DBZ-003-2042004 Seat No. _____

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

July - 2022

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 Crammer's rule :
$3x - 2y + 1 = 0,\ -x + y = 1$

2 (a) Attempt All : **4**

(1) $AA^{-1} =$ _____

(2) $(AB)^T =$ _____

(3) $(A^{-1})^T =$ _____

(4) Define Null Matrix

(b) Any **one** : **2**

(1) If $A = \begin{bmatrix} 3 & 5 \\ 7 & -2 \end{bmatrix}$, find Adj A.

(2) If $A = \begin{bmatrix} 3 & 2 \\ 5 & 1 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 3 \\ 3 & -1 \end{bmatrix}$ 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 $\left(B \times adj\ B\right)$.

(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) $A \cap \varnothing =$ _____

(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

(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, _____

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

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

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

(b) Any **one** : **2**

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

(2) Find the 8^{th} 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 20^{th} term.

(2) Find sum of terms of series
2 + 22 + 222 + 2222 + ... n terms.