Discrete Mathematical Structures

UNIT – I					
1		Explain in detail about the Logical Connectives with Examples?	L2	CO1	[12M]
2	a)	Write a short notes on Well Formed Formula with suitable example.	L3	CO1	[6M]
	b)	Show that $(P \wedge Q) \rightarrow (P \vee Q)$ is a tautology without using Truth Table	L2	CO1	[6M]
3	a)	Construct the truth table for the following statement. $(\sim P \leftrightarrow \sim Q) \leftrightarrow (Q \leftrightarrow R)$	L3	CO1	[6M]
	b)	Write a short notes on Duality Law with suitable example	L2	CO1	[6M]
4	a)	Show that $(P \rightarrow Q) \vee (P \rightarrow R) \Leftrightarrow P \rightarrow (Q \vee R)$ i) Using Truth Table. ii) Without using Truth Table	L2	CO1	[6M]
	b)	Find the PDNF of Negation of $P \vee (\neg P \wedge \neg Q \wedge R)$	L2	CO1	[6M]
5	a)	Determine whether the conclusion C follows logically from the premises H1 and H2. H1 : $P \rightarrow Q$, H2:$\sim P$, C:Q	L2	CO1	[6M]
	b)	Obtain the PCNF of the following formula $(\sim P \rightarrow R) \wedge (Q \leftrightarrow P)$ i) Using Truth Table. ii) Without using Truth Table	L2	CO1	[6M]
6	a)	Obtain DNF for $p \rightarrow ((p \rightarrow q) \wedge \neg(\neg q \vee \neg p))$.	L3	CO1	[6M]
	b)	Check whether the given statement formula is a Tautology or not: $(P \rightarrow (Q \rightarrow R)) \rightarrow ((P \rightarrow Q) \rightarrow (P \rightarrow R))$	L2	CO1	[6M]
7	a)	Construct the truth table for each of these compound statements. i) $(P \rightarrow Q) \wedge (\sim P \rightarrow Q)$ ii) $P \rightarrow (\sim Q \vee R)$	L3	CO1	[6M]
	b)	Obtain the Principal disjunctive normal form of $\mathbf{(P \wedge Q) \vee (\sim P \wedge R) \vee (Q \wedge R)}$	L2	CO1	[6M]
8	a)	Define Tautology, Contradiction and Contingency with suitable examples	L1	CO1	[6M]
	b)	Write a short notes on PDNF and PCNF	L2	CO1	[6M]

9	a)	Show that $(P \rightarrow Q) \rightarrow Q \Leftrightarrow (PvQ)$ Using Truth Table	L2	CO1	[6M]
	b)	Explain PDNF with suitable example.	L2	CO1	[6M]
10	a)	Construct the truth table for the following statement. $(\sim P \leftrightarrow \sim Q) \leftrightarrow (Q \leftrightarrow R)$	L3	CO1	[6M]
	b)	Explain PCNF with suitable example.	L2	CO1	[6M]

UNIT – II					
1		Explain about Hassee Diagram. Explain with an example.	L2	CO2	[12M]
2		Explain about Properties of Binary relations.	L2	CO2	[12M]
3	a)	Explain about the following properties of a binary relation in a set. Give one example for each i) Reflexive ii) Symmetric	L2	CO2	[6M]
	b)	Define Function. Explain the types of functions with example.	L2	CO2	[6M]
4		Define Set. Explain the Representation of set. Write about types of sets.	L2	CO2	[12M]
5	a)	Let X = {1,2,3,4} be a set and R is a relation on the set X such that R = {(1,1),(1,4),(4,1),(4,4),(2,2),(2,3),(3,2),(3,3)}.Draw its matrix and graph. Also prove that R is an equivalence relation.	L4	CO2	[6M]
	b)	Consider the relation P ={(1,2), (2.4),(3,3)} and Q ={(1,3),(2,4),(4,2)}. Find P ∪Q, P ∩Q, D(P), D(Q),D(P∪Q),R(P),R(Q),R(P∪Q).	L2	CO1	[6M]
6		Explain representation of partially ordered set with suitable example	L2	CO1	[12M]
7	a)	Explain about the following properties of a binary relation in a set.Give one example for each i) Symmetric ii) Transitive	L2	CO1	[6M]
	b)	Write a short notes on Covering & Partition of a Set with an example.	L3	CO1	[6M]

8	a)	Let X = {1,2,3} f,g,h and s be functions from X to X given by f = {(1,2) (2,3) (3,1)} g = {(1,2) (2,1) (3,3)} h = {(1,1) (2,2) (3,3)} find fog,gof,sog,gos, fos and fohog.	L4	CO1	[6M]
	b)	Let X={2,3,6,12,24,36} and the relation <= be such that x <= y. If x divides y . Draw the Hasse diagram.	L4	CO2	[6M]
9		Explain the operation on sets.	L2	CO1	[12M]
10		Explain about the following relations i) Equivalence relations ii) Partial ordering relations	L2	CO1	[12M]

UNIT – III					
1		Define Graph. Explain the basic concepts of graphs?	L1	CO3	[6M]
2		Explain Adjacency Matrix with an example.	L3	CO3	[6M]
3		Explain Incidence Matrix with an example.	L3	CO3	[6M]
4		Explain any 3 types of graphs with an example.	L3	CO3	[6M]
5		Differentiate directed and undirected graph with example.	L2	CO3	[6M]
6		Explain the terms simple graph, wheel graph and weighted graph with suitable examples.	L3	CO3	[6M]
7		Define Subgraphs.Explain with an example.	L3	CO3	[6M]
8		Explain the terms complete graph, cycle graph, wheel graph with suitable examples.	L3	CO3	[6M]