



# VIT

Vellore Institute of Technology

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

SLOT: A1+TA1+TA1

REG. NO.: 218-0307

**Programme Name & Branch** : B.Tech.  
**Course Code and Course Name** : BAMA7205 & Discrete Mathematics and Linear Algebra  
**Faculty Name(s)** : Common  
**Class Number(s)** : Common  
**Date of Examination** : 27.01.2026  
**Exam Duration** : 90 minutes  
**General Instruction(s):** Maximum Marks: 50

- Answer All Questions
- M - Max mark; CO - Course Outcome; BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply)
- CO1: Apply proof techniques in solving logical problems
- CO2: Solve engineering problems involving counting principles.

Q. No	Question	M	CO	BL
1.	Without constructing the truth tables, find the principal disjunctive normal form (PDNF) and principal conjunctive normal form (PCNF) of the statement $(p \vee \neg(q \vee r)) \vee (((p \wedge q) \wedge \neg r) \wedge p)$	10	1	2
2.	(a) Symbolize the following statement with and without the set of all positive integers as its domain. "Given any positive integers, there is a greater positive integer." (b) Show that the set of premises $(p \rightarrow q) \wedge (r \rightarrow s), (q \rightarrow t) \wedge (s \rightarrow u), \neg(t \wedge v)$ and $(p \rightarrow r)$ implies $\neg p$ .	4	1	2
3.	Show that the premises, "Every student who submits the assignment passes the course", "Every student in this class submits the assignment or drops the course", "No student in this class drops the course" and "There exists a student in this class" imply the conclusion, "There exists a student in this class who passes the course".	10	1	3
4.	Let $A_1, A_2, A_3$ and $A_4$ be subsets of a universal set $U$ containing 75 elements. Each subset contains 28 elements. The intersection of any two of the subsets contains 12 elements, the intersection of any three of the subsets contains 5 elements, and the intersection of all four subsets contains 1 element. Determine (a) how many elements belong to none of the four subsets, (b) how many elements belong to $A_1$ or $A_2$ or $A_3$ but not $A_4$ , (c) how many elements belong to exactly three of the four subsets. $\int \delta$	10	2	3
5.	Solve the recurrence relation $a_n = 4a_{n-1} - 4a_{n-2} + 4^n, n \geq 2$ , given that $a_0 = 2, a_1 = 8$ .	10	2	2