Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.VOC- SEMESTER– II EXAMINATION – WINTER 2023

Subject Code:21120204 Date:01-01-2024

Subject Name:Basic Mathematics

Time:02:30 PM TO 04:30 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
Q1	**(a)**	If $A = \{1,2,3,4\}$, $B = \{3,4,9,11\}$ and $C = \{2,11,18,22\}$ then verify that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$	**05**
	(b)	Define Graph and multiple edges with example	**05**
Q2	**(a)**	Solve the equation $6x^2 - 5x = 4$.	**05**
	(b)	Find real and imaginary part of $\frac{1+2i}{1-3i}$.	**05**
		OR	
	(b)	Let $f: A \to B$ where A={1, 2, 3} ; B={1, 2, 3, 4, 5, 6, 7, 8, 9} $f(x) = x^2$ then find domain, co-domain and range of *f*.	**05**
Q3	**(a)**	Let u = (1, 2, 3) and v = (2, −3, 7). Then find $u + v$, $3u$,$-2v$,$3u - 2v$, $u \cdot v$	**05**
	(b)	If $\begin{vmatrix} 2 & 3 \\ 4 & 5 \end{vmatrix} = \begin{vmatrix} x & 3 \\ 2x & 5 \end{vmatrix}$ then find the value of x	**05**
		OR	
Q3	**(a)**	Define Relation. Explain different types of relation with examples.	**05**
	(b)	If $A = \begin{bmatrix} 1 & -2 & 3 \\ 0 & 4 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 6 & 8 \\ 1 & -3 & -7 \end{bmatrix}$ then find $A+B$, $3A$, $2A-3B$	**05**
Q4	**(a)**	Find mean deviation of the following data	**05**

x	5	6	7	8	9	10	11	12	13	14
f	25	45	90	165	112	96	81	26	18	12

	(b)	A card is drawn from a well-shuffled pack of 52 cards. Find the probability of (i) getting a king card (ii) getting a red card	**05**
		OR	
Q4	**(a)**	Find the quartile deviation from the following data:	**05**

Class	0-5	5-10	10-15	15-20	20-25	25-30
Frequency	4	6	8	12	7	2

	(b)	If A and B are two events such that $P(A) = 0.3$, $P(B) = 0.4$ and $P(A \cap B) = 0.2$, find (i) $P(A \cup B)$ (ii) $P(\bar{A})$ (iii) $P(\bar{B})$ (iv) $P(\bar{A} \cap B)$ (v) $P(\bar{A} \cup \bar{B})$	**05**
Q5	**(a)**	Construct truth table for $A \wedge (B \vee C) \leftrightarrow (A \wedge B) \vee (A \wedge C)$	**05**
	(b)	Explain different types of logic gate with diagram	**05**

OR

Q5	**(a)**	State De Morgan's Law and prove it using truth table	**05**
	(b)	Design a Boolean function of $A\square B + C'$ using logic gates	**05**

****