D 41451 (Pages : 2) Name

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, JANUARY 2008

Computer Science

CS 101—DISCRETE MATHEMATICS

(2005 admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer any **five** *questions..*

1. Define Lattices with examples. What are the properties of lattices.
2. Define Cosets with examples.
3. Define the following binary relations with examples.
   (a) Reflexive.
   (b) Symmetric.
   (c) Transitive.
4. Define with example
   (a) Partial ordered set.
   (b) Totally ordered set.
5. Define recurrence relation with examples.
6. Describe tautologies and contradiction with examples.
7. What are the basic set operations ? Explain with examples.

(5 x 8 = 40 marks)

Part B

Answer any **four** *questions.*

1. Define when two groups will become isomorphic. Show that the following groups if order 4 are isomorphic, the law of composition for each being stated in brackets :
   (a) The number 1, i, —1 ,–i (ordinary multiplication)
   (b) The residues 1, 2, 3, 4 (mod 5) (multiplication and reduction modulo 5).
2. What are Boolean functions ? Give example. How Boolean functions can be minimized. Explain with the help of example.
3. Prove that every chain is a distributive lattice.

Turn over

4. Describe :

(a) Onto function.

(b) One-to-one function.

(c) Into function.

(d) One-to-one onto function.

5. Describe with examples

(a) Finite state machines.

(b) Regular expressions.

6. Draw the truth table of (P A Q R) ∨ (Q ∧ R) (P R) and hence show that it is independent of the truth values of P and Q.

(4 x 10 = 40 marks)