

B.Sc.(IT) Semester - 2 (CBCS) Examination**June/July-2022 [OLD COURSE]****MATHEMATICAL AND STATISTICAL FOUNDATION OF COMPUTER SCIENCE(CORE)****Time: 2:30 Hours****Marks: 70****Instructions:**

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

Q.1(A) Answer the following questions. (04)

1. What is the determinant of $A = \begin{bmatrix} -3 & 6 \\ 7 & 4 \end{bmatrix}$?
2. Any two rows are identical, the value of the determinant is
3. Define: Square matrix.
4. Value of determinant of unit matrix is

Q.1(B) Attempt any one question. (02)

1. If $\begin{vmatrix} x & 4x-1 \\ 1 & x \end{vmatrix} = 0$ then 'x' =
2. Find the determinant of $B = \begin{bmatrix} 10 & 4 & 6 \\ 12 & 25 & 50 \\ 5 & 2 & 3 \end{bmatrix}$

Q.1(C) Attempt any one question. (03)

1. Prove that $\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix} = 0$.
2. Solve the following equation by Cramer's rule $3x+y=1$, $5x+2y=4$

Q.1(D) Attempt any one question in detail. (05)

1. Explain any one properties of determinants.
2. Solve x, y & z using cramer's rule $x+2y-3z=-4$, $2x-y-z=-3$, $2x+y+z=7$.

Q.2(A) Answer the following questions. (04)

1. Define: Diagonal matrix.
2. Define: Symmetric matrix.
3. Define: Inverse of matrix.
4. If $A = \begin{bmatrix} 2 & 3 \\ 6 & 7 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 2 \\ 7 & 5 \end{bmatrix}$ then $A+B=.....$

Q.2(B) Attempt any one question. (02)

1. If $A = \begin{bmatrix} 4 & 6 \\ 3 & 2 \end{bmatrix}$ & $B = \begin{bmatrix} 1 & 5 \\ 2 & 7 \end{bmatrix}$ then find AB.
2. If $AB = \begin{bmatrix} 2 & 4 \\ 3 & 5 \end{bmatrix}$ & $ABC = \begin{bmatrix} 2 & -1 \\ 3 & 0 \end{bmatrix}$ then find the value of C.

Q.2(C) Attempt any one question. (03)

1. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 3 & 1 \\ 4 & 5 \end{bmatrix}$ & $C = \begin{bmatrix} 1 & 1 \\ 2 & 2 \end{bmatrix}$ verify that $A \cdot (B+C) = A \cdot B + A \cdot C$
2. If $A = \begin{bmatrix} 2 & 3 & 1 \\ 1 & 2 & 3 \\ 3 & 1 & 2 \end{bmatrix}$ then find the Adjoint of A.

Q.2(D) Attempt any one question in detail. (05)

1. If $A = \begin{bmatrix} 2 & 0 & -1 \\ 5 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix}$ then find the inverse of A.
2. If $A = \begin{bmatrix} -1 & 3 & 5 \\ 1 & -3 & -5 \\ 1 & 2 & 5 \end{bmatrix}$ then show that $A^3 = A$

Q.3(A) Answer the following questions. (04)

1. Define: Compliment of a set.
2. What is the Distance between the points (1, 2) and (3, 5)?
3. If $A = \{a, b, c\}$ & $B = \{c, d, e\}$ then find $A \cap B =$
4. Write equation for internal division formula.

Q.3(B) Attempt any one question. (02)

1. Find the coordinate of point which divides the join of points (3,4) and (7,11) externally in the Ratio 2:1.
2. $A=\{1,2,3,4,5\}$, $B=\{2,3,4\}$, $C=\{4,5,6\}$ then show that $A-(B\cup C)=(A-B)\cap(A-C)$.

Q.3(C) Attempt any one question. (03)

1. Prove that $(A\cup B)' = A' \cap B'$.
2. What will be value of 'K' if the distance between (K, -4) and (-8,2) be 10.

Q.3(D) Attempt any one question in detail. (05)

1. Show that the points (4,-5), (8,1), (14,-3), (10,-9) are the vertices of Square.
2. In usual notation prove that $A \times (B \cap C) = (A \times B) \cap (A \times C)$.

Q.4(A) Answer the following questions. (04)

1. Define: Mode.
2. Which symbol used to denote mean.
3. Define Quartile deviation.
4. If there are 4 Observations 15, 18, 21, 29 then the range of these data is

Q.4(B) Attempt any one Question. (02)

1. Calculate mean for the given frequency.

X	15	20	25	30	35	40	45
F	12	16	18	20	22	23	25

2. Find the range and coefficient of range for following data.

X	50	55	60	65	70	75	80
F	7	12	15	19	16	11	8

Q.4(C) Attempt any one question. (03)

1. Explain advantages and disadvantages of mode.
2. Calculate standard deviation and variance of the following data.

X	4	5	6	7	8	9	10
F	6	2	3	4	1	5	3

Q.4(D) Attempt any one question in detail. (05)

1. Find mean, median, mode for the following data.

X	1	2	3	4	5	6	7
F	9	11	15	19	4	2	1

2. Calculate range, coefficient of range, Quartile deviation, coefficient of quartile deviation of following data,

X	15	18	20	29	29	30	31
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Q.5(A) Answer the following questions. (04)

1. What is sequence?
2. Write an equation sum of n^{th} term of an arithmetic progression.
3. Define: Geometric progression.
4. If $5+7+9+\dots=480$ then $n=\dots$

Q.5(B) Attempt any one question. (02)

1. If $T_{35}=30$ then $S_{69}=\dots$
2. Which term of the G.P. 2, -6, 18, -54.....is -4374?

Q.5(C) Attempt any one question. (03)

1. Find the sum of the following sequences 4, 8, 12, 16, 20.... Up to 25 term.
2. Find the fifth term from the end of the G.P. 8, 4, 2, 1..... $1/1024$.

Q.5(D) Attempt any one question in detail. (05)

1. The eight term of A.P. is 5 and thirteenth term is 25. Find fifteenth term.
2. Find the sum of the following series up to 'n' term $6+66+666+\dots$ Up to n term.
