VIT®

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

REG. NO.:

SCHOOL OF ADVANCED SCIENCES

DEPARTMENT OF MATHEMATICS

FALL SEMESTER – 2025~2026

SLOT: C2+TC2+TCC2

CONTINUOUS ASSESSMENT TEST – I

Programme Name & Branch	:	B.Tech. (All Branches)
Course Code & Course Name	:	BMAT205L – Discrete Mathematics and Graph Theory
Class Number(s)	:	Common Slot QP
Faculty Name(s)	:	Common Slot QP
Date of Examination	:	19-08-2025
Exam Duration	:	90 Minutes **Maximum Marks : 50**

General Instruction(s): Answer All Questions.

- M – Max. Marks; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyze, 5 – Evaluate, 6 – Create).
- Course Outcomes:

  [1]. Learn proof techniques and concepts of inference theory.

  [2]. Use algebraic structures in applications.

Q. No.	Questions	Marks	CO	BL
1.	Show that the following statements constitute a valid arguement: *"If you send me an e-mail message, then I will finish writing the program. If you do not send me an e-mail message, then I will go to sleep early. If I go to sleep early, then I will be feeling refreshed. Therefore, if I do not finish writing the program, then I will be feeling refreshed. "*	10	1	2
2.	Obtain the principal disjunctive and principal conjunctive normal forms of the following statement: $\Big(P \to (Q \wedge R)\Big) \to \Big(\neg P \to (\neg Q \wedge \neg R)\Big)$.	10	1	1
3.	Show that the conclusion $\Big(Q(y) \wedge (\exists x)(P(x) \wedge R(x))\Big)$ can be derived from $(\forall x)\Big(P(x) \longrightarrow (Q(y) \wedge R(x))\Big)$ and $(\exists x)(P(x))$.	10	1	3
4.	Show that $G = \left\{ \begin{pmatrix} a & a \\ a & a \end{pmatrix} : a \neq 0 \text{ and } a \in \mathbb{R} \right\}$ is a group under the matrix multiplication. Is it an Abelian group?	10	2	3
5.	Show that $H = \{[0], [2], [4]\}$ is a subgroup of a group $(\mathbb{Z}_6, +_6)$. Obtain all the distinct left cosets of H in $\mathbb{Z}_6$ and hence compute the index of H in Z_6.	10	2	2

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