DBZ-003-2032004 Seat No. _____

B. C. A. (Sem. II) (CBCS) (W.E.F. 2019) Examination

July - 2022

Mathematical & Statistical Foundation of Computer Science

(New Course)

Faculty Code : 003
Subject Code : 2032004

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

1 (a) Attempt all : **4**

(1) Determinants is Scalar Quantity. (True/False)
(2) Determinants is not a square. (True/False)
(3) In determinants if all the elements of any row Or col. is zero then value of Determinants is zero. (True/False)
(4) The Value of $\begin{vmatrix} 3 & 3 \\ 0 & 2 \end{vmatrix} =$ _____

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

(1) If $\begin{vmatrix} -2k & 1 \\ 2k & 4 \end{vmatrix} = 12$, find k.

(2) The value of $\begin{vmatrix} 1 & 6 & 4 \\ 2 & 6 & 4 \\ 0 & -1 & 4 \end{vmatrix}$

(c) Any **one** : **3**

(1) If $\begin{vmatrix} 5 & 2 & 4 \\ 1 & 2 & y \\ 6 & 3 & y \end{vmatrix} = 0$, find y.

(2) $\begin{vmatrix} y^2 & 16 \\ 4 & y \end{vmatrix} = 0$ find y.

(d) Any **one** : **5**

(1) Write rules of determinants.

(2) Solve by Crammer's :

$2x + 9y = 31,\ 2x + 5y = 19$

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

(1) Define Zero Matrix

(2) Define Row Matrix

(3) Define Null Matrix

(4) Define Column Matrix

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

(1) Define Transpose of a Matrix with examples.

(2) If $\begin{bmatrix} 5 & -1 \\ 2 & 2 \end{bmatrix}$, find A^2.

(c) Any **one** : **3**

(1) If $A = \begin{bmatrix} 4 & 7 \\ 5 & 3 \\ 6 & 2 \end{bmatrix}$ $B = \begin{bmatrix} 9 & -5 \\ 2 & -1 \\ 0 & -3 \end{bmatrix}$ find $(A+B)^T$.

(2) If $A = \begin{bmatrix} 2 & 4 \\ 2 & -3 \end{bmatrix}$ find $(Adj\ A)$.

(d) Any **one** : **5**

(1) If $A = \begin{bmatrix} 2 & 1 & -1 \\ 1 & 0 & -1 \\ 1 & 1 & 2 \end{bmatrix}$ find A^{-1}.

(2) If $A = \begin{bmatrix} 4 & 1 \\ 7 & 2 \end{bmatrix}$ and $AB = I$ then find matrix B.

3 (a) Attempt **all** : **4**

(1) Define tabular method of set.

(2) Give an example of an infinite set.

(3) Write two properties of intersection.

(4) Write Distance formula for two points

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

(1) If $A = \{1, 1\}$ and $B = \{2, 2\}$ $U = \{1, 2, 3, 4, 5\}$ find $(A \cap B)'$

(2) Two points are (–1, –2) and (–4, 4), find Distance.

(c) Any **one** : **3**

(1) Find area of triangle whose vertices are (1, 3), (5, 7), (3, 4).

(2) If $A = \{2, 4, 5, 6, 8\}$, $B = \{4, 5, 6, 7\}$ and $U = \{x \mid 0 < x \leq 10\}$, find $(A \cup B)'$.

(d) Any **one** : **5**

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

$$A \cup (B \cup C) = (A \cup B) \cup (A \cup C)$$

(2) If $A = \{-2, 3, 4, 7\}$, $B = \{3, 4, 5\}$, $C = \{1, 2\}$ find $(A - B) \times C$ and $(A \cap B) \times C$.

4 (a) Attempt **all** : **4**

(1) Define average.

(2) Median is central value. (True / False)

(3) Find Mode from :
5, 15, 7, 8, 2, 5, 3, 5, 2, 6, 9, 2, 7, 2

(4) If $Q1 = 10$, $Q3 = 50$, find $Q2$

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

(1) Find Median of the following data :
35, 52, 86, 37, 72, 99, 105

(2) Find Mean value :
12.28, 16, 20, 17, 21, 30, 44.

(c) Any **one** : **3**

(1) Find Mean if $Z = 4$ and Median = 5.2

(2) Find Mean from the following distribution :

x :	10	11	12	13	14	15
f :	5	20	32	28	18	6

(d) Any **one** : **5**

(1) Find Median from the following distribution.

Class	20 – 25	25 – 30	30 – 35	35 – 40	40 – 45	45 – 50	50 – 55
f	2	5	8	10	7	10	3

(2) Find standard deviation to the following data :

Class	0	1	2	3	4
f	1	3	7	3	1

5 (a) Attempt **all** : **4**

(1) Identify the progression : 64, 16, 4, 1.....

(2) In A.P. what is Common _____
(Ratio / Difference)

(3) In A.P. if $T_8 = 90$, then what is term number.

(4) Find 7^{th} terms of 2, 4, 8, 16,.....

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

(1) In A.P. first term = 5 and $d = 2$ find 10^{th} term.

(2) Find the 10^{th} term of 2, 4, 8, 16, _____

(c) Any **one** : **3**

(1) Find the sum of first 20 terms in an A.P. :
15, 18, 21,.....

(2) Two numbers are 4 and 18 find AM, GM, HM.

(d) Any **one** : **5**

(1) The 5^{th} term of G.P. is 32 and its 10^{th} term is 1024. Find sum of its 12 terms.

(2) Find sum of terms of series
7 + 77 + 777 + 7777 + _____ n terms.