

B.SC(IT) SEMESTER - 3 (NEP-2020) Examination**OCT/NOV-2024****Mathematics (Multidisciplinary Course)****Time: 2:00 Hours****Marks: 50****Instructions:**

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

Que-1 Answer the Followings (Any Two)**(10)**

- 1) Prove De' Morgan law 1. $(A \cup B)' = A' \cap B'$ 2. $(A \cap B)' = A' \cup B'$
- 2) show that (2, 2), (2, 4), (4, 4) and (4, 2) are the vertices of square.
- 3) Find the area of triangle (a) A (1, -2), B (-5, -6), C (0, 3) and (b) A (5, 3), B (0, 10), C (1, -1).
- 4) In a survey, it was found that 21 people liked product A, 26 people liked product B and 29 people liked product C. 14 people liked both product A and B, 12 people liked C and A, 14 People liked both B and C, 8 liked all three products. How many liked the product C only? How many people liked the product A only?

Que-2 Answer the Followings (Any Two)**(10)**

- 1) Find the inverse of the following matrix $\begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$
- 2) If $\begin{bmatrix} 1 & 1 \\ 3 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 2 \\ 0 \end{bmatrix}$ than find the value of x and y.
- 3) If $A = \begin{bmatrix} 1 & 0 \\ -2 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 4 \\ -5 & 0 \end{bmatrix}$, $C = \begin{bmatrix} 1 & -3 \\ 2 & 5 \end{bmatrix}$ than prove that $A(B + C) = AB + AC$.
- 4) Let $A = \begin{bmatrix} 2 & -3 \\ -1 & 0 \\ 4 & 5 \end{bmatrix}$, $B = \begin{bmatrix} -2 & 0 & 4 \\ 1 & -3 & 5 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & -4 \\ 4 & 0 \\ -3 & 2 \end{bmatrix}$ Evaluate each of following.
(1) $3A$ (2) $3C - 2A$ (3) $A^T - 3B$ (4) $A + 3C$ (5) $2A + 3B$

Que-3 Answer the Followings (Any Two)**(10)**

- 1) Find the quartile deviation and co-efficient of quartile deviation of the following data:
17, 2, 7, 27, 15, 5, 14, 8, 10, 24, 28, 48, 10, 8, 7, 18
- 2) The mean of the following data is 28 than find the value of missing frequency x.

Class	0-10	10-20	20-30	30-40	40-50	50-60
fi	12	18	27	x	17	6

- 3) The following data give the life period of 400 bulbs (lamps): draw the histogram of given data.

Life time	400-500	500-600	600-700	700-800	800-900	900-1000	1000-1100
Number of bulbs	10	56	60	80	74	68	52

4) Find the mean, median and mode of the following data:

Class	1 – 5	6 - 10	11 - 15	16 - 20	21 - 25	26 - 30	31 – 35
Frequency	18	32	30	40	25	15	40

Que-4 Answer the Followings (Any Two)

(10)

- 1) A and B are two events such that $P(A) = 0.42$ and $P(B) = 0.48$ And $P(A \cap B) = 0.16$
Find $P(A \cup B)$, $P(A' \cap B)$, $P(A \cap B')$, $P(A' \cap B')$, $P(A' \cup B')$.
- 2) Two dice are thrown simultaneously, and the sum of the number obtained is found to be 6. What is probability that the number 4 has appeared at least once?
- 3) A bag contains 6 red, 5 blue and 4 yellow balls. 2 balls are drawn, but first ball is drawn without replacement find the following $P(\text{red then blue})$ and $P(\text{blue then blue})$.
- 4) Explain terms Sample Space, experiment, event, outcome.

Que-5 Answer the Followings (Any Two)

(10)

- 1) A and B are two independent events such that $P(A) = 0.3$ and $P(B) = 0.6$ Find $P(A \cup B)$, $P(A' \cap B)$, $P(A \cap B')$, $P(A' \cap B')$, $P(A' \cup B')$.
- 2) Find the determinant of matrix $A = \begin{bmatrix} 1 & -4 & -2 \\ 2 & 0 & -7 \\ 6 & -2 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} -3 & 2 & 4 \\ 0 & 1 & 4 \\ 2 & 4 & -3 \end{bmatrix}$
- 3) Explain Union and Intersection Operation between two sets with example.
- 4) Find the mean, median and mode of the following data.

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70
frequency	5	7	8	11	9	4	3
