

DISCRETE STRUCTURES
(CS-203/204, Dec.2005)

Time: 3Hrs

Max. Marks: 60

Note: Section A is compulsory. Attempt any four questions from Section B and any two from Section C.

Section-A

1. (a) What is the in degree and out degree of a graph?
(b) What is a chromatic number?
(c) What is a Mameltonian chair?
(d) What is a connected graph?
(e) Let $A=B=\{1,2,3,4,5\}$, define function $f:A \rightarrow B$ r.t. , f is one to one and onto.
(f) Describe the set of exam integers in the Set-builder rotation.
(g) How many subsets to of $\{1,2,\dots,9\}$ contain at least 5 elements?
(h) What is a group?
(i) What is a sub ring?
(j) What is a ring without identity?

Section-B

2. Suppose that there are n people in a room, $n \geq 1$ and that they all shake hands with one another, prove that $n(n-1)/2$ handshakes will have occurred.
3. What are the properties for a relation to be equivalence relation?
4. What is the Basic principle of counting? Explain.
5. Prove that $A \cup (B - A) = A \cup B$.
6. How group theory is applied in coding theory?

Section-C

7. Solve the recurrence relation $T(K) - TT$
 $(K-1) + 10T (K-2) = 6+8K$ where $T (0)=1$ and $T(1)=2$
8. State the commutative laws, associative laws, and absorption law for lattices.
9. (a) Simplify f algebraically, where

$$f(x_1, x_2, x_3) = \overline{((x_1 + x_2) * x_3)}. (x_1 + x_2)$$