

Roll No .....

**CS/IT-305 (GS)**  
**B.E. III Semester Examination, June 2020**  
**Grading System (GS)**  
**CS-305: Data Structures**  
**IT-305: Data Structure and Algorithm**  
**Time : Three Hours**

**Maximum Marks : 70**

**Note:** i) Attempt any five questions.  
ii) All questions carry equal marks.

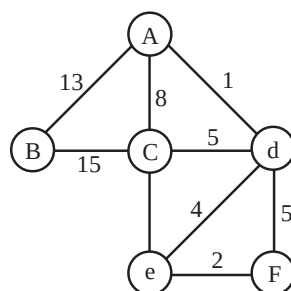
1. Define the term array. How are two-dimensional arrays represented in memory? Explain how address of an element is calculated in a two-dimensional array.
2. Write an algorithm to implement depth-first search. How is depth-first search different from Breadth-first search? Also write any two application of complete graph.
3. Explain the following:
  - i) Sparse matrices
  - ii) Backtracking
4. Write short notes on:
  - i) AVL Tree
  - ii) Minimum Cost Spanning Tree
  - iii) Sparse Matrix and its implementation
5. Define Huffman code. Explain using suitable example how Huffman codes are evaluated.
6. What are B-trees? Construct a B-Tree of order 3 for the following set of input data:  
69, 19, 43, 16, 25, 40, 132, 100, 145, 7, 15, 18.

OR

Write an algorithm for postfix to infix conversion. Consider the following arithmetic expression P, written in postfix notation:

P : 12, 7, 3, -, /, 2, 1, 5, +, \*, +. Translate P into infix expression using stack operations.

7. Find the minimum cost spanning tree for the following weighted graph.



[2]

OR

Define the term Recursion? Give a recursive algorithm to find  $n^{\text{th}}$  term of a Fibonacci series?

8. Answer any two of the following:

- a) Write an algorithms to find the largest of given  $n$  numbers. Derive its time complexity using asymptotic notations.
- b) What is Generalized linked list?
- c) Define internal and external sorting.
- d) Explain adjacency matrices graph representation.

\*\*\*\*\*

downloaded from  
StudentSuvidha.com