



COMP 4 – 2 (RC)

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

Duration : 3 Hours

Total Marks : 100

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

MODULE – I

1. a) What is structure and how structure is different than union ? 2
- b) Describe the use and limitations of the C functions `getc()` and `putc()`. 2
- c) Write a recursive function in C- for N-disk problem in Tower of Hanoi. 6
- d) Give the general algorithm to insert and delete an element from the front of a linked list. 10

OR

2. a) What are advantages of macros in C. 2
- b) A two-dimensional array `X[5][4]` is stored in row wise order. The first element of the array is stored at location 80. Find the memory location of `X[3][2]`, if each element of array required 4 memory locations. 4
- c) Explain the use of these functions : 4
 - i) `strcpy ()` ii) `strcmp ()`
 - iii) `strlen ()` iv) `strcat ()`
- d) i) Compare linear linked list and doubly linked list according to their advantages and disadvantages. 4
- ii) Write a function in C for deleting an element at the end of a doubly linked list implemented dynamically. 6

P.T.O.



MODULE – II

3. a) Explain difference between : 6
 i) Linear Queue and circular Queue
 ii) Array based Queue and linked Queue.
- b) Write a C program to implement Push and Pop operations using array. 6
- c) Write short note on complete binary tree. 2
- d) Suppose the following sequences of the binary tree is given in pre-order and in-order respectively as follows : 6
 Preorder : A, B, C, D, E, K, F, G, H, I, J
 Inorder : D, C, K, B, F, G, A, I, J, H
 Draw the suitable binary tree.
4. a) Write a program in C to implement the queue operations. 4
b) Write a program in C to input a string and print the reverse of the string with help of stack. 6
c) Explain the following with suitable example : 10
 i) High Balance Binary Tree
 ii) Weight Balance Binary Tree
 iii) Threaded Binary Tree
 iv) Strictly Binary Tree
 v) Extended Binary Tree

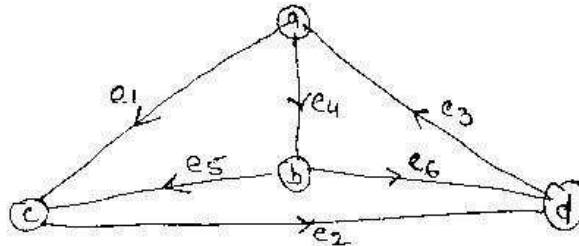
MODULE – III

5. a) Explain the followings with suitable example : 6
 i) BFS ii) DFS
 iii) Linked representation of a graph.



b) Find incidence matrix and adjacency lists for the following graph.

4



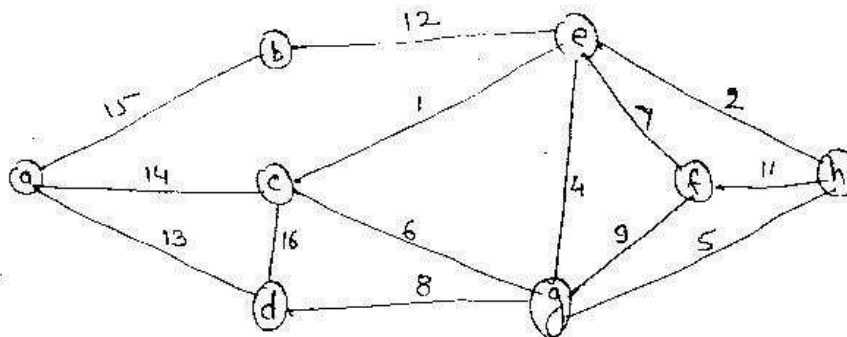
c) Explain the followings :

10

- 1) Garbage collection
- 2) Garbage compaction
- 3) Internal fragmentation
- 4) External fragmentation
- 5) Dynamic memory management.

6. a) Find a minimum spanning tree for the given graph using prims algorithm.

6



b) Explain the followings with suitable example :

6

- i) Multigraph
- ii) Complete graph
- iii) Connected graph



- c) Explain the dynamic memory allocation methods. 2
- d) Explain and compare the first fit, best fit and worst fit memory management techniques with example. 6

MODULE – IV

7. a) Evaluate the postfix expression $562+*124/-$ using stack. 4
- b) Explain the Josephus problem and its solution with an example. 6
- c) What do you mean by sorting ? Define its importance. 4
- d) What is hashing and explain the following hashing methods. 6
- I) Division method
- II) Multiplication method
8. a) Give the implementation at palindrome using queue. 4
- b) Suppose A, B, C, D, E, F, G and H are 8 data items and suppose they are assigned weights as follows : 8
- | | | | | | | | | |
|---------------------|----|---|----|----|---|----|----|---|
| Data items : | A | B | C | D | E | F | G | H |
| Weight : | 22 | 5 | 11 | 19 | 2 | 11 | 25 | 5 |
- c) State the differences in between linear search and binary search. 4
- d) What is linear probing and how it differ from quadratic probing. 4