Code: 9A05301

R09

II B. Tech I Semester (R09) Supplementary Examinations, May 2012
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(Common to CSS, IT & CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) Explain the law of duality.
   (b) Explain the terms of equivalence.

2 (a) Verify the proposition $(p \wedge q) \; 7 \; (p \vee q)$ is a contradiction.
   (b) Symbolize the following statements:
        (i) X is the father of the mother of y.
        (ii) All rational numbers are real numbers.

3 (a) What is a relation? Explain the properties of relations.
   (b) What are the operations on relations?

4 (a) Explain about homomorphism.
   (b) Prove that "Let $\theta: G \rightarrow G$" be a homomorphism. Then θ is one – one $\Leftrightarrow K = \ker \theta = \{e\}$.

5 (a) Solve the recurrence relation using generating function $a_n - a_{n-1} = 2(n-1)$ for $n \geq 1$ and $a_0 = 3$.
   (b) Suppose there are n guests in a party. Each person shakes hands with everybody else exactly once. Deduce the recurrence relation for the number of handshakes that occur and solve the relation.

6 If a certain license plate require 3 English letters followed by 4 digits. How many different plates can be manufactured if repetition of letters and digits are allowed? How many plates are possible if repetition of letters only allowed? How many are possible if only the digits can be repeated? How many are possible if no repetitions are allowed?

7 (a) For any simple graph G, prove that the number of edges of G is less than or equal to $n(n-1)/2$, where n is the number of vertices in a graph.
   (b) Define spanning tree and planar graph.

8 (a) How many vertices are needed to construct a graph with 7 edges in which each vertex is of degree 2?
   (b) Define Hamilton graph. Illustrate with an example.

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