



VIT[®]

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

WINTER SEMESTER 2022-2023

SCHOOL OF ADVANCED SCIENCES

DEPARTMENT OF MATHEMATICS

CONTINUOUS ASSESSMENT TEST – I

Course Code	: BMAT205L	
Course Name	: Discrete Mathematics and Graph Theory	
Slot	: A1+TA1+TAA1	
Duration	: 90 Minutes	
Date	: 22.01.2023	Max. Marks: 50

Answer all the following questions.

1. Define principal Conjunctive normal form (PCNF) and without constructing the truth table, find the PCNF of the following statement $(p \rightarrow (q \wedge r)) \wedge (\neg p \rightarrow (\neg q \wedge r))$.
(10M)
2. Construct an argument using rules of inference to show that the hypotheses “Radha works hard”, “If Radha works hard, then she is a dull girl” and “ If Radha is a dull girl, then she will not get the job ” imply the conclusion “ Radha will not get the job ”.
(10M)
3. Verify the validity of the following argument: Every living thing is a plant or an animal. Rama’s dog is alive and it is not a plant. All animals have hearts. Therefore Rama’s dog has a heart.
(10M)
4.
 - (i) Symbolize the following statement:
 - ~~(a)~~ Every Mathematics student needs a course in Computer science.
 - ~~(b)~~ There is a student in this class who owns a Personal computer.
 - (ii) Prove for any commutative monoid $\langle M, * \rangle$, the set of Idempotent elements of M forms a submonoid. (10M)
5. Show that the set Q^+ of all positive rational numbers forms an abelian group under the operation $*$ defined by $a * b = \frac{1}{2}ab$, $a, b \in Q^+$.
(10M)