

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

## GUJARAT TECHNOLOGICAL UNIVERSITY

BVOC- SEMESTER- II EXAMINATION – SUMMER 2023

Subject Code:21120204

Date:21-07-2023

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.

**Q.1** (a) Let  $A = \{4, 5, 7, 8, 10\}$ ,  $B = \{4, 5, 9\}$  and  $C = \{1, 4, 6, 9\}$  then verify that  $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ . **05**

(b) Give an example of relation which is reflexive and transitive but not symmetric. **05**

**Q.2** (a) Define simple graph and null graph with example. **05**

(b) Solve  $x^2 - x + 2 = 0$ . **05**

**OR**

(b) Express  $\frac{1+i}{3+2i}$  in terms of  $a + ib$ . **05**

**Q.3** (a) Find value of  $x$  for which  $\begin{vmatrix} 3 & x \\ x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$  **05**

(b) Let  $f:A \rightarrow B$  where  $A = \{1, 2, 3\}$  and  $B = \{1, 2, 3, 4, 5, 6, 7\}$   $f(x) = 2x$  then find domain, co-domain and range of  $f$ . **05**

**OR**

**Q.3** (a) If  $A = \begin{bmatrix} 1 & -2 & 3 \\ -4 & 2 & 5 \end{bmatrix}$  and  $B = \begin{bmatrix} 2 & 3 \\ 4 & 5 \\ 2 & 1 \end{bmatrix}$  then find  $AB$  and  $BA$ . **05**

(b) If  $A = \begin{bmatrix} 2 & 0 & -1 \\ 5 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix}$  then find  $A^{-1}$ , if it exist. **05**

**Q.4** (a) Find mean deviation about mean for following data: **05**

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

- (b) Three unbiased coins are tossed. Find probability of (i) all heads (ii) at least 2 heads (iii) at most 2 heads. **05**

**OR**

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

$x_i$	4	8	11	17	20	24	32
$f_i$	3	5	9	5	4	3	1

- (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 (i) a diamond (ii) a black card. **05**

- Q.5** (a) State Boolean Algebra with an example. **05**

- (b) What is De Morgan's law in Boolean Algebra. By using it, show equivalent expression for  $[(x \cdot y) (z' + xy')] = x' + y' + z'$ . **05**

**OR**

- Q.5** (a) What is logic gate? Mention about AND gate, OR gate and NOT gate. **05**

- (b) Write truth table for compound proposition  $p \vee (q \wedge r) \leftrightarrow [(p \vee q) \wedge (p \vee r)]$  **05**

\*\*\*\*\*