[6179]-261

S.E. (Information Technology Engg.)
DATA STRUCTURES & ALGORITHMS
(2019 Pattern) (Semester - III) (214443)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*

Q1) a) Explain stack data structure as an ADT and Discuss briefly applications of stack. **[6]**

b) Write sudo code for insert and delete operations of linear queue. **[5]**

c) Discuss the types of priority queue with their applications. **[5]**

OR

Q2) a) Convert the following infix expressions to postfix using stack. Clearly indicate the contents of stack. **[6]**

i) $(A + B) * C - D * F + C$

ii) $(A - 5) * (B + C - D * E) / F$

b) Write sudo code for insert & delete operations of circular queue. **[8]**

c) Enlist applications of Queue data structures. **[2]**

Q3) a) Explain importance of threaded binary tree and Discuss inorder threaded binary tree with example. **[6]**

b) Write sudo code for deleting a node in BST considering all scenarios. **[8]**

c) Discuss with the help of example, the significance of height of tree and depth of a tree. **[4]**
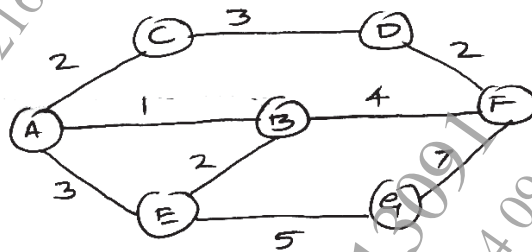
OR

Q4) a) Enlist the difference between a general tree & binary tree. Convert the given general tree to binary tree and write down the steps required for the same. **[8]**
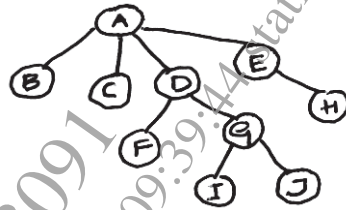
b) Write sudo code for creating a BST of N-nodes. **[6]**

c) Explain with the help of example, threaded binary tree traversals. **[4]**

Q5) a) For the given graph show step-wise representation of MST using Kruskal's algorithm. **[6]**

b) Construct an AVL search tree by inserting the following elements in the order of their occurence. Show the balance factor and type of rotation at each stage. **[8]**

c) Enlist and discuss applications of Heap. **[4]**

OR

Q6) a) Find the MST using Prin's algorithm for the following graph. Also write algorithm for the same. **[8]**
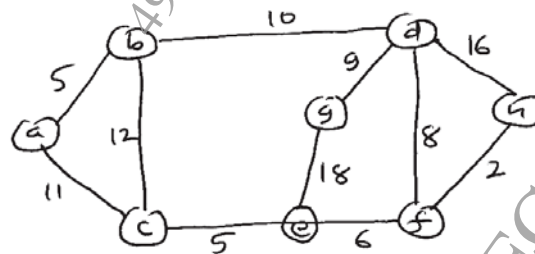
b) Which data structures supports to perform sorting using heap data structure. Explain it to sort it in ascending order. 1, 12, 9, 5, 6, 10. **[8]**

c) What is the time-complexity of Prin's algorithm & Kruskal's algorithm. **[2]**

Q7) a) Explain why file opening nodes are important while opening any file. Explain the use of following file-opening nodes. **[8]**

    i) ios : : app

    ii) ios : : ate

    iii) ios : : in

b) For a given set of values : **[10]**

9, 45, 13, 59, 12, 75, 88, 11, 105, 46

Create a hash table and resolve collison using chaining and without replacement.

<div align="center">OR</div>

Q8) a) Write sudo code to perform following operations on sequential file: **[8]**

    i) Create and display

    ii) Insert a record

b) What is hashing? Explain various hash collision resolution techniques.**[8]**

c) What is the time complexity of a deleting a record from indexed sequential file. **[2]**

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