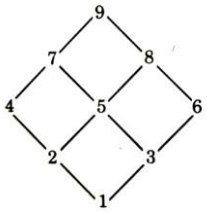
B. TECH – CS
Assignment - 1
Semester-3rd Session: 2025-26 (ODD)
BCS-303: Discrete structures and Theory of Logic

Unit-1 **Set Theory, Relations , POSET & Lattices**	**Course Outcome: CO1 – Acquire Knowledge of sets and relations for solving the problems of POSET and lattices.**
Date of Distribution:	**Faculty Name: Mr. Anil Gupta**

Sr.	**MANDATORY QUESTIONS**	BL
1	Describe the following in set builder form: • A = {-4,-3,-2,-1,0,1,2,3} • B = {1,8,27,64}	
2	Show that we can have A ∩ B = A ∩ C without B = C.	
3	State the formula of Distributive laws and De- Morgan's Law.	
4	Let A ={1,2,3,4} and R= { (1,1), (1,2), (2,1), (2,2), (3,3), (3,4), (4,3), (4,4)}. Determine whether the relation is reflexive, irreflexive, symmetric, asymmetric, antisymmetric or transitive.	
5	Let R = {(1,2), (2,3), (3,1)} and A= {1,2,3} then find the reflexive, symmetric and transitive closure.	
6	Write the Step wise Procedure of Hasse diagram and draw the hasse diagram of following: • [D_{16}, /] • ({2, 3, 5, 30, 60, 120, 180, 360}, /) • ({1, 2, 3, 4, 6, 9}, /)	
7	Let A= {a,b} R = {(a,a),(b,a),(b,b)} S = {(a,b),(b,a),(b,b)} Then,verify $(SOR)^{-1}= R^{-1}$ o S^{-1}	
8	Let A = {x: x is a prime number less than 10} and B= {x: x∈ N, x is a factor of 8}. Find A ∪ B.	
9	Show that D_{36}= {1, 2, 3, 4, 6, 9, 12, 18, 36} denote the set of divisors of 36 ordered of divisibility then (D_{36}, 'l')is lattice.	
10	Justify that for any set A, B and C: i. (A – (A ∩ B)) = A – B ii. (A – (B ∩C)) = (A – B) U (A – C)	
11	Find the numbers between 1 to 500 that are not divisible by any of the integers 2 or 3 or 5 or 7.	
12	Express power set of each of these sets. {Ø,{ Ø}} {a,{a}}	
13	If f : R → R, g : R → R and h : R → R defined by f(x) = 3x2 +2, g(x) = 7x – 5 and h(x) = 1/x. Compute the following composition functions i. (fogoh)(x)	

	ii. (gog)(x) iii. (goh)(x) iv. (hogof)(x)	
14	Prove that $A \times (B \cap C) = (A \times B) \cap (A \times C)$.	
15	Determine whether the following Hasse diagram represent a lattice or not.  	
16	Distinguish between Bounded lattice and Complement lattice? Example with an example.	
	SUPPLEMENTARY QUESTIONS	
1	Show that D_{36}= {1, 2, 3, 4, 6, 9, 12, 18, 36} denote the set of divisors of 36 ordered of divisibility then (D_{36}, 'l')is lattice.	
2	Identify whether the each of the following relations defined on the set X = {1,2,3,4} are reflexive, symmetric, transitive and/or antisymmetric? R1 = { (1,1), (1,2), (2,1) } (ii) R2 = { (1,1), (1,2), (1,4), (2,1), (2,2), (3,3), (4,1), (4,4) } R3 = { (2,1), (3,1), (3,2), (4,1), (4,2), (4,3) }	

REFERENCES

TEXT BOOKS:				
Ref. [ID]	**Authors**	**Book Title**	**Publisher/Press**	**Edition &Year of Publication**
[T1]	B. Kolman, R.C. Busby, and S.C. Ross	Discrete Mathematical Structures	5/e, Prentice Hall	2004.
[T2]	E.R.Scheinerman,	DiscreteMathematics,	Brooks/Cole	2000.
Ref. [ID]	**Authors**	**Book Title**	**Publisher/Press**	**Edition &Year of Publication**
[R1]	Liptschutz, Seymour	Discrete Mathematics",	McGraw Hill.	2015
[R2]	J.P.Chauhan	"Discrete Structures & Graph Theory	Krishna's Education	2007
ONLINE/DIGITALREFERENCES:				