

B.C.A Semester - 2 (CBCS) Examination
March/April – 2025 (New Course)
Foundation of Mathematics and Statistics (CORE)

Time: 2:30 Hours

Marks: 70

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Que.1 (A) Answer following Questions (03)

- 1) Cramer's Rule uses _____ mathematical concept to solve linear equations
- 2) If the determinant of a matrix is zero, the matrix is said to be _____.
- 3) If a square matrix has a row or column of all zeroes, then its determinant is _____.

Que.1 (B) Answer Any Two (06)

- 1) Solve the following equations using Cramer's Rule.
 $2x+3y=8, \quad 4x-5y=-24$
- 2) Explain 2 x 2 order determinant.
- 3) Explain Cramer's Method to solve equations.
- 4) Find the value of k if determinant of following is 10

$$\begin{vmatrix} 2 & k \\ 3 & 4 \end{vmatrix}$$

Que.1 (C) Answer Any One (05)

- 1) Write short note on properties of determinants.
- 2) Find the determinant of:

$$\begin{vmatrix} 3 & 0 & 2 \\ 2 & 1 & -1 \\ 4 & -3 & 5 \end{vmatrix}$$

Que.2 (A) Answer following Questions (03)

- 1) A matrix in which all elements are zero is called _____
- 2) A triangular matrix in which all elements below the main diagonal are zero is called _____.
- 3) Matrix multiplication is defined for two matrices AAA and BBB if the number of columns in AAA is equal to the number of _____.

Que.2 (B) Answer Any Two (06)

- 1) $A = \begin{bmatrix} 4 & 5 & 2 \\ 3 & 2 & 7 \end{bmatrix}$ find 2(A).
- 2) If $A = \begin{bmatrix} 6 & 8 \\ 2 & 3 \end{bmatrix}$ $B = \begin{bmatrix} 5 & 2 \\ 6 & 3 \end{bmatrix}$ then find A - B
- 3) Explain Transpose of matrix.
- 4) If $\begin{bmatrix} 8 & 7 & -6 \\ 3 & 5 & -4 \end{bmatrix}$ $B = \begin{bmatrix} -2 & 5 & 7 \\ -2 & 4 & -3 \end{bmatrix}$ then find
 (1) A + B (2) A - B

Que.2 (C) Answer Any One (05)

- 1) Explain with example: Inverse of Matrix.
- 2) Write short note on addition and multiplication of matrix.

Que.3 (A) Answer following Questions (03)

- 1) The midpoint of the segment joining (x1,y1) and (x2,y2) is _____.
- 2) If $A = \{1,2,3\}$ and $B = \{2,3,4\}$ then the union $A \cup B$ is _____.
- 3) If $A = \{a,b,c\}$, then the number of subsets of A is _____.

- Que.3 (B) Answer Any Two (06)
- 1) Explain section formula without proof.
 - 2) Explain difference between two sets.
 - 3) Explain Cartesian product.
 - 4) Find the distance between P (-1, 4) Q (2, 8) along with diagram.
- Que.3 (C) Answer Any One (05)
- 1) Write short note on Operations of sets and its properties.
 - 2) Write short note on De Morgan's Law.
- Que.4 (A) Answer following Questions (03)
- 1) If all values in a dataset are identical, the standard deviation is _____.
 - 2) Quartiles divide a dataset into _____ equal parts.
 - 3) Consider the dataset {2, 4, 4, 4, 5, 5, 7, 9}. Mean = _____
- Que.4 (B) Answer Any Two (06)
- 1) Find the mean of the data set: 47, 41, 25, 54, 45, 26, 44, 33, 38, 40.
 - 2) Find out Range and Co-efficient of Range of observation 12, 6, 2, 4, 7, 15
 - 3) Explain Mean with grouped and ungrouped data.
 - 4) Explain Median with example.
- Que.4 (C) Answer Any One (05)
- 1) Find out Quartile Deviation, Co-efficient of Quartile Deviation, and Standard Deviation from the following data:
- | | | | | | | | | |
|-------|------|-------|--------|---------|---------|---------|---------|---------|
| Class | 0-40 | 40-80 | 80-120 | 120-160 | 160-200 | 200-240 | 240-280 | 280-320 |
| Freq. | 9 | 15 | 22 | 29 | 31 | 26 | 24 | 19 |
- 2) Write short note on Range and Quartile.
- Que.5 (A) Answer following Questions (03)
- 1) A _____ is an ordered list of numbers arranged in a specific order.
 - 2) A _____ is the sum of the terms of a sequence.
 - 3) Find the sum of the first 15 terms of an AP with $a=4$ and $d=6$.
- Que.5 (B) Answer Any Two (06)
- 1) In a GP, if the 3rd term is 24 and the 6th term is 192, find the first term.
 - 2) If the sum of the first 4 terms of a GP is 30 and $a=2$, find the common ratio r .
 - 3) Find the 12th term of an AP if the sum of the first 12 terms is 156 and the first term is 3
 - 4) The sum of the first n terms of an AP is 100. If the first term is 2 and the common difference is 3, find n .
- Que.5 (C) Answer Any One (05)
- 1) Explain Harmonic progression with example.
 - 2) Write short note on arithmetic progression
