Reg. No. | | | | | | | | |

G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.

UG DEGREE END SEMESTER EXAMINATIONS - APRIL 2025.
(For those admitted in June 2024 and later)

PROGRAMME AND BRANCH: B.Sc., COMPUTER SCIENCE

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
I	PART - III	ELECTIVE GENERIC-1	U24CS1A1	DISCRETE MATHEMATICS

Date & Session: 24.04.2025/AN **Time: 3 hours** **Maximum: 75 Marks**

Course Outcome	Bloom's K-level	Q. No.	SECTION – A (10 X 1 = 10 Marks) Answer ALL Questions.
CO1	K1	1.	What is the cardinality of the power set of a set with 3 elements? a) 3 b) 6 c) 8 d) 9
CO1	K2	2.	Which of the following statements about set inclusion is true? a) A set is always a subset of itself b) A set cannot be a subset of itself c) A proper subset includes all elements of another set d) A subset must always be larger than the original set
CO2	K1	3.	What does the domain represent in a function a) The set of possible input values b) The set of possible output values c) The set of all real numbers d) The set of ordered pairs
CO2	K2	4.	What is the domain of the function f(x) = 1/x? a) All real numbers b) All real numbers except 0 c) All integers d) Only positive real numbers
CO3	K1	5.	Which of the following is a tautology? a) $p \wedge \neg p$ b) $p \vee \neg p$ c) $\neg(p \wedge q)$ d) $p \leftrightarrow q$
CO3	K2	6.	Which of the following is logically equivalent to "$p \rightarrow q$"? a) $\neg p \vee q$ b) $p \wedge q$ c) $p \vee \neg q$ d) $\neg p \wedge q$
CO4	K1	7.	Which of the following matrices is symmetric? a) A where $A^T = -A$ b) A where $A^T = A$ c) A where $A^T \neq A$ d) A where A^T is undefined
CO4	K2	8.	If a matrix A is skew-symmetric, what is true about its diagonal elements? a) They are all 1 b) They are all 0 c) They are all negative d) They are all nonzero
CO5	K1	9.	Which of the following matrices is singular? a) A matrix with determinant zero b) A matrix with all diagonal elements equal c) A diagonal matrix d) An identity matrix
CO5	K2	10.	What is the inverse of a non-singular matrix A? a) A^T b) A^{-1} c) det(A) d) A + I

Course Outcome	Bloom's K-level	Q. No.	**SECTION – B (5 X 5 = 25 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K3	11a.	Define power set and find the power set of the set {1, 2, 3}.
			(OR)
CO1	K3	11b.	Describe operations on sets with examples.
CO2	K3	12a.	Discover equivalence relations with suitable examples.
			(OR)
CO2	K3	12b.	Explain functions with an example and discuss their types.
CO3	K4	13a.	Construct truth tables for basic logical operators AND, OR, and NOT.
			(OR)
CO3	K4	13b.	Analyze the concept of logical equivalence and its importance in logic.
CO4	K4	14a.	Differentiate between symmetric and skew-symmetric matrices with examples.
			(OR)
CO4	K4	14b.	Examine the Transpose of a Matrix.
CO5	K5	15a.	Interpret the properties of the inverse of a matrix.
			(OR)
CO5	K5	15b.	Explain the properties of the adjoint of a matrix.

Course Outcome	Bloom's K-level	Q. No.	**SECTION – C (5 X 8 = 40 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K3	16a.	Explain ordered pairs and the Cartesian product of sets with an example.
			(OR)
CO1	K3	16b.	Organize the concept of proper sets with detailed examples.
CO2	K4	17a.	Explain relations on sets with examples. Discuss equivalence relations and their properties.
			(OR)
CO2	K4	17b.	What are the properties of functions? Discuss injective, surjective, and bijective functions with examples.
CO3	K4	18a.	Illustrate the different types of normal forms in propositional logic with examples.
			(OR)
CO3	K4	18b.	Define logical equivalence and discuss its importance. Prove that $p \rightarrow q$ is logically equivalent to $\neg p \vee q$ using a truth table.
CO4	K5	19a.	Explain matrix operations such as addition, subtraction, and multiplication with examples.
			(OR)
CO4	K5	19b.	Interpret the properties of the transpose of a matrix with examples.
CO5	K5	20a.	Explain the concept of the inverse of a matrix. Discuss the properties of the inverse of a matrix with examples.
			(OR)
CO5	K5	20b.	Differentiate between singular and non-singular matrices. Explain their significance in matrix algebra.