

Code: CS3T1

II B.Tech - I Semester – Regular/Supplementary Examinations
November - 2019

DISCRETE MATHEMATICS
(COMPUTER SCIENCE & ENGINEERING)

Duration: 3 hours

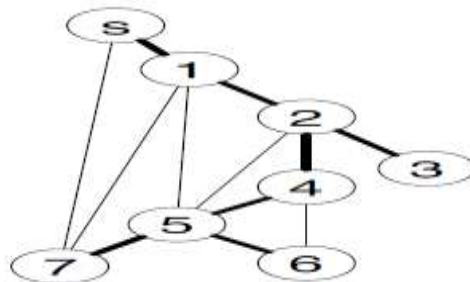
Max. Marks: 70

PART – A

Answer *all* the questions. All questions carry equal marks

11x 2 = 22 M

1. a) Obtain the Truth table for $(\neg P \vee Q) \vee (\neg P \wedge \neg R)$
- b) Give the converse and contra positive of the implication of the statement “If it is raining then I get wet”.
- c) Predicate statements are more specific than propositional statements? Justify it with an example?
- d) Define the quantifiers that are applicable in predicate calculus?
- e) Define complete lattice and complement lattice?
- f) Draw the hasse diagram of (X, \leq) , where
 $X = \{2, 3, 6, 12, 24, 36, 48, 64, 72\}$ and the relation \leq be such that $x \leq y$ if x divides y.
- g) Find the DFS and BFS sequence of the following graph(S is the starting vertex).

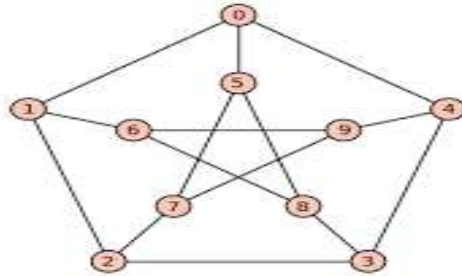


h) Define the following graph with examples

i) Cycle graph

ii) Complete graph

i) Verify the following graph is planar or not



j) Find the number of spanning trees that are formed for the complete graph with 4 vertices.

k) Show that the chromatic number of complete bipartite graph

$K_{m,n}$ is 2.

PART – B

Answer any **THREE** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Explain about tautology of statement formulas? Prove the following statement formulas. 8 M

i) $((P \vee Q) \wedge \neg(\neg P \wedge (\neg Q \vee \neg R))) \vee (\neg P \vee \neg Q) \vee (\neg P \wedge \neg R)$ is a tautology

ii) $\neg(P \vee Q) \rightarrow (\neg P \vee (\neg P \vee Q)) \Leftrightarrow (\neg P \vee Q)$

b) Explain about implications of statement formulas and prove the following implications without using truth tables. 8 M

i) $(\neg P \wedge \neg Q) \Rightarrow \neg(P \wedge Q)$

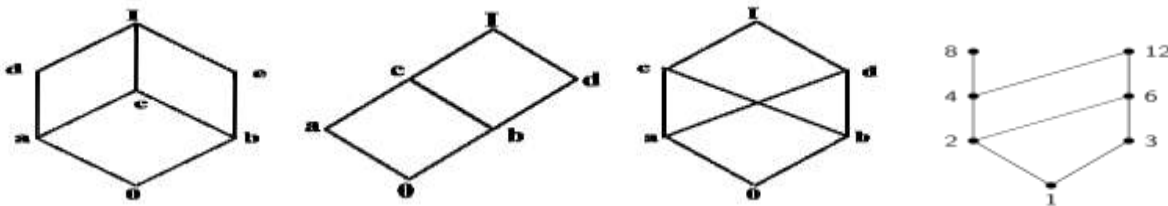
ii) $(P \rightarrow (Q \rightarrow R)) \Rightarrow (P \rightarrow Q) \rightarrow (P \rightarrow R)$

3. a) Solve and show that $R \wedge (P \vee Q)$ is a valid inference from the premises $P \vee Q$, $Q \rightarrow R$, $P \rightarrow M$, $\neg M$. 8 M

b) By using proper predicates and quantifiers, show the following statements in terms of predicate formulas 8 M

- i) All men are mortal
- ii) Some roses are yellow
- iii) All Russians are taller than all Americans
- iv) Some monkeys have no tail

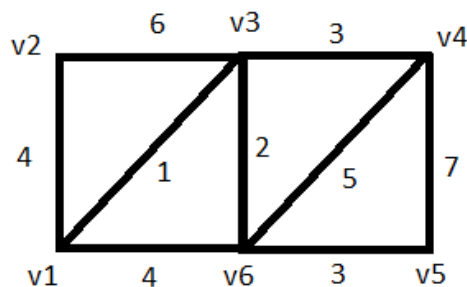
4. a) Identify, which of the partially ordered sets (hasse diagrams) are lattices(with explanation) 8 M



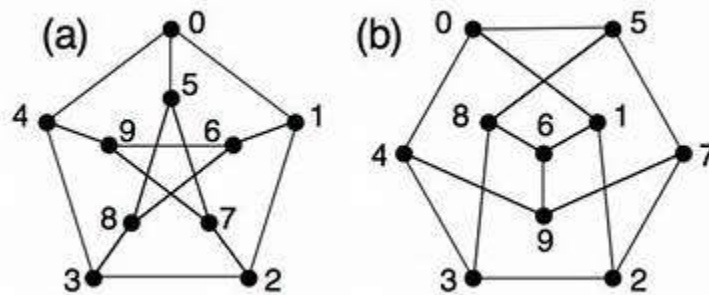
b) Draw the hasse diagram for the $P(S)$, is the power set of S and \subseteq and \supseteq are taken as subset and superset. Where

$S = \{a, b, c\}$ 8 M

5. a) Using Prim's algorithm find a minimal Spanning tree for the Weighed graph shown below 8 M



b) Define the concept of isomorphism of two graphs? Find the below graphs are isomorphic or not 8 M



6. a) Define Eulerian and Hamiltonian Graphs , draw the graphs
 i) Eulerian but not Hamiltonian
 ii) Hamiltonian but not Eulerian
 iii) Either Eulerian or Hamiltonian
 iv) Neither Eulerian nor Hamiltonian 8 M

b) Define the chromatic number and find the chromatic number of the following graphs 8 M

