Name of the Student:

R	A													

SRM Institute of Science and Technology
College of Engineering and Technology
DEPARTMENT OF MATHEMATICS
SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

A1 SLOT
SET - A

Academic Year: 2022-23 (Even)

Test : **CLAT- 1**
Course Code & Title : **18MAB302T-Discrete Mathematics for Engineers**
Year & Sem : II & IV

Date : 08/02/2023
Duration: 1 Period (50 minutes)
Max. Marks: 25

18MAB302T – Discrete Mathematics for Engineers		Program Outcomes (POs)												PSO		
		Graduate Attributes														
S. No.	Course Outcomes (COs)	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Problem solving in sets, relations and functions.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Solving problems in basic counting principles, inclusion exclusion and number theory.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Solving problems of mathematical logic, inference theory and mathematical induction.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Gaining knowledge in groups, rings and fields. Solving problems in coding theory.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Gaining knowledge in graphs and properties. Learning about trees, minimum spanning trees and graph coloring.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
6	Learning mathematical reasoning, combinatorial analysis, algebraic structures and graph theory.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-

Part - A
(3 x 4 = 12 Marks)
Instructions: Answer all Questions

Q. No	Question	Marks	BL	CO	PO	PI Code
1	Prove that $A \cap (B - C) = (A \cap B) - (A \cap C)$ analytically where A, B, C are sets.	4	1	1	1	1.1.1
2	Given $R = \{(a,b)/\ a \leq b, a, b \in A\}$ where $A = \{1,2,3\}$, find the matrix representing (a) R^2 (b) R^{-1} (c) R'	4	2	1	2	2.1.1
3	If f, g, h are all functions defined on the set of real numbers such that $f(x) = x^3 - 4x$, $g(x) = \frac{1}{x^2+1}$ and $h(x) = x^4$, find $((f \circ g) \circ h)(x)$ and $(g \circ h)(x)$.	4	3	1	2	2.2.1

Part – B
(1x 13 = 13 Marks)
Instructions: Answer all Questions

4a	Construct the relation R defined on $A = \{3,5,9,15,24,25\}$ such that aRb if a divides b. Draw its directed graph and Hasse Diagram.	6	3	1	2	2.2.1
4b	Let $A = \{1,2,3,4\}$ and $R = \{(1,2),(1,3),(2,3),(2,4),(3,3),(4,2)\}$. Find the transitive closure of R using Warshall algorithm.	7	4	1	2	2.1.3

Name of the Student:

R	A														

SRM Institute of Science and Technology
College of Engineering and Technology
DEPARTMENT OF MATHEMATICS
SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

A1 SLOT
SET - B

Academic Year: 2022-23 (Even)

Test : CLAT- 1
Course Code & Title : 18MAB302T-Discrete Mathematics for Engineers
Year & Sem : II & IV

Date : 08/02/2023
Duration: 1 Period (50 minutes)
Max. Marks: 25

18MAB302T – Discrete Mathematics for Engineers		Program Outcomes (POs)													
		Graduate Attributes											PSO		
S. No.	Course Outcomes (COs)	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Problem solving in sets, relations and functions.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Solving problems in basic counting principles, inclusion exclusion and number theory.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Solving problems of mathematical logic, inference theory and mathematical induction.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Gaining knowledge in groups, rings and fields. Solving problems in coding theory.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Gaining knowledge in graphs and properties. Learning about trees, minimum spanning trees and graph coloring.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
6	Learning mathematical reasoning, combinatorial analysis, algebraic structures and graph theory.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-

Part - A
(3 x 4 = 12 Marks)
Instructions: Answer all Questions

Q. No	Question	Marks	BL	CO	PO	PI Code
1	Prove that $(A - C) \cap (C - B) = \emptyset$ analytically where A, B, C are sets.	4	1	1	1	1.1.1
2	If R and S are relations represented by the matrices $M_R = \begin{bmatrix} 0 & 1 & 0 \\ 1 & 1 & 1 \\ 1 & 0 & 0 \end{bmatrix}$ and $M_S = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$, find (i) $M_{R \cup S}$ (ii) $M_{R \cap S}$ (iii) $M_{R \circ S}$ (iv) M_{R-S}.	4	2	1	2	2.1.1
3	If f, g, h are all functions defined on the set of real numbers such that $f(x) = x + 3$, $g(x) = x^2 + 2x$ and $h(x) = 2x$, find $(f \circ g \circ h)(x)$ and $h^{-1}(x)$.	4	3	1	2	2.2.1

Part – B
(1x 13 = 13 Marks)
Instructions: Answer all Questions

4a	Construct the relation R defined on $X = \{x, y, z\}$ such that $R = \{(A, B); \text{if } A \subseteq B \text{ forall } A, B \text{ in } \wp(X)\}$, where $\wp(X)$ denote the power set of X. Draw its directed graph and Hasse Diagram.	6	3	1	2	2.2.1
4b	Using Warshall's algorithm, find the transitive closure of the relation $R = \{(1,2), (1,4), (2,3), (3,2), (3,4), (4,1)\}$.	7	4	1	2	2.1.3

SRM INSTITUTE OF SCIENCE & TECHNOLOGY

A1 SLOT
SET - A

Name of the Student:

R	A													

SRM Institute of Science and Technology
College of Engineering and Technology
DEPARTMENT OF MATHEMATICS
SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2022-23 (Even)

Test: CLAT- II
Course Code &Title : 18MAB302T-Discrete Mathematics for Engineers
Year & Sem: II & IV

Date: 24/03/2023
Duration:2 Periods (100 minutes)
Max. Marks: 50

18MAB302T – Discrete Mathematics for Engineers		Program Outcomes (POs)													
		Graduate Attributes												PSO	
S. No.	Course Outcomes (COs)	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Problem solving in sets, relations and functions.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Solving problems in basic counting principles, inclusion exclusion and number theory.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Solving problems of mathematical logic, inference theory and mathematical induction.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Gaining knowledge in groups, rings and fields. Solving problems in coding theory.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Gaining knowledge in graphs and properties. Learning about trees, minimum spanning trees and graph coloring.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
6	Learning mathematical reasoning, combinatorial analysis, algebraic structures and graph theory.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-

	Part – A (10 x 1 = 10 Marks) **Instructions: Answer all Questions**						
Q. No	**Question**	**Answer**	**Marks**	**BL**	**CO**	**PO**	**PI Code**
1	Identify the number of permutations of a set of k elements is (a) k! (b) (k-1)! (c) (k+1)! (d) none of these		1	1	2	2	1.1.1
2	6 boys and 6 girls are to be seated in a row. How many ways they can seat such that no two girls should be seated together (a) 352800 (b) 352806 (c) 432800 (d) 362790		1	2	2	2	1.1.1
3	If gcd (a, b) = 1 then the gcd (Ka, Kb) = ? (a) 1 (b) K (c) 2K (d) does not exists		1	2	2	2	1.1.1
4	The product of any m consecutive integers is divisible by (a) m-1 (b) m+1 (c) m (d) m-2		1	1	2	2	1.1.1
5	If a|b and a|c , then (a) b|a (b) c|a (c) a|b+c (d) b|c		1	1	2	2	1.1.1
6	The contra positive statement of $\neg R \rightarrow S$ is (a) $S \rightarrow R$ (b) $R \rightarrow S$ (c) $\neg S \rightarrow R$ (d) $S \rightarrow \neg R$		1	1	3	2	1.1.1

7	Which one is a contradiction? (a) $(P \vee \neg P)$ (b) $(P \wedge \neg P)$ (c) $(P \wedge Q)$ (d) $(P \vee Q)$		1	2	3	2	1.1.1
8	Identify the dual of the statement $(P \wedge Q) \vee (R \wedge S)$ is (a) $(P \wedge Q) \wedge (R \wedge S)$ (b) $(P \vee Q) \vee (R \vee S)$ (c) $(P \wedge Q) \vee (R \vee S)$ (d) $s \rightarrow (p \vee r)$,		1	2	3	2	1.1.1
9	$A \wedge B$ is equivalent to which of the following? (a) $\neg A \rightarrow \neg B$ (b) $\neg A \rightarrow B$ (c) $\neg(A \rightarrow \neg B)$ (d) $\neg B \rightarrow A$		1	2	3	2	1.1.1
10	The rule $((p \rightarrow q) \wedge \sim q) \rightarrow \sim p$ is recognized as (a) Disjunctive syllogism (b) Modus Ponens (c) Hypothetical syllogism (d) Modus Tollens		1	1	3	2	1.1.1

Evaluation Sheet:

Part- A (10*1= 10 Marks)				
Q. No	CO	Max. Marks	Marks Obtained	Total
1	2	1		
2	2	1		
3	2	1		
4	2	1		
5	2	1		
6	3	1		
7	3	1		
8	3	1		
9	3	1		
10	3	1		

Signature of the Course Teacher

SRM INSTITUTE OF SCIENCE & TECHNOLOGY

A1 SLOT
SET - A

SRM Institute of Science and Technology

College of Engineering and Technology

DEPARTMENT OF MATHEMATICS

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2022-23 (Even)

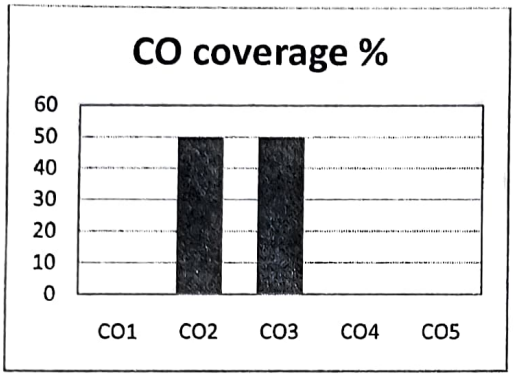
Test: CLAT- II
Course Code &Title : 18MAB302T-Discrete Mathematics for Engineers
Year & Sem: II & IV

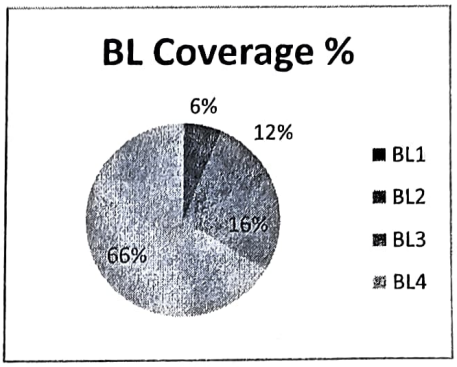
Date: 24/03/2023
Duration:2 Periods (100 minutes)
Max. Marks: 50

	Part – B (4 x 4 = 16 Marks) **Instructions: Answer any four Questions**					
Q. No	**Question**	**Marks**	**BL**	**CO**	**PO**	**PI Code**
11	Estimate the gcd (432, 95256) and lcm (432, 95256) by prime factorization technique.	**4**	**2**	**2**	**2**	**1.1.1**
12	If $\gcd(a,b)=1$ then prove that the $\gcd(a+b,a^2-ab+b^2)=1$ or 3.	**4**	**3**	**2**	**2**	**1.1.1**
13	Let S be a square where each side has length 2 unit. Estimate the minimum number of points to be chosen from the interior of S (Using pigeonhole principle) such that distance between two points will be less than $\sqrt{2}$ unit.	**4**	**3**	**2**	**2**	**1.1.1**
14	Examine the logical equivalence of $(p\rightarrow q)\wedge(p\rightarrow r)\equiv p\rightarrow(q\wedge r)$.	**4**	**4**	**3**	**2**	**1.1.1**
15	Describe the following sentences as a mathematical logical argument. "If the Germany has good forward striker and the Argentina have weak mid fielders then Germany can beat Argentina. If Germany can beat Argentina then Germany can beat Brazil. The Germany cannot beat the Brazil. Therefore either Germany does not have good forward strikers or the Argentina has strong mid-fielders."	**4**	**3**	**3**	**2**	**1.1.1**
16	Using the proof by contrapositive that if n^2+5 is odd then n is even, $\forall n\in\mathbb{N}$.	**4**	**3**	**3**	**2**	**1.1.1**
	Part – C (2 x 12 = 24 Marks) **Instructions: Answer all the Questions**					
17 (a)	Find the number of positive integers between 1 to 10000 which are neither a perfect square nor a perfect cube.	**12**	**4**	**2**	**2**	**1.1.1**
	OR					
17 (b)	Using Euclidean algorithm find the gcd (154, 272). Hence evaluate m and n such that gcd (154, 272) = 154m + 272n.	**12**	**4**	**2**	**2**	**1.1.1**
18 (a)	Using indirect method of proof show that q can be derived from $p\rightarrow q$, $r\rightarrow q$, $s\rightarrow(p\vee r)$, and s.	**12**	**4**	**3**	**2**	**1.1.1**

18 (b)	OR Using the principle of Mathematical induction show that $4^{n+1}+5^{2n-1}$ is divisible by 21 $\forall n \in \mathbb{N}$.	12	4	3	2	1.1.1

Course Outcome (CO) and Bloom's level (BL) Coverage in Questions





Approved by the Audit Professor/Course Coordinator

Part- B (4 * 4 = 16 Marks)				
11	2	4		
12	2	4		
13	2	4		
14	3	4		
15	3	4		
16	3	4		
Part- C (2 * 12 = 24 Marks)				
17 (a)	2	12		
17 (b)	2	12		
18 (a)	3	12		
18 (b)	3	12		
Total Marks Obtained				

CO Attainment

CO	Marks Scored
CO2	
CO3	
Total	

Signature of the Course Teacher

SRM INSTITUTE OF SCIENCE & TECHNOLOGY

A1 SLOT
SET - B

Name of the Student:

R	A													

SRM Institute of Science and Technology
College of Engineering and Technology
DEPARTMENT OF MATHEMATICS
SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2022-23 (Even)

Test: CLAT- II
Course Code &Title : 18MAB302T-Discrete Mathematics for Engineers
Year & Sem: II & IV

Date: 24/03/2023
Duration:2 Periods (100 minutes)
Max. Marks: 50

18MAB302T – Discrete Mathematics for Engineers		Program Outcomes (POs)														
		Graduate Attributes												PSO		
S. No.	Course Outcomes (COs)	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Problem solving in sets, relations and functions.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Solving problems in basic counting principles, inclusion exclusion and number theory.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Solving problems of mathematical logic, inference theory and mathematical induction.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Gaining knowledge in groups, rings and fields. Solving problems in coding theory.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Gaining knowledge in graphs and properties. Learning about trees, minimum spanning trees and graph coloring.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
6	Learning mathematical reasoning, combinatorial analysis, algebraic structures and graph theory.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-

Part – A (10 x 1 = 10 Marks)
Instructions: Answer all Questions

Q. No	Question	Answer	Marks	BL	CO	PO	PI Code
1	If there are n^r arrangements of r objects and n bins then (a) The objects and bins are all distinguishable (b) the objects are distinguishable and bins are indistinguishable (c) the objects are indistinguishable and bins are distinguishable (d) The objects and bins are all indistinguishable		1	1	2	2	1.1.1
2	In how many different ways 7 different beads can arrange to form a necklace? (a) 250 (b) 300 (c) 360 (d) 350		1	2	2	2	1.1.1
3	If gcd(a,b) = d then (a) $\gcd(\frac{a}{d},\frac{b}{d}) = 1$ (b) gcd (a,2b) = a (c) $\gcd(a,\frac{b}{d}) = 2$ (d) $\gcd(\frac{a}{d}, b) = 1$		1	1	2	2	1.1.1
4	If a|c and b|c with gcd (a,b) = 1 , then (a) ab |c (b) c| ab (c) c|a (d) c|b		1	1	2	2	1.1.1

5	Identify the correct statement. (a) lcm (-4, 14) = 28 (b) lcm (-4, 14) = -28 (c) lcm (-4, 14) =-56 (d) lcm (-4, 14) = -4		1	2	2	2	1.1.1
6	The inverse statement of $\neg R \rightarrow S$ is (a) $S \rightarrow R$ (b) $R \rightarrow \neg S$ (c) $\neg S \rightarrow R$ (d) $S \rightarrow \neg R$		1	1	3	2	1.1.1
7	Recognize the statement which is a tautology? (a) $(P \vee \neg P)$ (b) $(P \wedge \neg P)$ (c) $(P \wedge Q)$ (d) $(P \vee Q)$		1	2	3	2	1.1.1
8	Identify the dual of the statement $(P \vee Q) \rightarrow R$ (a) $(P \wedge Q) \wedge R$ (b) $(P \vee Q) \vee R$ (c) $\neg(P \wedge Q) \wedge R$ (d) $(P \vee Q) \wedge \neg R$		1	2	3	2	1.1.1
9	Describe the negation of the statement: "Today is not a rainy day." (a) Today is a rainy day (b) Today is sunny (c) Today is cloudy (d) Today is not sunny		1	1	3	2	1.1.1
10	The rule $((p \rightarrow q) \wedge p) \rightarrow q$ is recognized as (a) Disjunctive syllogism (b) Modus Ponens (c) Hypothetical syllogism (d) Modus Tollens		1	2	3	2	1.1.1

Evaluation Sheet :

Part- A (10*1= 10 Marks)				
Q. No	CO	Max. Marks	Marks Obtained	Total
1	2	1		
2	2	1		
3	2	1		
4	2	1		
5	2	1		
6	3	1		
7	3	1		
8	3	1		
9	3	1		
10	3	1		

Signature of the Course Teacher

SRM INSTITUTE OF SCIENCE & TECHNOLOGY

A1 SLOT
SET - B

Name of the Student:

R	A														

SRM Institute of Science and Technology
College of Engineering and Technology
DEPARTMENT OF MATHEMATICS
SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu
Academic Year: 2022-23 (Even)

Test: CLAT- II **Date: 24/03/2023**
Course Code &Title : 18MAB302T-Discrete Mathematics for Engineers **Duration:**2 Periods (100 minutes)
Year & Sem: II & IV **Max. Marks: 50**

Part – B (4 x 4 = 16 Marks)
Instructions: Answer any four Questions

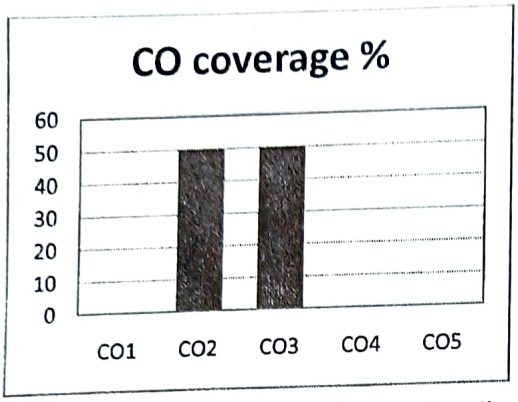
Q. No	Question	Marks	BL	CO	PO	PI Code
11	Estimate the gcd (512, 320) and lcm (512, 320) by prime factorization technique.	4	2	2	2	1.1.1
12	If $\gcd(a,b)=1$ then prove that the $\gcd(a+b,a-b)=1$ or 2.	4	3	2	2	1.1.1
13	Let A be an equilateral triangle where each side has length 1 unit. Find the minimum number of points to be chosen from the interior of A (using pigeonhole principle) such that distance between two points will be less than $1/3$ unit.	4	3	2	2	1.1.1
14	Construct the truth table for the compound proposition $p \vee (\neg p \rightarrow (q \vee (q \rightarrow \neg r)))$	4	4	3	2	1.1.1
15	Using proof by contraposition, show that if n^3+5 is an odd integer, then n is an even integer.	4	3	3	2	1.1.1
16	Using the principle of Mathematical induction show that $1+2+.....+n=\frac{n(n+1)}{2} \quad \forall n \in \mathbb{N}$	4	3	3	2	1.1.1

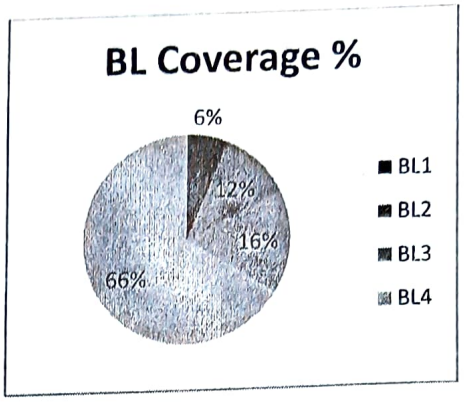
Part – C (2 x 12 = 24 Marks)
Instructions: Answer all the Questions

17 (a)	Find the number of positive integers between 1 to 1000 which are not divisible by any of 2, 3 and 7.	12	4	2	2	1.1.1
	OR					
17 (b)	Using Euclidean algorithm estimate the gcd (256, 1166). Hence evaluate m and n such that gcd (256, 1166) = $256m + 1166n$.	12	4	2	2	1.1.1
18 (a)	Examine the validity of the argument, " It is not sunny this afternoon and it is colder than yesterday. We will go for swimming only if it sunny. If we do not go for swimming then we will take a trip. If we take a trip then we will be home by sunset. Therefore, we will be home by sunset."	12	4	3	2	1.1.1
	OR					

18 (b)	Show that $r \rightarrow s$ can be derived from the premises $p \rightarrow (q \rightarrow s)$, $\neg r \vee p$ and q.	12	4	3	2	1.1.1

Course Outcome (CO) and Bloom's level (BL) Coverage in Questions





Approved by the Audit Professor/Course Coordinator

Part- B (4 * 4 = 16 Marks)				
11	2	4		
12	2	4		
13	2	4		
14	3	4		
15	3	4		
16	3	4		
Part- C (2 * 12 = 24 Marks)				
17 (a)	2	12		
17 (b)	2	12		
18 (a)	3	12		
18 (b)	3	12		
Total Marks Obtained				

CO Attainment

CO	Marks Scored
CO2	
CO3	
Total	

Signature of the Course Teacher

SRM INSTITUTE OF SCIENCE & TECHNOLOGY

A1 SLOT
SET - A

Name of the Student:

R	A													

SRM Institute of Science and Technology
College of Engineering and Technology

DEPARTMENT OF MATHEMATICS

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2022-23 (Even)

Test: CLAT- III **Date: 02/05/2023**
Course Code &Title : 18MAB302T-Discrete Mathematics for Engineers **Duration:**2 Periods (100 minutes)
Year & Sem: II & IV **Max. Marks:** 50

18MAB302T – Discrete Mathematics for Engineers		Program Outcomes (POs)													
		Graduate Attributes												PSO	
S. No.	Course Outcomes (COs)	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Problem solving in sets, relations and functions.	3	3	-.	-	-	-	-	-	-	-	-	-	-	-	-
2	Solving problems in basic counting principles, inclusion exclusion and number theory.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Solving problems of mathematical logic, inference theory and mathematical induction.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Gaining knowledge in groups, rings and fields. Solving problems in coding theory.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Gaining knowledge in graphs and properties. Learning about trees, minimum spanning trees and graph coloring.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
6	Learning mathematical reasoning, combinatorial analysis, algebraic structures and graph theory.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-

	Part – A (10 x 1 = 10 Marks) **Instructions: Answer all Questions**						
Q. No	**Question**	**Answer**	**Marks**	**BL**	**CO**	**PO**	**PI Code**
1	In a group G={1,-1,i,-i} under multiplication, the order of the element *i* is (a) 4 (b) 1 (c) 2 (d) 3		1	1	4	1,2	1.1.1
2	If $*$ is the binary operation on the set of positive rational numbers defined by $a * b = \frac{ab}{2}$ then the identity element is (a) 1 (b) -1 (c) 2 (d) 3		1	2	4	1,2	1.1.1
3	A cyclic group is always (a) Abelian (b) non-abelian (c) only monoid (d) only semigroup		1	2	4	1,2	1.1.1
4	A commutative ring with unity and without zero divisors is called		1	1	4	1,2	1.1.1

	(a) Field (b) Integral Domain (c) Non-abelian ring (d) Integral field						
5	The weight of word $x = 11100$ in $\mathbf{B}^5$ (a) 1 (b) 1 (c) 2 (d) 3		1	1	4	1,2	1.1.1
6	How many edges are there in a complete bipartite graph $\mathbf{K}_{3,3}$? (a) 4 (b) 9 (c) 6 (d) 16		1	1	5	1,2	1.1.1
7	Choose the correct statement (a) Every complete graph is complete bipartite. (b) Every complete graph is tree. (c) Every complete graph is regular. (d) Every complete graph is bipaprtite.		1	2	5	1,2	1.1.1
8	What is the chromatic number of a circuit of length 8 (C_8)? (a) 8 (b) 5 (c) 2 (d) 3		1	2	5	1,2	1.1.1
9	How many vertices are there in a graph with 16 edges and every vertex has degree 4? (a) 4 (b) 8 (c) 9 (d) 10		1	2	5	1,2	1.1.1
10	A vertex which is adjacent to exactly one vertex in a graph is called ..... Vertex. (a) Isolated (b) Pendant (c) Incident (d) Simple		1	1	5	1,2	1.1.1

Evaluation Sheet :

Part- A (10*1= 10 Marks)				
Q. No	CO	Max. Marks	Marks Obtained	Total
1	4	1		
2	4	1		
3	4	1		
4	4	1		
5	4	1		
6	5	1		
7	5	1		
8	5	1		
9	5	1		
10	5	1		

CO Attainment	Marks Scored
CO4	
CO5	
Total	

Part- B (4 * 4 = 16 Marks)				
11	4	4		
12	4	4		
13	4	4		
14	5	4		
15	5	4		
16	5	4		
Part- C (2 * 12 = 24 Marks)				
17 (a)	4	12		
17 (b)	4	12		
18 (a)	5	12		
18 (b)	5	12		
Total Marks Obtained				

Signature of the Course Teacher

A1 SLOT
SET - A

SRM Institute of Science and Technology

College of Engineering and Technology

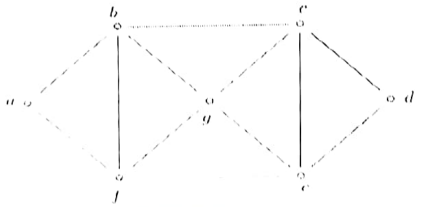
DEPARTMENT OF MATHEMATICS

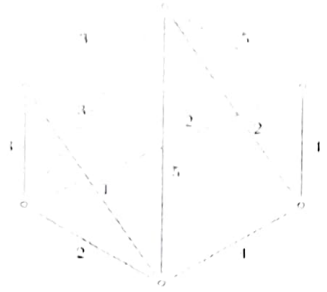
SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2022-23 (Even)

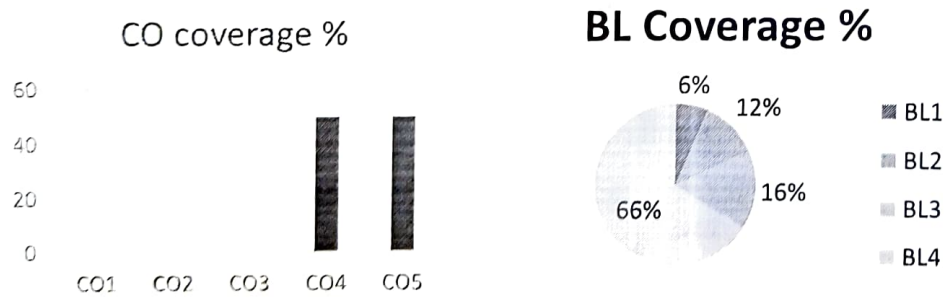
Test: CLAT- III
Course Code &Title : 18MAB302T-Discrete Mathematics for Engineers
Year & Sem: II & IV

Date: 02/05/2023
Duration:2 Periods (100 minutes)
Max. Marks: 50

	Part – B (4 x 4 = 16 Marks) **Instructions: Answer any four Questions**					
Q. No	**Question**	**Marks**	**BL**	**CO**	**PO**	**PI Code**
11	Show that the inverse of each element of a group is unique.	4	2	4	1,2	1.1.1
12	Show that G={1,3,7,9} forms a group under multiplication modulo 10	4	3	4	1,2	1.1.1
13	Show that the intersection of two subgroups is again a subgroup.	4	3	4	1,2	1.1.1
14	Find the adjacency and incidence matrix of K_4.	4	4	5	1,2	1.1.1
15	Give an example of a graph which is not Eulerian but Hamiltonian. For the same example verify the necessary and sufficient condition for Euler graph is not satisfied.	4	3	5	1,2	1.1.1
16	Find the chromatic number of the following graph. Also verify its planarity. 	4	3	5	1,2	1.1.1
	Part – C (2 x 12 = 24 Marks) **Instructions: Answer all the Questions**					
17 (a)	The necessary and sufficient condition for a nonempty subset H of a group {G,*}to be a subgroup is, for every a, b ∈H ⇒a∗b^{-1}∈H. **(OR)**	12	4	4	1,2	1.1.1
17 (b)	List the code words generated by the encoding function $e: B^2 \rightarrow B^5$	12	4	4	1,2	1.1.1

	with respect to the parity check matrix $\begin{pmatrix} 0 & 1 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$. Also decode the received words (i) [1 1 0 1 0] (ii) [0 0 1 1 1].					
18 (a)	Find the minimum spanning tree using Kruskal's Algorithm.  **(OR)**	**12**	**4**	**5**	**1,2**	**1.1.1**
18 (b)	(i) Prove that the number of edges in a bipartite graph with n vertices is at most $\frac{n^2}{4}$.	**8**	**4**	**5**	**1,2**	**1.1.1**
	(ii) Show that a tree with n vertices has n-1 edges.	**4**	**4**	**5**	**1,2**	**1.1.1**

Course Outcome (CO) and Bloom's level (BL) Coverage in Questions



Approved by the Audit Professor/Course Coordinator

SRM INSTITUTE OF SCIENCE & TECHNOLOGY

A1 SLOT
SET - B

Name of the Student:

R	A														

SRM Institute of Science and Technology
College of Engineering and Technology
DEPARTMENT OF MATHEMATICS
SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2022-23 (Even)

Test: CLAT- III
Course Code &Title : 18MAB302T-Discrete Mathematics for Engineers
Year & Sem: II & IV

Date: 02/05/2023
Duration: 2 Periods (100 minutes)
Max. Marks: 50

18MAB302T – Discrete Mathematics for Engineers		Program Outcomes (POs)												PSO		
		Graduate Attributes														
S. No.	Course Outcomes (COs)	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Problem solving in sets, relations and functions.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Solving problems in basic counting principles, inclusion exclusion and number theory.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Solving problems of mathematical logic, inference theory and mathematical induction.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Gaining knowledge in groups, rings and fields. Solving problems in coding theory.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Gaining knowledge in graphs and properties. Learning about trees, minimum spanning trees and graph coloring.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
6	Learning mathematical reasoning, combinatorial analysis, algebraic structures and graph theory.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-

Part – A (10 x 1 = 10 Marks)
Instructions: Answer all Questions

Q. No	Question	Answer	Marks	BL	CO	PO	PI Code
1	In a cyclic group G={1,-1,i,-i} under multiplication, the generators are (a) {1,i} (b) {1,-i} (c) {-1,i} (d) {i,-i}		1	1	4	1,2	1.1.1
2	The inverse element of "a" in group (G,*) with binary operation such that a*b = a+b+2. (a) -a (b) a^{-1} (c) -2 (d) –(a+4)		1	2	4	1,2	1.1.1
3	If every element in a group is its own inverse then the group must be (a) Abelian (b) Non Abelian (c) Cyclic (d) Non Commutative		1	1	4	1,2	1.1.1
4	Every finite integral domain is (a) field (b) cyclic group (c) Non Commutative ring (d) Non Abelian group		1	1	4	1,2	1.1.1
5	Let x= 1001, y=0100, z=1000. Find the minimum distance between these code words (a) 1 (b) 2 (c) 3 (d) 4		1	2	4	1,2	1.1.1

6	How many edges are there in a complete graph K_9 (a) 10 (b) 25 (c) 20 (d) 36		1	1	5	1,2	1.1.1
7	Which of the following statement is false? (a) Sum of the degrees of n vertices of a tree is 2n-2. (b) There is no circuit in a tree. (c) There exists a tree with 8 vertices and 8 edges. (d) A tree with e edges has e+1 vertices		1	2	5	1,2	1.1.1
8	What is the chromatic number of the complete bipartite graph $K_{4,3}$? (a)2 (b) 3 (c) 4 (d) 5		1	2	5	1,2	1.1.1
9	A vertex which is not adjacent to any other vertex in a graph is called ..... vertex? (a) Isolated (b) Pendant (c) incident (d)simple		1	1	5	1,2	1.1.1
10	A graph in which loops and parallel edges are allowed is called a (a) Weighted Graph (b) Simple Graph (b) Multigraph (d) Pseudograph		1	2	5	1,2	1.1.1

Evaluation Sheet :

Part- A (10*1= 10 Marks)				
Q. No	CO	Max. Marks	Marks Obtained	Total
1	4	1		
2	4	1		
3	4	1		
4	4	1		
5	4	1		
6	5	1		
7	5	1		
8	5	1		
9	5	1		
10	5	1		

CO Attainment	Marks Scored
CO4	
CO5	
Total	

Part- B (4 * 4 = 16 Marks)				
11	4	4		
12	4	4		
13	4	4		
14	5	4		
15	5	4		
16	5	4		
Part- C (2 * 12 = 24 Marks)				
17 (a)	4	12		
17 (b)	4	12		
18 (a)	5	12		
18 (b)	5	12		
Total Marks Obtained				

Signature of the Course Teacher

SRM INSTITUTE OF SCIENCE & TECHNOLOGY

A1 SLOT
SET - B

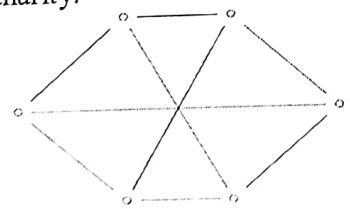
Name of the Student:

R	A														

SRM Institute of Science and Technology
College of Engineering and Technology
DEPARTMENT OF MATHEMATICS
SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu
Academic Year: 2022-23 (Even)

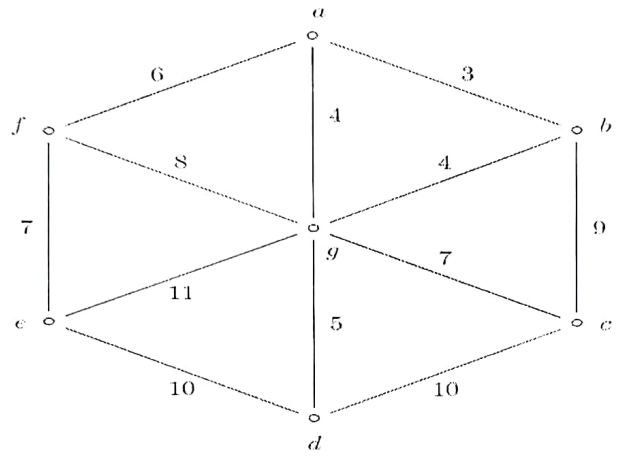
Test: CLAT- III **Date: 02/05/2023**
Course Code &Title : 18MAB302T-Discrete Mathematics for Engineers **Duration:**2 Periods (100 minutes)
Year & Sem: II & IV **Max. Marks:** 50

Part – B (4 x 4 = 16 Marks)
Instructions: Answer any four Questions

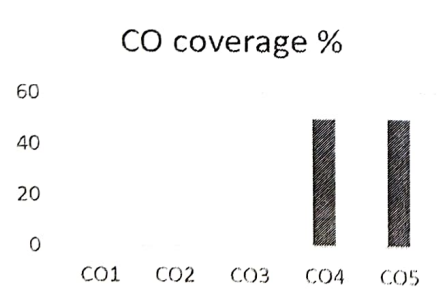
Q. No	Question	Marks	BL	CO	PO	PI Code
11	Show that identity element of a group is unique.	4	2	4	1,2	1.1.1
12	Show that G={1,2,3,4} forms a group under multiplication modulo 5.	4	3	4	1,2	1.1.1
13	Prove that if (G,*) is an abelian group then $(a*b)^2=a^2*b^2$, for any a,b in G.	4	3	4	1,2	1.1.1
14	Find the adjacency and incidence matrix of $K_{2,3}$.	4	4	5	1,2	1.1.1
15	Give an example of a graph which is Eulerian but not Hamiltonian. For the same example, verify the necessary and sufficient condition for Euler Graph.	4	3	5	1,2	1.1.1
16	Find the chromatic number of the following graph. Also verify its planarity. 	4	3	5	1,2	1.1.1

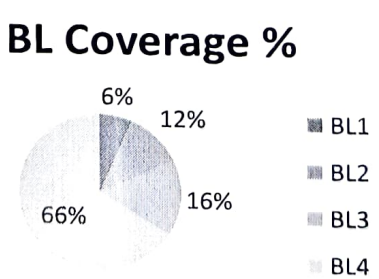
Part – C (2 x 12 = 24 Marks)
Instructions: Answer all the Questions

17 (a)	Prove that every subgroup of a cyclic group is cyclic. **(OR)**	12	4	4	1,2	1.1.1

17 (b)	List the code words generated by the parity check matrix $\begin{pmatrix} 1 & 1 & 1 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$ when the encoding function is $e: B^3 \rightarrow B^6$. Also decode the received words (i) [1 1 0 1 0 1] (ii) [0 0 1 1 1 1].	**12**	**4**	**4**	**1,2**	**1.1.1**
18 (a)	Find the minimum spanning tree using Krushkall's Algorithm. 	**12**	**4**	**5**	**1,2**	**1.1.1**
	(OR)					
18 (b)	(i) Show that the maximum number of edges of a disconnected graph with n vertices and k components is $\frac{(n-k)(n-k+1)}{2}$.	**8**	**4**	**5**	**1,2**	**1.1.1**
	(ii) Show that for any graph G, the number of vertices of odd degree is even.	**4**	**4**	**5**	**1,2**	**1.1.1**

Course Outcome (CO) and Bloom's level (BL) Coverage in Questions





Approved by the Audit Professor/Course Coordinator