BACHELOR OF TECHNOLOGY (C.B.C.S.) (2021-COURSE)
B. Tech. Sem - III CS&E : WINTER- 2022
SUBJECT : NON-LINEAR DATA STRUCTURES

Day : Wednesday Time : 10:00 AM-01:00 PM

Date : 07-12-2022 **W-25310-2022** Max. Marks : 60

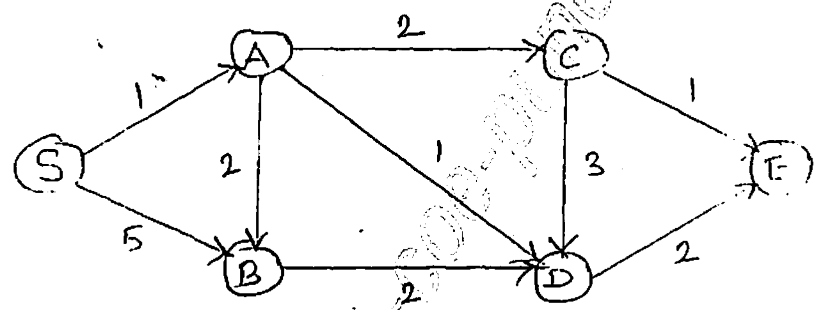
N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labeled diagram **WHEREVER** necessary.
4) Assume suitable data if necessary.

Q.1 Define Data structure. Differentiate between linear and nonlinear data structure. Explain any one type of nonlinear data structure. **[10]**

OR

Q.1 Using Dijkstra's Algorithm, find the shortest distance from source vertex 'S' to remaining vertices in the following graph. Also, write the order in which the vertices are visited. **[10]**



Q.2 Explain what is tree traversal. Explain the different types of traversal with example and comment on the output received. **[10]**

OR

Q.2 Comment on the use of Huffman algorithm in data structure. Construct a Huffman tree by using these nodes. **[10]**

Values	Frequency
A	05
B	25
C	07
D	15
E	04
F	12

Q.3 What is Red Black tree? What are the properties of Red Black Tree? Create a Red Black tree by inserting the following sequence of numbers. **[10]**
8, 18, 5, 15, 17, 25, 40 and 80.

OR

Q.3 Define Splay tree in data structure, also explain steps for inserting element in splay tree. What are splay tree used for? Differentiate between splay tree and AVL tree. **[10]**

P.T.O.

Q.4	Explain heap algorithm and give its complexity. Explain how heap sort works by taking an example.	[10]

OR

Q.4	Which heap is used in Huffman coding? What is time complexity of Huffman coding, also explain its limitations? Let A = {a/20, b/15, c/5, d/15, e/45} be the alphabet and its frequency distribution. Draw the Huffman tree.	[10]
Q.5	Write short note on Collision Resolution Strategies along with advantages and disadvantages.	[10]

OR

Q.5	Explain the concept of hashing and discuss on rehashing with example.	[10]
Q.6	What is Knuth-Morris-Pratt algorithm, explain with example and give its complexity?	[10]

OR

Q.6	Write brute force pattern matching algorithm and explain with example.	[10]

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