Total No. of Questions : 8]

SEAT No. :

**P654**

[Total No. of Pages : 2

# [5869] - 283
## S.E. (Information Technology)
## DATA STRUCTURES & ALGORITHMS
## (2019 Pattern ) (Semeser - III) (214443)

*Time : 2½ Hours]* *[Max. Marks : 70*

***Instructions to the candidates:***

1) ***Answer Q.1, or Q.2, Q.3 or Q.4, Q.5or Q.6, Q.7 or Q.8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume suitable data, if necessary.***

***Q1)*** a) Convert the following infix expressions to prefix expressions using stack data structure.

i) A+B*C^D-E/F

ii) ((A+B)*C-(D-E))^(F+G) **[9]**

b) Implement Priority queue using linked representation and mention the time complexity of operations. **[9]**

OR

***Q2)*** a) Write sudo code for converting a given infix expression to postfix expression and apply the algorithm to convert (a+b)*c to postfix. **[9]**

b) Write a code for singly linked list creation, insert and Display and mention the time complexity of operations. **[9]**

***Q3)*** a) Suppose the following sequence lists the nodes of a binary tree in preorder and inorder respectively. **[9]**

Preorder - G B Q A C K F P D E R H

Inorder - Q B K C F A G P E D H R

Construct a binary tree from the given traversals

b) Write a note non-recursive function to delete a node in the BST. **[8]**

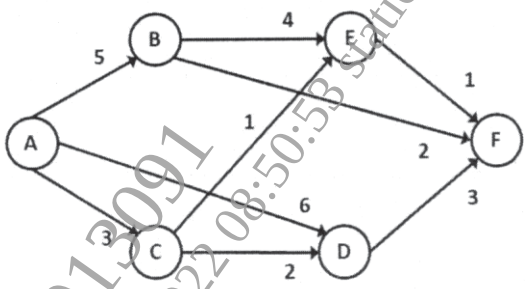
OR

***Q4)*** a) Explain the difference between array representation and linked representation of binary tree. Justify your answer using suitable example of each. **[9]**

b) What are the advantages and disadvantages of TBT? Write a algorithm to implement Inorder Traversal of Inorder TBT. **[8]**

***P.T.O.***

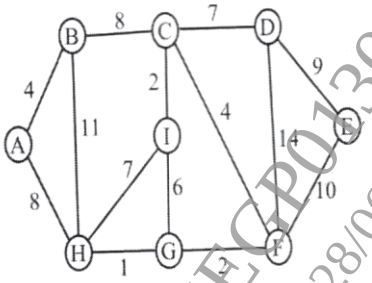
***Q5)*** a) For the given graph, construct the Adjacency Matrix and Adjacency List. Discuss the limitation(s) of Adjacency Matrix. **[9]**




b) What is topological Sorting? Illustrate with an example how topological sorting is performed. List any two applications where topological sorting can be used. **[9]**

OR

***Q6)*** a) What is the cost of the MST? Construct a minimum spanning tree for the given graph using Prim's Algorithm. List applications where MST is required. **[9]**




b) Illustrate with examples the Reheap up and Reheap down operations w.r.t. heaps. List any three applications of Heap. **[9]**

***Q7)*** a) Explain basic concept of Hash table? Define Hash table? Write characteristics of good hash function. **[9]**

b) Write Comparison of different file organizations (sequential, index sequential and Direct Access) **[8]**

OR

***Q8)*** a) Explain with example hash functions. **[9]**

b) Explain Concept of File? Write all File types and explain file organization. **[8]**

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