Enrolment No/Seat No.: _____

R.N.G.PATEL INSTITUTE OF TECHNOLOGY-RNGPIT

(An Autonomous College U/s UGC Act 1956)

B.Voc. SEMESTER-II, SEMESTER END EXAMINATION – SUMMER 2025

Subject Code: 1SH208 **Date: 19-05-2025**

Subject Name: MATHEMATICS

Time: 11:00 AM to 01:00 PM **Total Marks: 50**

Instructions

1. It is **compulsory** for students to write **Enrolment No. /Seat No.** on the question paper.
2. Attempt all questions in the question paper.
3. The figures to the right of each question indicate full marks. Make suitable assumptions with proper justification wherever required.
4. Simple, non-programmable scientific calculators are permitted.
5. BL - Bloom's Taxonomy Levels (R-Remember, U-Understanding, A-Application, N-Analyze, E-Evaluate, C-Create), CO - Course Outcomes.

Que. No	Questions	Marks	BL	CO
Q.1	**Multiple-Choice Questions**	**[05]**		
(a)	Let $R: A \to B$ be a relation, then domain of a relation is ___	**1**	**R**	**1**
	(i) A **(ii)** B			
	(iii) Both A and B **(iv)** None of these			
(b)	If $\bar{a} = 2i - 3j$, $\bar{b} = i - 3j$, $\bar{c} = 3i + j$ then $2\bar{a} \cdot (\bar{b} + \bar{c}) =$ ____	**1**	**A**	**2**
	(i) $8i - 8j$ **(ii)** 8			
	(iii) 28 **(iv)** 16			
(c)	The transpose of a matrix is obtained by	**1**	**R**	**2**
	(i) Multiplying all elements by -1 **(ii)** Interchanging rows and columns			
	(iii) Reversing all rows **(iv)** Squaring all elements			
(d)	Which of the following is true for a perfectly symmetrical distribution?	**1**	**U**	**3**
	(i) Skewness = 1 **(ii)** Skewness < 0			
	(iii) Skewness $= 0$ **(iv)** Skewness > 0			
(e)	The possible truth values of a boolean variable are	**1**	**R**	**4**
	(i) 1 **(ii)** 0			
	(iii) Both 1 and 0 **(iv)** None of the above			

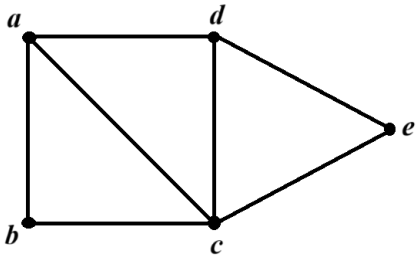
Q.2 Attempt Any Three **[15]**

(a) If $A = \{1,2,3,4\}$, $B = \{3,4,6,8\}$ and $C = \{6,8,9,10\}$ then verify that **5 A 1**
i. $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
ii. $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$

(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. **5 A 1**

(c) What is graph? Define Simple graph, Multigraph, Finite graph and Infinite graph with example. **5 R 1**

(d) Find vertices, edges, parallel edges, loops and degree of vertices from the following graph **5 A 1**



Q.3 Attempt Any Three **[15]**

(a) Find the inverse of the given matrix $\begin{bmatrix} 3 & -1 & 1 \\ 0 & 0 & 1 \\ 4 & -2 & 2 \end{bmatrix}$ **5 A 2**

(b) Find the complex conjugate and modulus of $\frac{2+i}{3+2i}$ **5 A 2**

(c) Find the roots of the equation $5x^2 - 2x - 6 = 0$ **5 A 2**

(d) Find mean deviation about the mean for the following data: **5 A 3**

(e)

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

Q.4 Attempt Any Three **[15]**

(a) Find standard deviation for the following data: **5 A 3**

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

(b) Explain AND, OR, NOT, NAND and NOR gates with block diagram and truth table. **5 R 4**

(c) State De Morgan's Law and prove it using truth table. **5 R,A 4**

(d) Construct a truth table for the compound proposition **5 A 4**

$$A \cdot (B + C) = [(A \cdot B) + (A \cdot C)]$$

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