Code No: NR210501 **NR**

II B.Tech I Semester Supplementary Examinations, May 2005
DISCRETE STRUCTURES & GRAPH THEORY
(Common to Computer Science & Engineering, Information Technology and Electronics & Computer Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. With reference to automatic theorem proving, show that SVR is tautologically implied by (P∨Q) ∧ (P → R)∧(Q→S)

2. (a) Let S = {1, 2, 3, 4, 5} and let A = S × S. Define the following relation R on A such that (a, b) R (a', b') if and only if a b' = a'b.
   (b) Show that R is an equivalence relation.
   (c) Compute A/R.

3. (a) Let L be lattice. Then prove that a ∧ b = a if and only if a ∨ b = b.
   (b) Define the dual of a statement in a lattice L.Why does the principle apply to L?

4. A plane graph G is self – dual if it is isomorphic to its dual. Show that the Graph given below is self – dual as shown in the figure1.

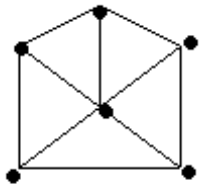

Figure 1:

5. Show that in a connected planar linear graph with 6 vertices and 12 edges, each of the regions is bounded by 3 edges.

6. (a) Do an analysis of the Dijkstra-prim minimum spanning tree algorithm, counting the number of times that an edge is considered for nodes added to the fringe, for updating edges to the fringenodes, or to pick the node to move from the fringe to the minimum spanning tree.
   (b) What is the value of the postfix expression.
   723 * - 4 ↑ 93 / + ?
   Give the solution steps.

7. (a) Compute the number of rows of 6 Americans, 7 Mexicans, and 10 Canadians in which an American invariably stands between a Mexican and a Canadian and in which a Mexican and a Canadian never stand side by side.

   (b) In how many ways can we choose 3 of the numbers from 1 to 100. So that their sum is divisible by 3 ?

8. Solve the recurrence relation
   S(k) - 0.25 S(k-1) = 0, S(o) = 6.

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