Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.VOC- SEMESTER–II EXAMINATION – SUMMER 2022

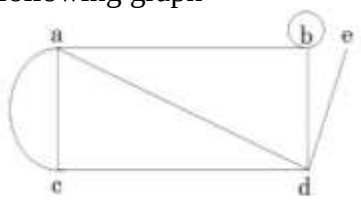
Subject Code:21120204 Date:02-08-2022

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 $A = \{1,2,3,4\}$, $B = \{3,4,9,11\}$ and $C = \{2,11,18,22\}$ then find (i) $(A \cap B)$, (ii) $(B \cap C)$, (iii) $(A \cap C)$, (iii) $(A \cap B \cap C)$.	**05**
	(b)	Find edges, vertices, parallel edges, loops, degree of vertices from the following graph 	**05**
Q.2	**(a)**	Solve the equation $3x^2 + 5x = 2$.	**05**
	(b)	Find real and imaginary part of $\frac{3-4i}{5+7i}$.	**05**
		OR	
	(b)	Let $f: A \to B$ where A={1,2,3} ; B={1,2,3,4,5,6,7} $f(x) = 2x$ then find domain, co-domain and range of *f*.	**05**
Q.3	**(a)**	Let u = (2, 3, −4) and v = (1, −5, 8). Then find $u + v$, $5u$,$-v$,$2u - 3v$, $u \cdot v$	**05**
	(b)	If $\begin{vmatrix} 11 & 40 & 28 \\ 3 & 12 & 8 \\ a & 2 & 2 \end{vmatrix} = 0$ Then find a	**05**
		OR	
Q.3	**(a)**	Consider the following relation on {1, 2, 3, 4, 5, 6} $R = \{(i, j) : \lvert i - j \rvert = 2\}$. Is *R* reflexive, symmetric or transitive ?	**05**
	(b)	Find AB and BA, where A = $\begin{bmatrix} 1 & -1 & 1 \\ -3 & 2 & -1 \\ -2 & 1 & 0 \end{bmatrix}$, B = $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 1 & 2 & 3 \end{bmatrix}$	**05**
Q.4	**(a)**	Find standard deviation of the following data	**05**

x	10	11	12	13	14	15	16	17	18
f	2	7	10	12	15	11	10	6	3

	(b)	Three unbiased coins are tossed. Find the probability of getting (i) exactly two heads (ii) atleast one tail	**05**
		OR	
Q.4	**(a)**	Find the quartile deviation from the following data:	**05**

Class	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45
Frequency	5	6	15	10	5	4	2	3

(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) $P(\bar{A}\cup B)$ (v) $P(\bar{A}\cap\bar{B})$ **05**

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

(b) Check whether F_2 is a minimization of F_1, where, **05**

$F_1=\bar{x}\cdot\bar{y}\cdot z+\bar{x}\cdot y\cdot z+\bar{x}\cdot y$ and $F_2=x\cdot\bar{y}+\bar{x}\cdot z$.

OR

Q.5 **(a)** Use truth table to prove that **05**

$(A+B)(A+C)=A+(BC)$

(b) Design a Boolean function of $AB+CD$ using logic gates **05**

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