Code No: **R201208** **R20** **SET - 1**

I B. Tech II Semester Supplementary Examinations, January/February - 2023

DATA STRUCTURES THROUGH C

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE Questions ONE Question from Each Unit
All Questions Carry Equal Marks

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UNIT - I

1. a) What is a stack? Explain overheads caused by stack in recursion with a suitable example. [7M]
   b) Implement an algorithm to insert and delete a key from circular queue. [7M]

(OR)

2. a) Discuss the procedure to convert infix expression to postfix expression with the following expression: ((A +B)-C) / D) * (E*(F-G)). [7M]
   b) Write a Program to Insert and Delete the Elements from Queue data Structure. [7M]

UNIT - II

3. a) Write an algorithm to insert a node at anywhere in a doubly linked list. [9M]
   b) How to represent Sparse Matrix using Single Linked List? Discuss. [5M]

(OR)

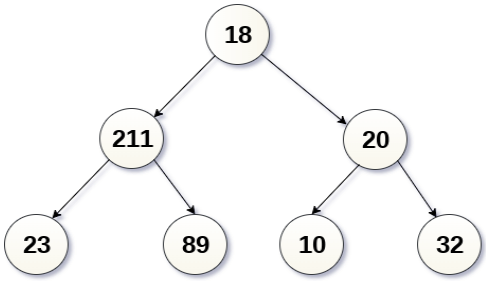
4. a) Write an algorithm for swapping two successive elements in a singly linked list with the first element placed at position P. [7M]
   b) "One of the applications of stack is Reversing a List" Explain it with a suitable algorithm. [7M]

UNIT - III

5. a) Discuss in-order traversal of threaded binary tree with an example. [6M]
   b) Create binary search tree for the following elements {23, 12, 45, 36, 5, 15, 39, 2, 19}. Discuss about the height of the above binary search tree. [8M]

(OR)

6. a) Show that the maximum number of nodes in a binary tree of height H is $2^{H+1} - 1$. [7M]
   b) Find in-order, pre-order and post-order traversal sequences of following binary tree? [7M]



UNIT - IV

7. a) What is Binary tree? Differentiate from the trees? Briefly Explain the Array representation of the binary tree? Give an example? [7M]
   b) Create a B-tree of order 4 by inserting the following elements one after the other: 14, 56, 23, 1, 67, 32, 86, 100, 12, 16, 28, 34, 50, 62, 91, 109 [7M]

(OR)

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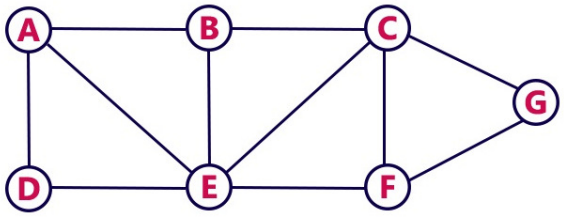
8. a) Explain about the Prim's minimum cost spanning tree with an example. [7M]

   b) Discuss and perform the BFS traversals for below graph. [7M]



UNIT - V

9. a) How to select pivot element in quick sort? Explain how partition is done in quick sort with example. [7M]

   b) Arrange the following list of elements in ascending order using shell sort: 9, 3, 5, 27, 4, 67, 18, 31, 13, 20, 39, 21. Clearly show the sorting process at each step. [7M]

(OR)

10. a) Describe insertion sort algorithm and trace the steps of insertion sort for sorting the list- 12, 19, 33, 26, 29, 35, 22, 37. Find the total number of comparisons made. [7M]

    b) Discuss hashing with example. Write a Program to Implement it. [7M]

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