VR14

14CS3302/14IT3302

II/IV B.Tech. DEGREE EXAMINATION, NOVEMBER, 2015

Third Semester

DISCRETE MATHEMATICAL STRUCTURES

Time: 3hours ***Max. Marks: 70***

Part-A is compulsory

Answer One Question from each Unit of Part-B

PART-A

10 x 1 = 10M

1. a. Define truth table.
   b. What is the use of logical inferences?
   c. Define permutation.
   d. Define recurrence relation.
   e. Draw a digraph for transitive relation.
   f. Define well-ordered set.
   g. Define lattice.
   h. What is the chromatic number of a graph?
   i. Define subgraph.
   j. Define Hamiltonian graph.

PART-B

4 x 15 = 60M

UNIT-I

2. a. Explain basic connectives with an example. **8M**

   b. Discuss the rules of inference for quantified propositions. **7M**

(or)

3. a. Explain the terms predicate and quantifier with examples. **8M**

   b. Prove that the proposition $\sim[p \vee q] \vee [(\sim p) \wedge q] \vee p$ is a tautology. **7M**

UNIT–II

4. a. Explain how to solve a recurrence relation using substitution with an example? **8M**

   b. Discuss the basic counting principles. **7M**

(or)

5. a. Solve the recurrence relation $a_n - 9a_{n-1} + 20a_{n-2} = 0$ for $n \geq 2$ and $a_0 = -3$, $a_1 = -10$ using generating function. **8M**

   b. Find the coefficient of x^{10} in $(x^3 + x^4 + \text{-------})^2$. **7M**

UNIT–III

6. a. Discuss the special properties of binary relations. **8M**

   b. Explain Warshall's algorithm with an example. **7M**

(or)

7. a. Consider the relation R = {(a, b), (b, c), (d, c), (d, a)}. Draw the digraph and write the adjacency matrix for the relation 'R'. **8M**

   b. Examine whether the poset $[D_{20}; /]$ is a lattice or not? Justify your answer. Where D_n denote the set of positive divisors of 'n'. **7M**

UNIT–IV

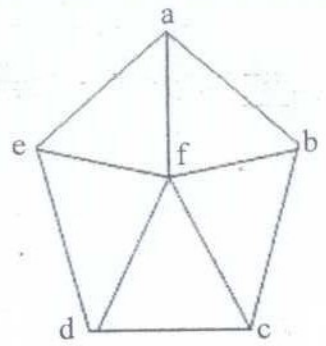
8. a. If G is a plane graph, then show that the sum of the degrees of the regions determined by G is $2|E|$, where $|E|$ is the number of edges of G. **7M**

   b. Give a proof of Euler's formula by using induction on the number of regions. **8M**

(or)

9. a. Show that a complete graph K_n is plannar iff $n \leq 4$. **8M**

   b. Find the chromatic number of the wheel graph **7M**



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