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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(CSE)/(IT) (2012 Batch) (Sem.-4)

DISCRETE STRUCTURES

Subject Code : BTCS-402

Paper ID : [A2305]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students has to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students has to attempt any **TWO** questions.

SECTION-A

1. **Write briefly :**

- a) What do you mean by chromatic number?
- b) What are Disjoint sets? Give example
- c) Define Existential quantifier and Universal quantifier.
- d) Define ring with example.
- e) Show that we can have $A \cup B = A \cup C$ without $B = C$.
- f) Define transitive relation.
- g) Define equivalence relation.
- h) Write an example for postfix and infix notation.
- i) Define cyclic group.
- j) Define shortest path in a graph.

SECTION-B

2. Let A and B be any two sets, then Prove the following :

A is disjoint union of $(A - B)$ and $(A \cap B)$ and

$(A \cup B)$ is disjoint union of $(A - B)$, $(A \cap B)$, $(B - A)$.

3. Explain the following terms by giving one example in each case :
 - a) Homomorphism
 - b) Isomorphism
 - c) Automorphism
4. Five coins are tossed and results are recorded:
 - a) How many different sequences of heads and tails are possible?
 - b) How many of the sequences in part (i) have exactly three heads recorded?
5. State Euler formula for connected planar graphs. Verify this by giving two examples.
6. State Koinsberg seven bridger problem. What is the solution to this problem? Elaborate.

SECTION-C

7. Define by giving one example of each :
 - a) Cut points
 - b) Bridge
 - c) Multigraph
 - d) Spanning Tree
8. What is meant by minimum spanning tree? Explain Prim's algorithm to find minimum spanning trees.
9. Find solution of the difference equation : $a_r + a_{r-1} = 5r2^r$.