D 12664 **(Pages : 2)** **Name.....**

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, JANUARY 2006

Computer Science

CS 101. DISCRETE MATHEMATICS

(2005 admissions)

Time : Three Hours **Maximum : 80 Marks**

Part A

Answer any **five** *questions.*
Each question carries **8** *marks.*

1. **Define the pigeonhole principle.**
2. **Define groups, ring-groups and subgroup with examples.**
3. **Define equivalence relation with example.**
4. **Differentiate distributive and complemented lattices with examples.**
5. **Describe about polynomial over rings.**
6. **Find the duals of :**
   (a) **(P v Q) R.**
   (b) **(P n Q) v T.**
   (c) **(P v Q) (P v (Q S)).**
7. **Describe about finite state machines with examples.**

(5 x 8 = 40 marks)

Part B

Answer any **four** *questions.*
Each question carries 10 marks.

8. **Which of the following are groups ? Give reasons :**
   (a) **rational number under multiplication.**
   (b) **positive rational numbers under multiplication.**
   (c) **{1, 2, 3, 4, 5, 6, 7} under multiplication mod 8.**
9. **Solve the recurrence relation** $a_1 = 14$, $a_n - a_{n-1} + a_{n-2} = 0$ $(n > 3)$.
10. **Prove that the order of any subgroups H of a finite group G divides the order of G.**

Turn over •