DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, SRINAGAR

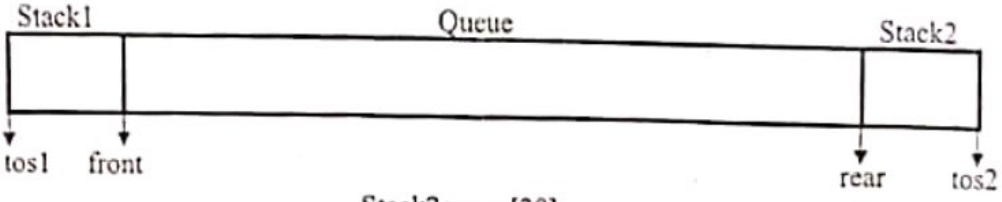
Major Examination, July-2014

4th Semester	B.Tech CSE	Time: 2 hours
Subject: Data Structures	Course Code: CSE-401	Max. Marks: 50

Note: 1) Attempt any four Questions.

2) Write comments while writing the programs.

Q1: Write a program that will implement the below shown figure:



Stack2queue[20]

First part represents a stack, middle portion is a queue and the last one is again a stack. Include functions for insertion, display and deletion operation for the three sections shown in the figure and also check the conditions in your code to overcome the problem of memory overlapping of three sections. **(12.5)**

Q2: a) Compare and contrast the Insertion, Selection and Bubble sort algorithms? **(6)**

b) Use merge sort algorithm to sort the following elements:

15, 10, 5, 20, 25, 30, 40, 35. **(6.5)**

Q3:a) Draw the Binary trees for the following tree traversals:

i. In-order: D, B, F, E, A, G, C, K, J, H, L
Post-order: D, F, E, B, G, K, J, L, H, C, A

(3)

b) Find the shortest path for figure 1 from node A to D, using Dijkstra's Algorithm.

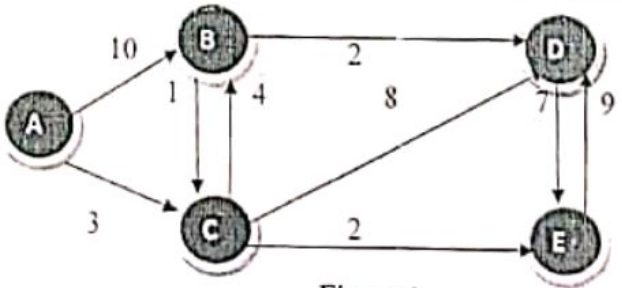
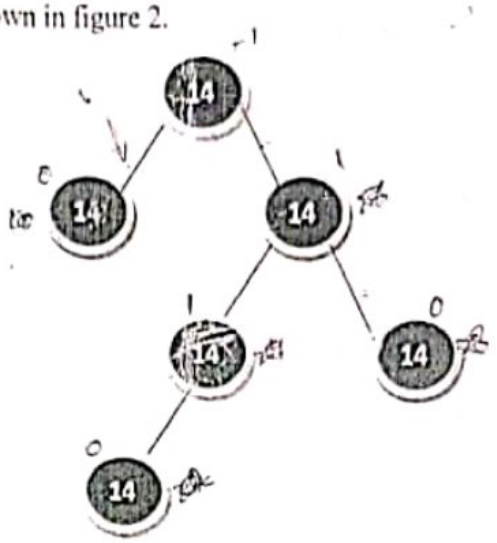


Figure 1

(6)

c) Balance the AVL tree shown in figure 2.



(3.5)

Figure 2

Q4: a) What is Hashing and why it is an efficient searching technique? Compare any two hash functions. (5)

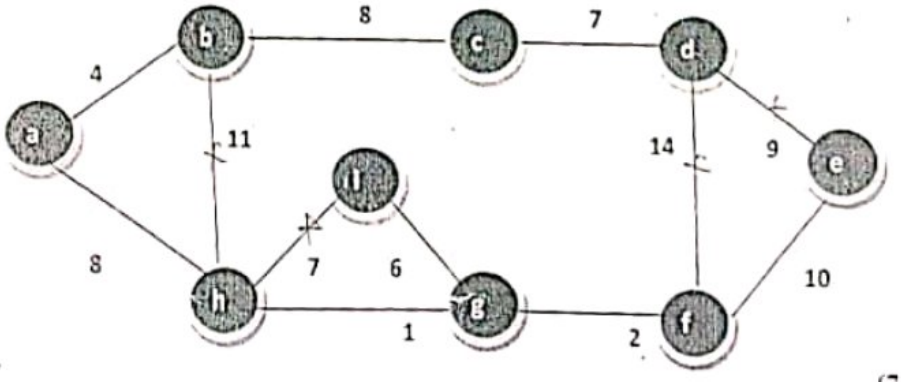
b) Write a Program in C for creating and display a circular linked list. (5)

c) Differentiate between tree and a graph. (2.5)

Q5: a) Briefly explain the following terms:

(i)level (ii) nodes (ii) complete binary tree (iv)regular graph (v) cycle (5)

b) What is Minimum Spanning Tree(MST) and why we require it?Show step wise procedure of Prim's and Kruskal's algorithm to obtain the MST for the figure 3:



(7.5)

Figure 3