REG.NO.:

VIT
Vellore Institute of Technology

SCHOOL OF ADVANCED SCIENCES
CONTINUOUS ASSESSMENT TEST - II
WINTER SEMESTER 2025-2026

SLOT: A1+TA1+TAA1

Programme Name & Branch	**: B. Tech - SCOPE**
Course Code and Course Name	**: IAMAT202 – Discrete Mathematics and Graph Theory**
Faculty Name(s)	**: Dr. Yamuna, Dr. Priya, Dr. Pallavee**
Class Number(s)	**: VL2025260504338, 4282, 4320.**
Date of Examination	**: 15/03/2026**
Exam Duration	**: 90 minutes** **Maximum Marks: 50**

General instruction(s):

- Answer All Questions
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- Course Outcomes (Type the CO statements covered in this question paper. Use the CO number as per the syllabus copy) .

CO2. Relate algebraic structures to enhance problem-solving techniques

CO3. Solve engineering problems involving counting principles.

CO4. Understand the fundamentals of graph theory, including trees and connectivity.

Q. No	Question	M	CO	BL
1.	a) Use a table to express the values of the following Boolean function $F(x, y, z) = x'y + (xyz)'$. b) Find the sum of product expansion of $f(x, y, z) = x + y + z$.	5+5	2	3
2.	How many permutations of the letters PQRSTXYZ contain (a) the string RST? (b) the strings QR and XYZ? (c) the strings PQ, ST and YZ? (d) the strings RPQ and QTS? (e) the strings QPR and PQS?	10	3	3
3.	Use the method of generating functions to solve the recurrence relation $a_n = 4a_{n-1} - 4a_{n-2}, \quad n \geq 2, a_0 = 2, a_1 = 8.$	10	3	4

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4.	a) A connected graph has 10 vertices and each vertex has degree 2. Identify the graph and justify using Handshaking Lemma. b) Let G_1 and G_2 be two graphs defined as follows: $G_1 : V_1 = \{1, 2, 3, 4\}$, $E_1 = \{(1,2), (2,3), (3,4)\}$ $G_2 : V_2 = \{2, 3, 4, 5\}$, $E_2 = \{(2,3), (3,4), (4,5)\}$ Answer the following: (a) Find the union of graphs $G_1 \cup G_2$. (b) Find the intersection of graphs $G_1 \cap G_2$. (c) Find the ring sum of graphs $G_1 \oplus G_2$. (d) Draw the graphs corresponding to each operation.	5+ 5	4	2
5.	a) Consider the graphs G_1 and G_2. Graph G_1: $V(G_1) = \{a, b, c, d, e\}$, $E(G_1) = \{ab, bc, cd, de, ea\}$ Graph G_2: $V(G_2) = \{1, 2, 3, 4, 5\}$, $E(G_2) = \{12, 23, 34, 45, 13\}$ Determine whether G_1 and G_2 are isomorphic or not. Justify your answer. b) Give an example of: (i) Eulerian but not Hamiltonian graph. (ii) Hamiltonian but not Eulerian graph.	5+ 5	4	3

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