



Seat No. _____

HQ-003-2042004

**B. Sc. (IT) (Sem. II) (CBCS)
(W.E.F. 2019) Examination**

April - 2023

**Mathematical & Statistical Foundation of
Computer Science**

Faculty Code : 003

Subject Code : 2042004

Time : $2\frac{1}{2}$ Hours / Total Marks : 70

1 (a) Attempt All : 4

- (1) Determinants is denoted by _____.
- (2) In determinants when any two rows are equal then determinant is _____.
- (3) Number of Rows and columns in determinants are equal. (False / True)

(4) The value of $\begin{vmatrix} 5 & -1 \\ 5 & 2 \end{vmatrix} =$ _____.

(b) Any **one** : 2

(1) $\begin{vmatrix} 5 & 4 \\ k & 2 \end{vmatrix} = \begin{vmatrix} 2k & 4 \\ 3 & 2 \end{vmatrix}$ find k .

(2) The value of $\begin{vmatrix} 2 & 7 & 4 \\ 0 & 0 & 0 \\ 2 & 5 & 7 \end{vmatrix}$.

(c) Any **one** : 3

(1) If $\begin{vmatrix} 0 & -2 & 3 \\ 4 & 5 & 2 \\ x & 8 & 9 \end{vmatrix} = 10$, find x .

(2) $\begin{vmatrix} y & 4 \\ 4 & 1 \end{vmatrix} = 8$, find y .

- (d) Any **one** : 5
- (1) Write any two rules for determinants with an example.
 - (2) Solve by Cramer's : $3x - 2y + 1 = 0, -x + y = 1$.
- 2 (a) Attempt All : 4
- (1) $AA^{-1} = \underline{\hspace{2cm}}$.
 - (2) $(AB)^T = \underline{\hspace{2cm}}$.
 - (3) $(A^{-1})^T = \underline{\hspace{2cm}}$.
 - (4) Define Null Matrix.
- (b) Any **one** : 2
- (1) If $A = \begin{pmatrix} 3 & 5 \\ 7 & -2 \end{pmatrix}$ find $Adj A$.
 - (2) If $A = \begin{pmatrix} 3 & 2 \\ 5 & 1 \end{pmatrix}, B = \begin{pmatrix} 1 & 3 \\ 3 & -1 \end{pmatrix}$ find AB .
- (c) Any **one** : 3
- (1) If $A = \begin{pmatrix} 1 & -2 \\ 3 & -4 \\ -5 & 6 \end{pmatrix}, B = \begin{pmatrix} 2 & 3 & -5 \\ 7 & 1 & 4 \end{pmatrix}$ find $A^T - B$.
 - (2) If $B = \begin{pmatrix} 2 & -3 \\ 5 & 1 \end{pmatrix}$ find $(B \times adj B)$.
- (d) Any **one** : 5
- (1) If $A = \begin{pmatrix} 2 & 3 & 1 \\ 0 & 5 & 6 \\ 1 & 1 & 2 \end{pmatrix}$ find A^{-1} .
 - (2) If $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ then find $A^2 + 2A + 3I$.
- 3 (a) Attempt All : 4
- (1) Define Singleton Set.
 - (2) Define Finite Set.
 - (3) Write De-Morgan's Law.
 - (4) $A \cap \phi = \underline{\hspace{2cm}}$.

(b) Any **one** : 2

(1) If $A = \{1, 2\}$, $B = \{x, y\}$ find $A \times B$.

(2) Two points are $(5, 2)$ and $(-7, -3)$, find distance.

(c) Any **one** : 3

(1) For what value of k , the distance between two points $(k, -20)$, $(-3, 4)$ will be 26?

(2) If $A = \{1, 3, 5, 7\}$, $B = \{3, 4, 5\}$ and $U = \{x/0 < x < 10\}$, find $(A \cup B)'$.

(d) Any **one** : 5

(1) For three sets A , B and C prove that

$$A \cap (B - C) = (A \cap B) - (A \cap C).$$

(2) If $A = \{2, 3, 8, 9\}$, $B = \{3, 4, 7, 8, 9, 10\}$ and

$U = \{x/1 \leq x \leq 10\}$ verify that $(A \cap B)' = A' \cup B'$.

4 (a) Attempt All : 4

(1) Write Mean formula.

(2) Write Quartile formula.

(3) Find mean from : 5, 7, -3, -6, 12.

(4) If $Q_1 = 36$, $Q_3 = 45$, find Q_2 .

(b) Any **one** : 2

(1) Find Median of the following data :

5, 9, 7, 6, 4, 2, 3, 1, 10.

(2) Find Mean value :

10, 32, 20, 15, 18, 27, 13.

(c) Any **one** : 3

(1) Find standard deviation from the following data :

X	11	14	17	21	15
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(2) Find Median from the following distribution :

X	0	1	2	3	4	5
f	80	85	100	112	84	80

(d) Any **one** : 5

(1) Find Q_3 from the following distribution :

Class	485-490	490-495	495-500	500-505	505-510
f	5	21	33	23	8

(2) Find Mean from the following data :

X	21	27	30	32	35	38	40
f	4	8	8	10	7	6	7

5 (a) Attempt All : 4

(1) Find common difference from the progression :

$-3, -7, -11, \dots$

(2) $1, \sqrt{2}, 2, 2\sqrt{2}, \dots$ is _____. (A.P./G.P.)

(3) In A.P. if $a = 2$ and $d = -3$ find T_7 .

(4) Find required terms from $1, \sqrt{5}, 5, 5\sqrt{5}, \dots$ (9th terms).

(b) Any **one** : 2

(1) Find sum of 3, 7, 11, 15, upto 16 terms.

(2) Find the 8th term of 1, 3, 9, 27,

(c) Any **one** : 3

(1) If $d = 4$, $l = 40$, $n = 12$ then find a and S_n .

(2) Find AM, GM, HM of two numbers 8 and 18.

(d) Any **one** : 5

(1) The sum of 6 terms of A.P. is 57 and the sum of its 10 terms is 155. Find 20th term.

(2) Find sum of terms of series :

$2 + 22 + 222 + 2222 + \dots n$ terms.
