Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL/MAY 2026

Third Semester

Master of Computer Applications

PMCVA105 – MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Regulations - 2024

Duration : 3 Hrs *Maximum : 100 Marks*

*PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)*

Q.No	*Questions*	*BTL*	*CO*	*Marks*
1.	Define propositional logic.	L2	1	2
2.	Define the term 'quantifier' in your own words.	L1	1	2
3.	State the principle of mathematical induction.	L2	2	2
4.	Define Permutations Principle.	L1	2	2
5.	List types of graph models.	L2	3	2
6.	List out the advantages of graph.	L1	3	2
7.	What is a Homomorphism?	L2	4	2
8.	Describe Lagrange's Theorem.	L1	4	2
9.	State a property of Boolean algebra.	L2	5	2
10.	Describe a lattice as an algebraic system.	L2	5	2

*PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)*

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a	i	Explain the rules of inference and validate a logical statement.	L3	1	8
		ii	Analyze the effect of nested quantifiers on logical validity.	L3	1	8
			Or			
	b	i	Evaluate the validity of an argument using predicates and quantifiers.	L3	1	8
		ii	Create a logical argument involving multiple quantifiers and provide a proof strategy.	L3	1	8
12.	a	i	Analyze a real-world problem using recurrence relations.	L4	2	8
		ii	Solve an application problem based on the Inclusion-Exclusion Principle.	L4	2	8
			Or			
	b	i	Evaluate the use of the Pigeonhole Principle in combinatorial problems.	L4	2	8
		ii	Create an example involving solving linear recurrence relations with generating functions.	L4	2	8

13.	a	i	Apply graph terminology to identify Euler and Hamilton paths in a given graph.	L3	3	8
		ii	Analyze the connectivity of a graph and explain graph isomorphism with examples.	L3	3	8
			Or			
	b	i	Evaluate special types of graphs with suitable example.	L3	3	8
		ii	Create a graph model demonstrating matrix representation with example.	L3	3	8
14.	a	i	Apply group theory concepts to prove a subgroup's properties.	L3	4	8
		ii	Analyze normal subgroups and cosets with examples.	L3	4	8
			Or			
	b	i	Evaluate Lagrange's theorem through practical examples.	L3	4	8
		ii	Create an example illustrating ring and field definitions with proofs.	L3	4	8
15.	a	i	Apply Boolean algebra laws to simplify logical expression.	L4	5	8
		ii	Analyze properties of lattices and explain their algebraic structure.	L4	5	8
			Or			
	b	i	Prove that Every chain is a distributive Lattice.	L4	5	8
		ii	In a Boolean Lattice, Prove that De-morgan's laws.	L4	5	8