Code No: **R201218** **R20** **SET - 1**

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

(Common to CSE, IT, CSE-AI&ML, CSE-AI, CSE-DS, CSE-AI&DS, AI&DS)

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 Consider the following list of elements: [14M]

235,107,708,78, 7, 0, 3, 1 6, 2, 67,56,45,33,42,87,32,25,9,100

i) Using the input above, explain the working principle of merge sort.

ii) Analyze merge sort's time complexity.

iii) Write a recursive algorithm for merge sort and merging operations.

(OR)

2 a) Define data structure. Describe the different types of data structures with applications. [7M]

b) Explain and contrast the various techniques to algorithm design. [7M]

UNIT - II

3 a) Given two sorted lists, L1 and L2 , write a procedure to compute L1 ∩ L2 using only the basic list operations. [6M]

b) What is a doubly-linked list? Create procedures for creating and accessing the elements of a double-linked list. [8M]

(OR)

4 a) Create a linked list which stores names of the employees. Then sort these names and re-display the contents of the linked list. [7M]

b) Analyze the differences between linked lists and linear arrays and write a program to differentiate insert and delete operations. [7M]

UNIT - III

5 a) How a stack implemented using a linked list differs from a stack does implemented using an array. [7M]

b) What is Double ended queue (deque).Create processes to insert and delete elements in a double ended queue. [7M]

(OR)

6 a) Explain the concept of a circular queue? How is it better than a linear queue? [7M]

b) Write a program to implement Queue using a linked lists. [7M]

UNIT - IV

7 a) Build the binary search tree using the numbers listed below, keeping the same order as: 10, 12,13,1 4,15, 16,17 ,18 , 19,20,11,12, 13.How to make the BST that was obtained above into a balanced BST. [7M]

b) Provide an illustration of the heap sort procedure. [7M]

(OR)

8 a) An AVL search tree is what? How should we describe its height? Describe the balancing factor connected to each node in the AVL tree. [7M]

b) Explain how an AVL tree can be used to sort a sequence of n elements in O (n log n) time. [7M]

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UNIT - V

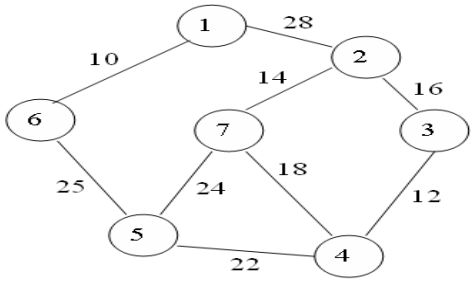
9 a) Write a program to create and print a graph data structure. [7M]

b) Write a short note on transitive closure of a graph and explain with program. [7M]

(OR)

10 a) Write a process for calculating the shortest path lengths for all possible pairs of shortest pathways. [7M]

b) Apply kruskal`s algorithm to the following graph? [7M]



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