C

19/187

B.C.A. Third Semester Examination, 2019

Second Paper

(Data Structure Using C & C++)

Time : Three Hours   **Maximum Marks : 75**

Note: Attempt any **five** questions. **All** questions carry equal marks.

Note: The answers to short questions should not exceed 200 words and the answers to long questions should not exceed 500 words.

1.   (a)   What is data structure? Explain various types of data structures in detail.   7

     (b)   Differentiate between row major and column major array index notation. How is index calculated in both.   8

2.   (a)   What is sparse matrix? Write a C program to add two sparse matrices and explain the assumed data structure.   8

    (b) Convert the following infix expression to postfix using stack   7

    (A+B*C)/(D-E)+F

3. (a) What is meant by circular queue and priority queue? Write a function to insert and delete and element from a circular queue.   8

    (b) What do you mean by Linked list? Write a function to insert and delete a node in a linked list.   7

4. (a) Write a C/C++ program to reverse a linked list by traversing it only once.   7

    (b) What is binary tree? Explain the representation of binary tree. Explain the different operations on a binary tree.   8

5. (a) List the types of binary search trees. Explain insertion and deletion operation on a binary search tree.   8

    (b) Show the result of inserting 3, 1, 4, 6, 9, 2, 5, 7 into an initially empty binary search tree. Also show the result of deleting the root.   7

6. (a) What is B-tree? Generate a B-tree of order 5 with the alphabets arrive in the sequence as follows: a g f b k d h m j e s i r x c l n t up.   10

    (b) Differentiate between B and B^+- tree.   5

7. (a) Explain the concept of hashing using division method of hashing. Store the following values in a hash table of size 11 25, 45, 96, 101, 102, 162, 197, 201. Show the hash table after storing.   10

    (b) Write C/C++ program for selection sort.   5

8. (a) Explain the working of merge sort on the following data: 8

10, 15, 0, 17, 20, 25, 30, 16, 70, 6

(b) What is the difference between a heap and a binary search tree? Obtain heap and binary search tree for following data set. 7

45, 56, 78, 23, 11, 54, 88, 43, 55, 21, 67, 55.

9. (a) Write a c/c++ program for binary search. 5

(b) Explain the various collision resolving techniques used in hashing functions. 10