REG.NO.: 25BUS07 84

VIT
Vellore Institute of Technology

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

SLOT: A1+TA1+TAA1

Programme Name & Branch : B.Tech.
Course Code and Course Name : BAMAT205 & Discrete Mathematics and Linear Algebra
Faculty Name(s) : Common
Class Number(s) : Common
Date of Examination : 27.01.2026
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)
- CO1: Apply proof techniques in solving logical problems
- CO2: Solve engineering problems involving counting principles.

$q \to u$ $p \to r$ $p \to u$

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."	4	1	2
	(b) Show that the set of premises $(p \to q) \wedge (r \to s), (q \to t) \wedge (s \to u), \neg(t \wedge u)$ and $(p \to r)$ implies $\neg p$.	6		
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. 16	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