VIT

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

REG. NO.: 24BCE3000

SLOT: A2 + TA2+TAA2

SCHOOL OF ADVANCED SCIENCES
DEPARTMENT OF MATHEMATICS
CONTINUOUS ASSESSMENT TEST - I
FALL SEMESTER – 2025-2026

Programme Name & Branch : B.Tech (BCE and BIT)
Course Code & Course Name : BMAT205L-Discrete Mathematics and Graph Theory
Class Number(s) : Common QP to Multiple Sections
Faculty Name(s) : Dr.R.Selvakumar, Dr.GSGN Anjaneyulu, Dr. Abhishek Das Dr. S. Dharani, Dr. A. Parthiban, Dr. Juhi Baroi, Dr. Praveen
Date of Examination : 17.08.2025, Session 2, 2:00 PM
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
  1. Learn proof techniques and concepts of inference theory.
  2. Use algebraic structures in applications.

Q. No.	Questions	M	CO	BL
1.	(a). Examine whether $\{(pvq)\rightarrow r\}\leftrightarrow\{\neg r\rightarrow \neg(pvq)\}$ is a tautology or not by the truth table. (b). For any three statement variables, P, Q, R, show that $P\rightarrow(Q\rightarrow R)\equiv(P\wedge Q)\rightarrow R$ without using truth table	10	1	1
2.	Obtain the PCNF and PDNF of $(p\wedge\neg q)\vee(q\wedge\neg p)\vee(r\wedge p)$ by using (i) Truth table technique (ii). Logical Equivalences	10	1	2
3.	(i). Write the negation" If x is not a real number, then x is not a rational number and not an irrational number" using predicative logical operators (iii). Show that $(\forall x)[(B(x)\vee C(x))\rightarrow A(x)] \Rightarrow (\forall x)[B(x)\rightarrow A(x)]$	10	1	1
4.	Let S be non-empty set and $P(S)$ be the collection of all subsets of S. Let the binary operation Δ called the symmetric difference of sets be defined as $A\,\Delta\,B = (A-B)\cup(B-A)$ for all A, B in P(S). Then show that $(P(S), \Delta)$ is an abelian group	10	2	3
5.	(a) Let G be any group. Then prove that the intersection of finite number of Subgroups is again subgroup. (b). Compute all the left Cosets of any of the proper subgroup of the group $\{-1, 1, i, -i\}$ under multiplication and write any two observation on Cosets	10	2	3

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