BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)

Computer Science & Engineering

B. Tech. Sem - III :SUMMER : 2023

SUBJECT : NON-LINEAR DATA STRUCTURES

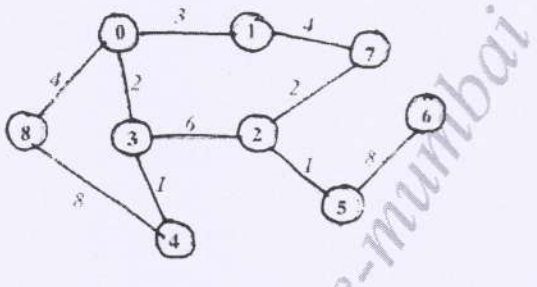
Day : Tuesday | Time : 02:30 PM-05:30 PM

Date : 09-05-2023 | **S-25310-2023** | Max. Marks : 60

N.B.

1) All questions are **COMPULSORY**.
2) Figures to the **RIGHT** indicate **FULL** marks.
3) Use of non-programmable calculator is **allowed**.
4) Assume suitable data **WHEREVER** necessary.
5) Draw neat labeled diagrams **wherever** necessary.

Q.1 What is minimum spanning tree? Write and apply Kruskal's algorithm to withdraw minimum spanning tree from following graph: **(10)**



OR

Q.1 **a)** Enlist disadvantages of linear data structures explain how nonlinear data structures overcome on it. **(05)**

b) Enlist Graph ADT operations. Explain how a graph can be represented using either adjacency matrix or adjacency list with example. **(05)**

Q.2 What are threaded binary tree? Write an algorithm for inserting a node in a threaded binary tree. **(10)**

OR

Q.2 **a)** Construct binary search tree for following elements and give the traversal sequence using any recursive traversal algorithm. **(05)**

7 10 14 23 33 56 66 70 80

b) Enlist & explain the properties of Binary Tree. **(05)**

Q.3 Describe the algorithms used to perform single and double rotation on AVL tree. **(10)**

OR

Q.3 **a)** Prove that: "Searching for a key in an m-Way search tree is similar to that of binary search tree". **(05)**

b) Enlist applications of tree and explain one in detail. **(05)**

Q.4 Implement the Fibonacci heaps and compare their performance with binary heaps when used in Dijkstra's algorithm. **(10)**

OR

Q.4 **a)** How to implement heap as priority queue ? **(05)**

b) Design an algorithm to insert a node into binary heap and demonstrate it using suitable example. **(05)**

PTO

Q.5 What are the advantages and disadvantages of various collision resolution strategies? **(10)**

OR

Q.5 **a)** Describe a note on quadratic probing. **(05)**

b) Compare separate chaining and open addressing. **(05)**

Q.6 Enlist string operations? Design an algorithm for following operations: **(10)**

i. Find out frequency of literals in given string.
ii. Count all the letter greater than 'M'.
iii. Print all the letters appearing before 'K'
iv. Count whitespaces in the string.

OR

Q.6 **a)** Illustrate Huffman coding algorithm. **(05)**

b) Explain dictionary as an abstract data type. **(05)**

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