311516.

COMP 4 – 2 (RC)

S.E. (Computer) (Semester – IV) (Revised Course) Examination, May/June 2016
DATA STRUCTURES

Duration : 3 Hours | Total Marks : 100

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

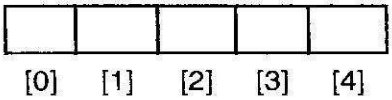
MODULE – I

1. a) Write C programs for the following with respect to 1-D arrays and functions. **8**
   i) Passing individual array elements to a function.
   ii) Passing whole 1-D array to a function.
   b) Write a C program to copy the contents of File A to File B. **8**
   c) Define and explain the following : **4**
   i) Macros ii) Strings

2. a) Write functions for : **6**
   i) Searching in a singly linked list.
   ii) Reversing a singly linked list.
   b) Write a program in C to delete a node in a doubly linked list. **6**
   c) Explain the following with the help of a diagram and C functions : **8**
   i) Deleting the first node of a circular linked list,
   ii) Deleting last node of a circular linked list and
   iii) Deleting a node from a specified position of a circular linked list.

MODULE – II

3. a) Write a C program for implementation of queue using array. **6**
   b) Given the initial state of a stack as shown below : **8**
   (a) Empty stack
   top = – 1



Show the state of the stack for each of the following operations

(b) Push 5 (c) Push 10 (d) Push 15 (e) Push 20
(f) Push 25 (g) Pop (h) Pop (i) Pop
(j) Push 30 (k) Pop (l) Pop

Write the conditions for stack underflow and stack overflow from the above sequence of operations.

c) Explain the priority queues with suitable illustrations. **6**

4. a) Construct the binary search tree for the following input : **8**

44, 18, 20, 33, 85, 50, 89, 90

Show how the tree would look after the deletion of node 85 and node 33 respectively.

b) Construct the one-way threaded binary tree for the binary tree specified by the in-order and pre-order traversal shown below.

In-order	D	B	E	A	J	F	I	C	G
Pre-order	A	B	D	E	C	F	J	I	G

6

c) Explain the array representation and linked representation of binary trees. **6**

MODULE – III

5. a) Explain the sequential and linked representations of a graph. **4**

b) Explain Depth First Search and Breadth First Search traversals of a graph with suitable examples.

c) Explain the following terms : **8**

i) Tree
ii) Spanning Tree
iii) Minimum Spanning Tree

Explain the two methods for computing a minimum spanning tree.

6. a) What is dynamic memory management and why is it required ? **4**

b) Explain the best fit, first fit and worst fit methods. **8**

c) Write short notes on : **8**

i) Reference Counting
ii) Mark and Sweep Garbage collection.

MODULE – IV

7. a) Show the steps to convert the following infix expression to postfix form using a stack : A + (B * C – (D/E ^ F) * E) * H **7**

   b) Explain how a linked list can be used to add two polynomials if : **6**
      i) The two polynomials are defined on the same variable and
      ii) The two polynomials are defined on more than one variable.

   c) Explain the Huffman algorithm with an example. **7**

8. a) Sort the following elements using insertion sort : **8**
      5, 12, 87, 25, 9, 65, 98, 34.

   b) Explain binary search method and trace it for the following data. **4**
      1, 3, 5, 17, 18, 31, 33 Key = 18.

   c) List and explain the different Hash functions. **8**