Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.VOC - SEMESTER– II EXAMINATION – SUMMER 2024

Subject Code: 21120204 Date:31-05-2024

Subject Name: Basic Mathematics

Time:10:30 AM TO 12:30 PM Total Marks:50

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			Marks
Q.1	**(a)**	If $A = \{1,2,3,4\}$ $B = \{3,4,6,8\}$ 3and $C = \{6,8,9,10\}$ then verify that i. $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ ii. $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$	**05**
	(b)	Let $f: A \to B$ where $A = \{1,2,3,4,5\}$ and $B = \{1,2,3, \ldots ,10\}$ is defined by $f(x) = 2x - 1$ then find domain, co-domain and range of f.	**05**
Q.2	**(a)**	Find the inverse of the given matrix $\begin{bmatrix} 3 & -1 & 1 \\ 0 & 0 & 1 \\ 4 & -2 & 2 \end{bmatrix}$.	**05**
	(b)	Find the complex conjugate and modulus of $\frac{2+i}{3+2i}$.	**05**
		OR	
	(b)	Find the roots of the equation $5x^2 - 2x - 6 = 0$.	**05**
Q.3	**(a)**	Check whether a relation $R: \mathbb{R} \to \mathbb{R}$ defined by $R = \{(a,b)/a + b \; is \; even \; \; number\}$ is equivalence or not?	**05**
	(b)	If $A = \begin{bmatrix} 2 & 3 & 4 \\ 1 & 4 & 3 \\ 2 & 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 2 & 1 \\ 4 & 1 & 2 \\ 3 & 4 & 4 \end{bmatrix}$ then find $A + B, 2A - B$.	**05**
		OR	
Q.3	**(a)**	Let $\overrightarrow{V_1} = 2\hat{\imath} - \hat{\jmath} + 3\hat{k}$ and $\overrightarrow{V_2} = \hat{\imath} + 2\hat{\jmath} - 5\hat{k}$ then find i. $2\overrightarrow{V_1} + \overrightarrow{V_2}$ ii. $3\overrightarrow{V_1} - 2\overrightarrow{V_2}$	**05**
	(b)	If $A = \begin{bmatrix} 1 & 0 \\ -1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -2 & 3 \\ 4 & 5 & 7 \end{bmatrix}$ then find i. AB ii. $(AB)^T$	**05**
Q.4	**(a)**	Find mean deviation about the mean for the following data:	**05**

x_i	2	5	6	8	10	12
f_i	2	8	10	7	8	5

(b) A card drawn from a well shuffled deck of 52 cards. If each outcome is equally likely, calculate probability that the card will be **05**
(i) a club
(ii) a red card.

OR

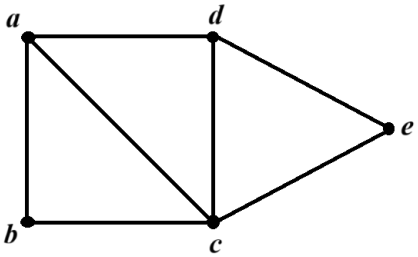
Q.4 **(a)** Find standard deviation for the following data: **05**

x_i	3	8	13	18	23
f_i	7	10	15	10	6

(b) Three coins tossed once. Find the probability of getting **05**
(i) exactly two heads
(ii) at least two tails

Q.5 **(a)** Construct a truth table for the compound proposition **05**
$A \cdot (B + C) = [(A \cdot B) + (A \cdot C)]$.

(b) Find vertices, edges, parallel edges, loops and degree of vertices from the following graph **05**



OR

Q.5 **(a)** State De Morgan's Law and prove it using truth table. **05**

(b) Define Simple graph and Multigraph with example. **05**

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