BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-III Computer Science & Engineering : SUMMER : 2025
SUBJECT: NON-LINEAR DATA STRUCTURES

Day : Tuesday
Date : 13/05/2025

S-29202-2025

Time : 02:30 PM-05:30 PM
Max. Marks : 60

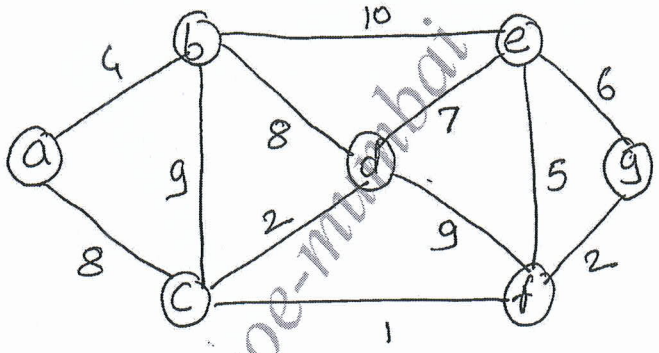
N.B :

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

Q.1 Define Nonlinear Data structure. Differentiate between Linear and Nonlinear data structure. Explain any one types of Nonlinear data structure. **(10)**

OR

Q.1 Construct MST from the given data using Kruskal's Algorithm. **(10)**



Q.2 What is binary search tree? Write an algorithm for inserting a node in binary search tree. Also write example of it. **(10)**

OR

Q.2 Explain how to delete an element from the binary search tree at **(10)**
i. leaf node ii. Internal node iii. Root node

Q.3 Construct AVL tree for following elements 21, 26, 30, 9, 4, 14, 28, 18, 15, 10, 2, 3, 7. **(10)**

OR

Q.3 What is splay tree? Write algorithm to search and insert element in splay tree. **(10)**

Q.4 Which heap is used in Huffman coding? What is time complexity of Huffman coding, also explain limitations? Draw Huffman tree for **(10)**

Character	Frequency
a	5
b	9
c	12
d	13
e	16
f	45

OR

Q.4 Create max heap for 8, 18, 5, 15, 17, 25, 40, 10 using heapify method and delete 25 and 40 from it. **(10)**

P.T.O.

Q.5 What is hash function? What are different characteristics of good hash function? Explain different types of hash function. (10)

OR

Q.5 How collision is resolved using chaining? For the given set of values. 11, 33, 20, 88, 79, 98, 44, 68, 66, 22. Create a hash table with size 10 and resolve collision using chaining with replacement and without replacement. Use the modulus Hash function. (key% size.) (10)

Q.6 Explain Boyer Moore algorithm. (10)

OR

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

i) Find out frequency of literals in given string
ii) Count all letter greater than M
iii) Count all letter before K
iv) Count all white space

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