Roll No. | | | | | | | | | | | | 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

INSTRUCTIONS 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 have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

a) How many relations are possible from a set A of m elements to another set B of n elements? Why?

b) Write two properties of sets.

c) Define injection and surjection.

d) Give an example of a relation which is symmetric and transitive but neither reflexive nor anti symmetric.

e) Give an example of graph that has Euler Circuit but not Hamiltonian Circuit.

f) Differentiate between directed and undirected graphs.

g) Define monoid. Give example for the same.

h) Prove by using Boolean algebra

$a+b.c = (a+b).(a+c)$

i) Define semi groups. Give example for the same.

j) Define POSETS.

SECTION-B

2. Prove that If R is an equivalence relation on a set A, show that R^{-1} is also an equivalence relation on A.

3. a) Reduce the following using rules of Boolean Algebra B : $\overline{\overline{a.\bar{b}+a.b.c+a(b+a\bar{b})}}$

   b) What is DNF? Write the DNF of $f(x,y,z)=(\bar{x}z)+(yz)+(y\bar{z})$

4. a) Definition of Isomorphic graphs. Give an example.

   b) Explain Complete and Bipartite graph.

5. a) Definition of Homomorphism.

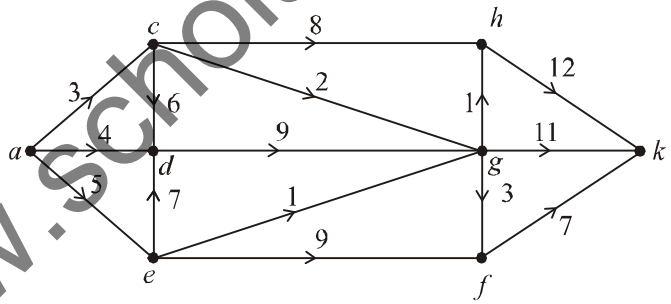
   b) Prove the Lagrange's Theorem.

6. How many 5-digits telephone numbers can be constructed using the digits 0 to 9 if each number starts with 67, for example 67125 etc., and no digit appears more than once?

SECTION-C

7. a) Prove that the sum of the degree of all the vertices in a graph G is equal to twice the number of edges in G.

   b) Find the shortest path from a to k using Dijkstra's Algorithm.



8. If A(n) – 9A(n – l) + 26 A(n – 2) – 24 A(n – 3) = 0 for n ≥ 3 with, A(0) = 0, A(1) = 1 and A(2) = 10 . Determine the sequence from its generating function.

9. a) Suppose R and S are symmetric relation on a Set A. Show that R intersection S is also symmetric.

   b) Show the difference between symmetric and anti symmetric relation with example.