - z = 0$ by Cramer's rule.

6. Define mean. Write it's merits and demerits.

7. Calculate Mode to the following data :

x	1	2	3	4	5	6	7
y	4	9	16	25	34	32	23

8. Explain conditional probability.

9. Define correlation and give two examples.

10. Find the Adjoint of the matrix $\begin{pmatrix} 2 & 1 & 2 \\ 1 & 0 & 1 \\ 2 & 2 & 1 \end{pmatrix}$.

SECTION B — ($5 \times 10 = 50$ marks)

Answer any FIVE questions.

11. By using Simpson's $\frac{1}{3}$ rule, evaluate $\int_{-3}^{3} x^4\,dx$ by taking 7 equidistance ordinates.

12. Compute $f(1.1)$ from the following data by using Newton's forward interpolation.

x	1	2	3	4	5
$f(x)$	7	12	29	64	123

13. If $A = \begin{pmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{pmatrix}$ then show that $A^2 - 4A - 5I = 0$.

14. If $A = \begin{pmatrix} 1 & -1 & 0 \\ 2 & 1 & 3 \\ 4 & 1 & 3 \end{pmatrix}$ $B = \begin{pmatrix} 4 & 1 & 0 \\ 2 & -3 & 1 \\ 1 & 1 & -1 \end{pmatrix}$ then show that $(AB)^T = B^T A^T$.

15. Find the inverse of the matrix $\begin{pmatrix} 1 & 2 & 1 \\ 3 & 2 & 3 \\ 1 & 1 & 2 \end{pmatrix}$.

16. Solve the equations, $x - y + 3z = 5$, $4x + 2y - z = 0$, $x - 3y - z = -5$ by matrix inverse method.

17. Calculate the standard deviation to the following group frequency distribution

C.I.	0-10	10-20	20-30	30-40	40-50	50-60
f	2	8	16	28	12	4

18. (a) Obtain Median of the following data :

x	5	8	11	14	17	20	23
f	2	8	12	20	10	6	3

(b) Find the Arithmetic mean to the following data.

x	1	2	3	4	5
f	5	8	10	12	6

19. State and prove Addition theorem.

20. State and prove Ranks Correlation coefficient.
