

GUJARAT TECHNOLOGICAL UNIVERSITY
BCA/MCA INTEGRATED - SEMESTER - II EXAMINATION - WINTER 2025

Subject Code: BC02001051

Date: 05-12-2025

Subject Name: Mathematics-2

Time: 02:30 PM TO 05:00 PM

Total Marks: 70

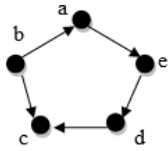
Instructions

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

	Marks
Q.1 (a) Explain the connectives in detail with suitable example.	07
(b) Explain the concept of duality in context to mathematical Logic with example.	07
Q.2 (a) Construct the truth table for the following statements. (i) $\neg p \wedge \neg q$ (ii) $\neg (p \wedge \neg q)$ (iii) $(p \vee q) \vee \neg q$ (iv) $(\neg p \rightarrow r) \wedge (p \leftrightarrow q)$	07
(b) Verify whether the following compound propositions is tautology or not: $((p \rightarrow q) \wedge (q \rightarrow r)) \rightarrow (p \rightarrow r)$	07
OR	
(b) Explain the Basic Counting Principles.	07
Q.3 (a) Explain the pigeonhole Principle in detail with example.	07
(b) In how many ways 6 children can be arranged in a line, such that: (i) Two particular children of them are always together. (ii) Two particular children of them are never together.	07
OR	
(a) Explain the partially ordered set with example.	07
(b) Nitin has 5 friends. In how many ways can he invite one or more of them to his party?	07
Q.4 (a) Explain the properties of binary relation on a set with example.	07
(b) Given the set $A = \{1, 2, 3, 4, 5\}$ and the relation $R = \{(1, 2), (2, 3), (3, 4), (4, 5)\}$, represent this relation using a graph and an adjacency matrix.	07
OR	
(a) Show that the relation R is an equivalence relation in the set $A = \{1, 2, 3, 4, 5\}$ given by the relation $R = \{(a, b) : a-b \text{ is even}\}$.	07
(b) Differentiate between the Permutation and Combination.	07
Q.5 (a) Explain the isomorphic graph and sub graph in detail with example.	07

- (b) Find the in degree, Out degree and total degree for the given graph:

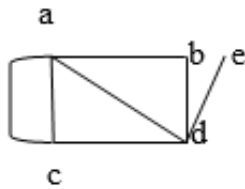
07



OR

- (a) Find vertices, edges, parallel edges, loops and degree of vertices from the following Graph:

07



- (b) Explain the strongly, weakly and unilaterally connected graphs with example.

07
