647510 **BIT2FmsC104x** **Seat No :_____**

B.Sc.(IT) 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) For a singular matrix, the determinant is _____.
2) The determinant of an identity matrix of any order is _____.
3) If a square matrix has a row or column of all zeros, its determinant is ___

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

1) Solve the following equations using Cramer's Rule.
   $5x-4y=6, \quad 2x+3y=7$
2) Explain 3 x 3 order determinant.
3) Explain Creamer's Method to solve equations.
4) Find the value of x if determinant of following is 7
   $\begin{vmatrix} x & 3 \\ 4 & 5 \end{vmatrix}$

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

1) Write short note on properties of determinants.
2) Find the determinant of: $\begin{vmatrix} 2 & -3 & 1 \\ 5 & 4 & -2 \\ 1 & -1 & 3 \end{vmatrix}$

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

1) In a skew-symmetric matrix, all diagonal elements are always _____
2) A triangular matrix in which all elements above the main diagonal are zero is called _____.
3) Two matrices can be added (or subtracted) if they have the same _____.

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

1) Explain Transpose of matrix.
2) Prove that A x B is not equal to B x A and A + B = B + A
3) If $\begin{bmatrix} 3 & 4 & -3 \\ 6 & 4 & -6 \end{bmatrix}$ B = $\begin{bmatrix} -3 & 5 & 6 \\ -4 & 2 & -6 \end{bmatrix}$ then find
   (1) A + B (2) A – B
4) A= $\begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix}$ and I = $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ Prove that $A^2 = 3A - 2I$

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

1) Explain with example: Adjoin of a Square Matrix.
2) Write short note on subtraction and division of matrix.

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

1) The intersection of the sets A={1,2,3,4} and B={3,4,5,6} is _____.
2) If A={1,2,3,4} and B={3,4,5}, what is the set difference A−B?
3) The coordinates of A and B are given by A(−3,4) and B(5,−2) respectively. If P divides AB internally in the ratio 2:3, what are the coordinates of P?

Que.3(B) Answer Any Two (06)

1) Explain area of triangle without proof.
2) Explain Cartesian product upto two sets.
3) Explain with example: how to find out distance between two points.
4) Explain how to find out area of triangle.

Que.3(C) Answer Any One (05)

1) Explain De Morgan's law.
2) Write short note on operations of sets and its properties.

Que.4(A) Answer following Questions (03)

1) The first quartile (Q1) is defined as the value below which _____% of the data falls.
2) The range of a dataset is calculated as _____
3) Consider the dataset {2, 4, 4, 4, 5, 5, 7, 9}. Mode = _____

Que.4(B) Answer Any Two (06)

1) Find the mean and standard deviation for the following data.

x	50	51	52	53	54	55	56	57	58
f	3	2	14	12	24	15	15	3	7

2) Find out Q3 and Q1 of observation 11,12,13,14,15,16,17
3) Explain Median for grouped and ungrouped data.
4) Explain Quartile with example.

Que.4(C) Answer Any One (05)

1) Calculate the mean, variance and standard deviation for the following data:

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	27	10	7	5	4	2

2) Explain Mode and standard deviation with example.

Que.5(A) Answer following Questions (03)

1) If a series is defined by, what $a_n = 2^n$ type of sequence is it?
2) Find the first term of an AP if the 5th term is 20 and the 10th term is 35.
3) The first term of an AP is a=3 and the common difference is d=5. Find the 10th term.

Que.5(B) Answer Any Two (06)

1) The first term of a GP is a=2 and the common ratio is r=3. Find the 8th term.
2) Find the sum of the first 6 terms of a GP with a=3 and r=2.
3) In an AP, the first term is 7 and the 8th term is 49. Find the common difference and the 5th term.
4) The sum of the first 20 terms of an AP is 210, and the first term is 2. Find the common difference d.

Que.5(C) Answer Any One (05)

1) Explain relation between AM,GM, HM with example.
2) Write short note on Geomatric progression

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