B.Tech / Integrated (MBA/M.Tech) 3rd Sem (CSE) Examination
June 2014
Discrete Structures
Subject Code: CSL-207

Before answering the question paper the candidate should ensure that they have been supplied the correct question paper. Complaints in this regard, if any, shall not be entertained after the examination.

Note: Question No. 1 is Compulsory and attempt two questions from each section. All questions carry equal marks.

1(a) What do you mean by Relation? Also explain Domain & range of a relation? (5)

(b) Explain Tautologies, Contradiction, Contingency with truth table? (5)

(c) Explain Generating Functions? (5)

(d) What do you mean by graph? Explain Directed & Undirected Graph with the help of example? (5)

SECTION-A

Q2(a) Explain Composition of function with the help of example also solve the below mention problem.

Let X= \{1, 2, 3\}, Y= \{a,b\} Z=\{5,6,7\}
F= \{(1, a), (2, a), (3, b)\}
G= \{(a, 5), (b, 7)\}
Find (i) FOG (ii) GOF (10)

(b) What do you think about Set? Discuss Various Operation that can be performed on Sets? (10)

Q3(a) Explain all Derived Connector & Fundamental Connector with truth Table? (10)

(b) Among 100 students, 32 study Mathematics, 20 study physics, 45 studies Biology, and 15 studies Mathematics and Biology. 7 study Mathematics and physics, 10 study physics and Biology. And 30 do not study any of the three subjects.

(i) Find the number of student studying all the three subjects.

(ii) Find the number of student studying exactly one of the three subjects (10)

Q4 (a) How many ways can we select a software development group of 1 project leader, 5 programmers and 6 data entry operator from a group of 5 project leaders, 20 programmers and 25 data entry operators? (5)

(b) Explain Pigeonhole principle? (5)

(c) How many different variables names can be formed by using the letters a, a, b, b, b, c, c, c? (5)

(d) There are 4 blue, 3 red, 2 black pens in a box. These are drawn one by one. Determine all the permutation? (5)

SECTION-B

Q5(a) What do you think about Recurrence relation? Also explain Order & Degree of Recurrence Relation? Solve the following recurrence relation \(a_r - a_{r-1} - 6a_{r-2} = 0\) with \(a_0=20, a_1=-5\) (10)

(b) What do you mean by Total Solution? Solve the difference equation \( \text{a}_r - 5\text{a}_{r-1} + 6\text{a}_{r-2} = 3r^2 - 2r + 1\) with \(a_0=45, a_1=7\) (10)

Q6(a) Explain the concept of Spanning Tree & Minimum Spanning Tree? (10)

(b) Give an example of graph that has an Eulerian circuit but not Hamiltonian circuit. (5)

(c) Give an example of graph that has no Eulerian circuit but has a Hamiltonian circuit? (5)

Q7 What do you mean by Algebric Structure? Explain properties of Algebric Structure with suitable example? (20)