

Code :9A05301

R9

II B.Tech I Semester(R09) Supplementary Examinations, May 2011
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

**(Common to Computer Science & Engineering, Information Technology, Computer Science
& Systems Engineering)**

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

1. (a) Explain the law of duality
 (b) Explain the terms of equivalence.
2. (a) prove or disprove the validity of the argument:
 Some dogs are animals.
 Some cats are animals.
 Therefore some dogs are cats.
 (b) Prove:
 Babies are illogical
 Nobody is disposed who can manage a crocodile
 Illogical persons are disposed
 Therefore Babies cannot manage crocodiles.
3. (a) What is a relation ? Explain the properties of relations ?
 (b) What are the operations on relations ?
4. (a) Explain about groupoid , semigroup and Monoid .
 (b) A binary operation $*$ is defined on Z by
 $a * b = a + b - a \cdot b$, $a, b \in Z$ show that $(Z, *)$ is a semi group.
5. (a) Find a generating function for a_r for the number of ways the sum r can be obtained when 10 distinguishable dice are rolled?
 (b) Solve the recurrence relation using characteristic roots $a_n + 5a_{n-1} + 5a_{n-2} = 0$, with $a_0 = 0$, $a_1 = 2\sqrt{5}$.
6. In how many ways can we draw a heart or a spade from an ordinary deck of playing cards? A heart or an ace? An ace or a king? A card numbered 2 through 10? A numbered card or a king?
7. (a) Explain the adjacency matrix representation of a graph with an example?
 (b) Prove that a connected graph of n vertices and m edges has $n-1$ branches and $m-n+1$ chord?
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?
