

**B.TECH.**  
**(SEM IV) THEORY EXAMINATION 2018-19**  
**DATA STRUCTURE**

Time: 3 Hours

Total Marks: 100

Note: Attempt all Sections. If require any missing data; then choose suitably.

## SECTION A

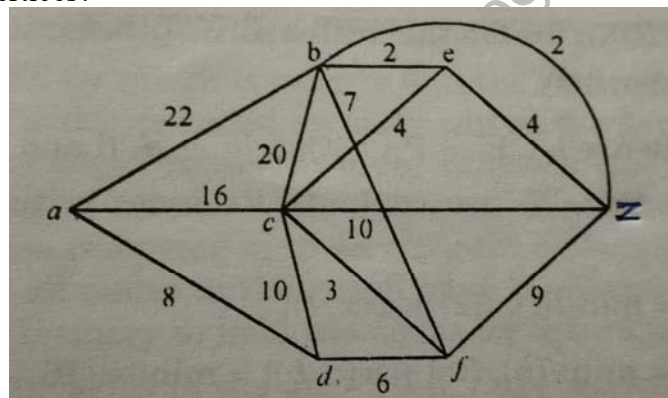
1. Attempt all questions in brief. 2 x 10 = 20

- a) Define the term (i) Entity (ii) file
- b) Define 3D array with example?
- c) Why stack is called a LIFO data structure?
- d) How does a linear queue compare with circular queue?
- e) Define the non-recursive traversal of binary search tree?
- f) Differentiate between complete binary tree and full binary tree?
- g) Define the degree of a vertex?
- h) Define Adjacency List with example?
- i) What is a sparse matrix? How is it stored in the memory of a computer?
- j) Define radix sort with example?

## SECTION B

2. Attempt any three of the following: 10x3=30

- a) What do you think about Algorithm, give example? How to express the time and space complexity, define with help of example?
- b) Differentiate between prefix and postfix expression? Write a program to input an infix expression and convert it into prefix form?
- c) Define tree with suitable example? Discuss the different tree terminologies?
- d) By applying Dijkstra's algorithm find the shortest path between the vertices *a* and *z* in the following graph, where the numbers associated with the edges are the distances between the vertices?



- e) Explain binary search tree and its operations. Make a binary search tree for the following sequence of numbers, show all steps: 45, 32, 90, 34, 68, 72, 15, 24, 30, 66, 11, 50, 10.

## SECTION C

3. Attempt any *one* part of the following: 10x1=10
- What do you mean by array? Classify them with example and what are the application of array?
  - Compare the linear linked list and doubly linked list according to their advantages and disadvantages? Write a function that removes all duplicate elements from a linear linked list?
4. Attempt any *one* part of the following: 10x1=10
- What is the principle of recursion? Discuss the different types of recursion?
  - What do you mean by queue? Discuss the operation of insert and delete performed by queue?
5. Attempt any *one* part of the following: 10x1=10
- Write a program to traverse the threaded binary tree is in-order, post-order and pre-order?
  - Define Huffman algorithm with suitable example? Draw the Hoffman tree-
- |           |    |   |    |    |   |    |    |   |
|-----------|----|---|----|----|---|----|----|---|
| Data Item | A  | B | C  | D  | E | F  | G  | H |
| Weight    | 22 | 5 | 11 | 19 | 2 | 11 | 25 | 5 |
6. Attempt any *one* part of the following: 10x1=10
- Explain with an example to find minimum cost spanning tree using kruskal algorithm.
  - Explain Breadth First Search? Give example to support your answer?
7. Attempt any *one* part of the following: 10x1=10
- Perform the Merge Sort on following set of elements. Also, write merge sort algorithm. 18, 25, 4, 26, 10, 15, 20, 5.
  - Write and explain the bubble sort algorithm for a given set of n data's where k<sup>th</sup> is the largest data.