A1

B

SRM Institute of Science and Technology

College of Engineering and Technology

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2021-22 (Even)

Test : CLAT- 1

Course Code & Title : 18MAB302T-Discrete Mathematics for Engineers

Date : 07/04/2022

Duration : 1 Period (50 minutes)

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.	M	H	M						M	M		H	-	-	-
2	Solving problems in basic counting principles, inclusion exclusion and number theory.	M	H		M	M				M			H	-	-	-
3	Solving problems of mathematical logic, inference theory and mathematical induction.	M	H							M			H	-	-	-
4	Gaining knowledge in groups, rings and fields. Solving problems in coding theory.	M	H		M					M			H	-	-	-
5	Gaining knowledge in graphs and properties. Learning about trees, minimum spanning trees and graph coloring.	M	H	M						M	M		H	-	-	-
6	Learning mathematic0al reasoning, combinatorial analysis, algebraic structures and graph theory.	M	H							M			H	-	-	-

Year & Sem : II & III

Max. Marks: 25

Course Articulation Matrix:

Part - A

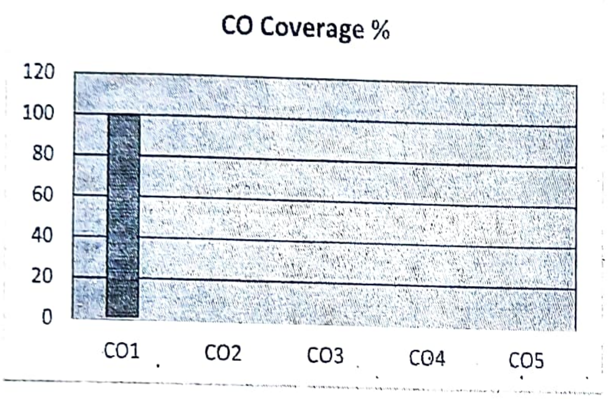
(3 x 4 = 12 Marks)

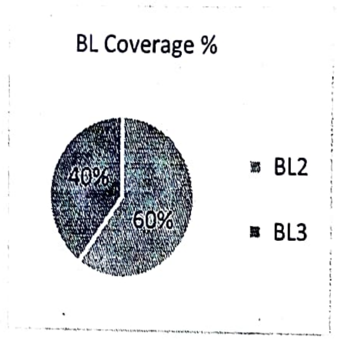
Instructions: Answer all Questions

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	2	1	1	1.1.1
2	Draw the Hasse diagram representing the partial ordering $\{(A, B) \,/\, A \subseteq B, A, B \in P(S)$ where $S = \{x, y, z\}\}$. Here P(S) denotes the power set of the set S.	4	3	1	2	2.1.1
3	Give an example of a relation R such that (i) R is reflexive, transitive but not symmetric. (ii) R is neither symmetric nor anti – symmetric.	4	3	1	2	2.4.4

Part – B (1x 13 = 13 Marks)						
4	a) Given $R = \{(1,1),(1,2),(1,4),(2,2),(2,3),(3,4),(4,1)\}$ defined on the set $A = \{1,2,3,4\}$, find the transitive closure of R using Warshall's algorithm.	7	3	1	2	2.1.3
	b) Prove that when two functions are bijective, then their composition will always yield a bijective function.	6	2	1	2	2.1.2

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





Approved by the Audit Professor/Course Coordinator

18MAB302T – Discrete Mathematics for Engineers

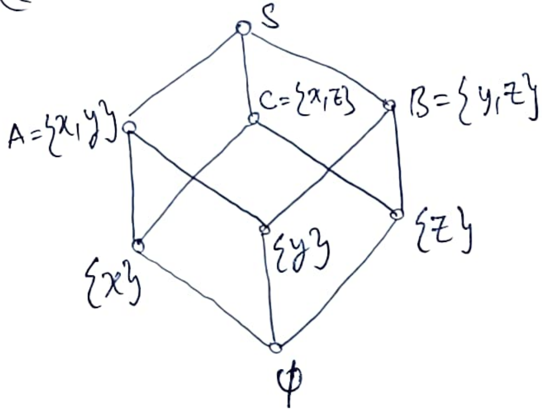
II Yr / IV Sem – CLAT1 – A1 / Set B

Part - A

1. $$(A-C)\cap(C-B) = \{x \mid x\in A \text{ and } x\notin C \text{ and } x\in C \text{ and } x\notin B\}$$
$$= \{x \mid x\in A \text{ and } (x\notin C \text{ and } x\in C) \text{ and } x\notin B\}$$
② marks
$$= \{x \mid (x\in A \text{ and } x\in \phi) \text{ and } x\notin B\}$$
$$= \{x \mid x\in \phi \text{ and } x\in \overline{B}\}$$
$$= \{x \mid x\in \phi\cap\overline{B}\} = \{x \mid x\in\phi\} = \phi.$$
② marks.

2. $P(S) = \{\phi, \{x\}, \{y\}, \{z\}, A=\{x,y\}, B=\{y,z\}, C=\{x,z\}, S\}$

$R = \{(\phi,\phi), (\phi,\{x\}), (\phi,\{y\}), (\phi,\{z\}), (\phi,A), (\phi,B), (\phi,C), (\phi,S),$
$(\{x\},\{x\}), (\{x\},A), (\{x\},C), (\{x\},S),$
$(\{y\},\{y\}), (\{y\},A), (\{y\},B), (\{y\},S),$
$(\{z\},\{z\}), (\{z\},B), (\{z\},C), (\{z\},S), (A,S), (B,S), (C,S), (S,S)\}.$



$R \rightarrow$ 1 marks

Hasse Diagram $\rightarrow$ 3 marks

3. ~~(i) R = {(1,1), (2,~~ $A = \{1,2,3\}$

(i) $R_1 = \{(1,1), (2,2), (3,3), (1,2)\}$

(ii) $R_2 = \{(1,1), (1,2), (2,1), (1,3)\}$

or any other correct answer.

Each ② marks.

[No explanation needed]