

 VIT-AP UNIVERSITY	Continuous Assessment Test - 1 Fall Semester (2025-26) - August 2025	
	Maximum Marks: 50	Duration: 90 Minutes
Course Code: MAT1003	Course Title: Discrete Mathematical Structures	School: SAS
Set No: 1	Exam Type: Closed Book	Session: <u>AN</u>
Date: <u>18/08/2025</u>	Slot: <u>A2</u>	
Keeping mobile phone/smart watch, even in 'off' position is treated as exam malpractice		
General Instructions if any Open Book/Open Notebook/Closed Book:		
1. "fx series" - non-Programmable calculator are permitted: YES 2. Reference tables permitted: NO		

Answer ALL Questions, Each Question Carries 10 Marks (5×10=50 Marks)

- Determine the following argument is valid or not using rules of inference and nested quantifiers. (10M)
 All lions are fierce.
 Some lions do not drink coffee
 Some fierce creatures do not drink coffee.
- (a) Convert the following propositions into principal disjunctive normal form (PDNF). (10M)
 $((p \vee q) \wedge (\neg q \vee r))$
 (b) Write the negation of the following statement "Every student in this class has taken exactly two mathematics classes at this school".
- (a) Write the converse, inverse, and contrapositive of the following statement
 "You will qualify GATE only if you work hard."
 (b) Show that the following premises are inconsistent. (10M)
 1. If Jack misses many classes through illness, then he fails high school.
 2. If Jack fails high school, then he is uneducated.
 3. If Jack reads a lot of books, then he is not uneducated.
 4. Jack misses many classes through illness and reads a lot of books.
- (a) Prove that if n is an integer, then $2n^2 + n + 1$ is not divisible by 3 using proof by cases. (10M)
 (b) Show that there exist irrational numbers x and y such that x^y is rational.
- (a) Compute the decimal expansion of $(7016)_8$. (10M)
 (b) Find the greatest common divisor 252 and 110 using Euclidean algorithm.