4/12/14 Repeat (M) Comp)

COMP 4 – 2 (RC)

S.E. (Comp.) (Semester – IV) (RC) Examination, Nov./Dec. 2014
DATA STRUCTURES

Duration : 3 Hours | Total Marks : 100

Instructions : 1) *Answer* ***any five*** *questions* ***selecting*** *atleast* ***one*** *from* ***each*** *Module.*
2) ***Make*** *necessary assumptions if* ***required***. ***Clearly*** *state* ***any*** *such assumptions made.*

MODULE – I

1. a) Write a C program for deleting duplicate numbers from a Linear List. 5
   b) Write a C program using recursion to find Fibonacci series. 5
   c) Write a program in C to delete a node in a doubly Linked List. 10

2. a) Define data structure and also write the difference between primitive and non-primitive data structures. 4
   b) What are advantages of Macro in C ? 2
   c) Let W be the string ABCD : 4
      i) Find the Length of W
      ii) List all substrings of W
      iii) List all the initial substrings of W.
   d) i) Compare the dynamic implementation of a Linear Linked List.
      ii) Explain circular linked list. What are the advantages of circular linked list. 10

MODULE – II

3. a) Explain the following terms : 6
      i) Infix expression
      ii) Polish notations
      iii) Reverse polish notation.
   b) What do you mean by queue ? Define insert and delete operations performed by queue. 6

P.T.O.

c) Write the functions in C to implement the following operations on a Binary Tree : 6

i) Inorder Traversal

ii) Pre-order Traversal

iii) Post-order Traversal.

d) Explain Threaded Binary Tree with example. 2

4. a) A Binary Tree T has 9 nodes, the inorder and pre-order traversals are given as follows : 10

Inorder : E A C K F H D B G

Pre-order : F A E K C D H G B

Draw the tree T.

b) Explain the implementation of operations in a circular queue. 5

c) Write a program in C to implement Push and Pop operations. 5

MODULE – III

5. a) Explain Breadth First Search (BFS) and Depth First Search (DFS) graph traversal algorithms with suitable examples. 6

b) Explain the followings with suitable example : 6

i) Finite and infinite graphs

ii) Weighted graph

iii) In-degree and out-degree.

c) Explain briefly the two principle methods of automatic list management. 4

d) Explain in brief : 4

i) Internal and external fragmentation

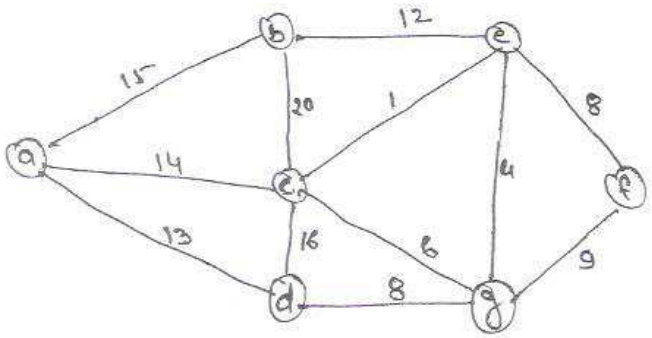
ii) Garbage collection and compaction.

6. a) Explain and compare first fit, best fit and worst fit memory management techniques with example. 6

   b) What is dynamic memory management and explain memory management functions in C ? 4

   c) Explain the linked representation of a graph with example. 4

   d) Find a minimum spanning tree for the given graph using Kruskal's Algorithm. 6



MODULE – IV

7. a) Convert the following infix expression to their equivalent post fix expression : 4

   i) (A * B) + (C – D)

   ii) (A/B)/C + D.

   b) Explain the link list representation of a polynomial. 4

   c) State the difference between the selection and heap sort according to their advantages and disadvantages. 6

   d) Explain the followings : 6

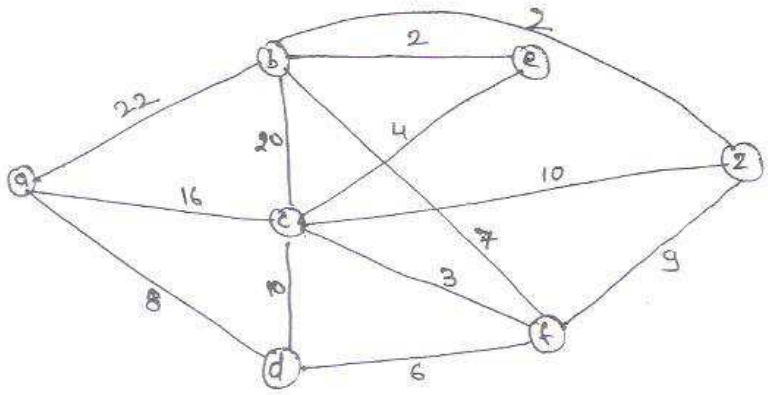
   i) Hash function

   ii) Double Hashing

   iii) Rehashing.

8. a) Write a program in C to input 10 numbers and search a particular number using Binary Search. 6

   b) Use Digikstra's algorithm to find the shortest path in the given graph : 6



   c) Suppose A, B, C, D, E, F, G, H are 8 data items and suppose they are assigned weights as follows : 8

Data items :	A	B	C	D	E	F	G	H
Weights :	22	5	11	19	2	11	25	5

   Draw the Huffman Tree.