MCA / SEM-II (CBSGS) / Data Structure / NOV-16

QP CODE : 514300

(3 hours) **Total marks:80**

Note:

1. **Q1 is compulsory**
2. **Attempt any four from remaining six questions**

Q1: **(a)** For a singly linked list write algorithms to 10

1. Append two list together
2. Count the number of nodes in the list

(b) Define max heap. Construct a valid max heap using following 10

18 ,15 ,6 ,20, 9, 7, 35 , 22 ,12,98

Q. 2 (a) Explain in brief threaded Binary tree 8

(b) Write an algorithm for selection sort. Show the tracing of selection sort for following array 7
22, 13, 18, 15, 37, 35, 20.

Q3: **(a)** Define stack. Write algorithms to implement push and pop algorithms. 8

(b) Define Binary tree? Reconstruct the binary tree using following traversal 7
Inorder: D B F E G H A C
Preorder: A B D E F G H C

Q4: **(a)** Define Graph? Explain the structures which are use to store a graph. 8

(b) An array contains the elements shown below. Using binary search algorithm, trace the 7
trace the steps to search element 13.
8, 13, 26, 35, 65, 108, 139

Q5: **(a)** What is binary search tree.Give algorithms to 8

i) Delete a node from BST
ii) Find largest node in the BST

(b) What is hashing? Why is it used? For the following data set implement the technique of modulo division for hashing and linear probing for collision resolution and store the data in an array of size 12.

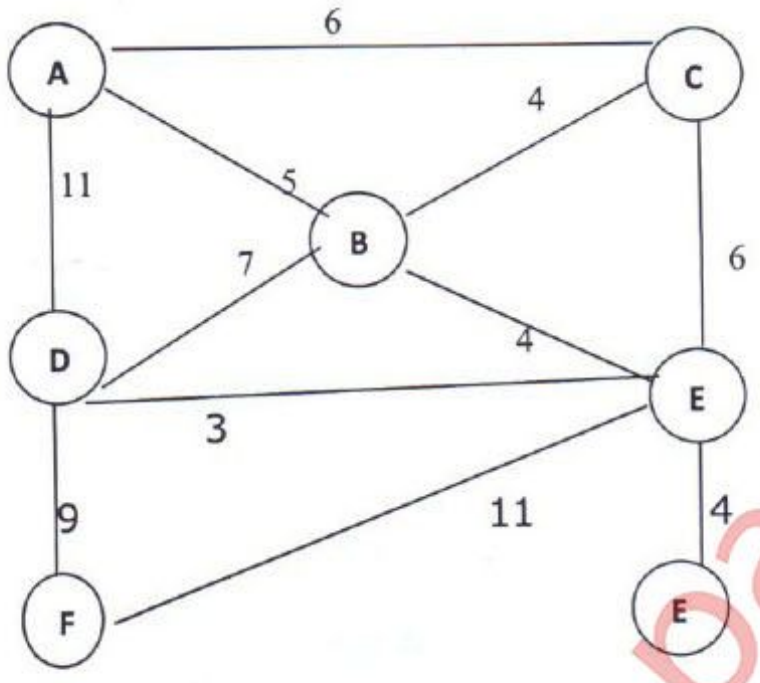
123, 536, 895, 661, 406, 193, 786, 805, 222, 100. 7

(TURN OVER)

Q.6 a) Define an expression tree. Consider following infix expression. Draw the expression tree and find prefix and postfix expressions: 8

(A*B)+(C*D) / (X-Y)+Z

(b) Define Minimum spanning tree.Give minimum spanning tree using Prim's algorithm for the given graph 7



Q7: **(a)** Explain the concept of complexity of an algorithm. Explain the Big-O notation. Explain the techniques of backtracking and divide and conquer. 8

(b) Define B-tree and B+ tree. Build a B-tree of order 3 by inserting the data in the sequence 7

95 36 29 88 46 2 19 32 75 49 55 62 5

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