

BACHELOR OF TECHNOLOGY (C.B.C.S.) (2020 COURSE)

B.Tech.Sem - III CS&E : : SUMMER - 2022

SUBJECT : NON-LINEAR DATA STRUCTURES

Day : Monday
Date : 30-05-2022

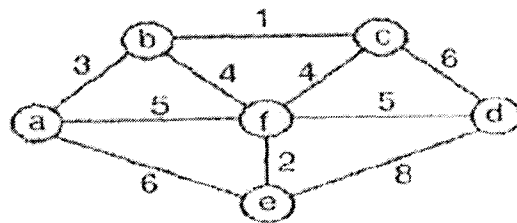
S-24292-2022

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) Use of non-programmable calculator is **allowed**.
- 4) Assume suitable data **WHEREVER** necessary.
- 5) Draw neat labeled diagrams **wherever** necessary.

Q.1 Formulate an algorithm to find the shortest path using Dijkstra's algorithm and (10) apply it on following graph:



OR

Q.1 a) Explain in detail graph traversal techniques with suitable example. (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 How to insert and delete an element into a binary search tree and write down the code for the insertion routine with an example. (10)

OR

Q.2 a) Construct binary 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) Define threaded binary tree and discuss its properties. (05)

Q.3 Illustrate the AVL tree insertion and deletion with suitable example. (10)

OR

Q.3 a) What is a red black tree? Mention the properties that a red black tree holds. (05)

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

Q.4 Write the algorithm for heap sort and analyses the heapify/Adjust function for its time complexity? (10)

OR

Q.4 a) List out unlikeness between Binomial and Fibonacci heap. (05)

b) How to implement heap as priority queue. (05)

PTO

- Q.5** a) Compare separate chaining and open addressing.
b) What is collision in hashing? How linear probing help us to resolve it.

OR

- Q.5** Show the result of inserting the keys 2,3,5,7,11,13,15,6,4 into an initially empty (10)
extendible hashing data structure with $M=3$.

- Q.6** Apply Brute-Force algorithm used for pattern matching with string "a b c a a b b" (10)
and pattern "a b b" .

OR

- Q.6** a) Formulate an algorithm to find out digits in given string. (05)
b) Explain dictionary as an abstract data type. (05)
