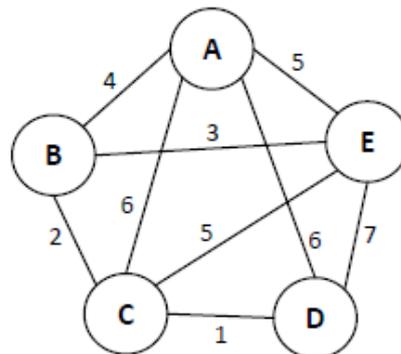


**GUJARAT TECHNOLOGICAL UNIVERSITY****MCA INTEGRATED- SEMESTER - III EXAMINATION- SUMMER-2023****Subject Code: 4430602****Date: 04/07/2023****Subject Name: Data Structures****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make Suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Use of simple calculators and non-programmable scientific calculators are permitted.

- Q.1 (a)** Answer the following. **07**
1. Define: Data Structures.
  2. What is an Algorithm?
  3. What is isolated node?
  4. What is Null graph?
  5. What is Cycle in graph?
  6. List out the applications of Queue.
  7. What is meaning of height of the tree?
- (b)** What is Asymptotic analysis? Explain all the notations of Asymptotic analysis. **07**
- Q.2 (a)** Convert the given infix notation into postfix notation using stack. **07**
- $$A * ( B + C ) / D + E * F$$
- (b)** Write the algorithm for inserting the node in sorted order in singly linked list. **07**
- OR**
- (b)** List out the application of the linked list? Explain how to add two different polynomials using linked data structure. **07**
- Q.3 (a)** Explain the algorithm for deleting the node from binary search tree using suitable example. **07**
- (b)** Explain different techniques for representation of the trees with example. **07**
- OR**
- Q.3 (a)** Explain Preorder, Inorder and Postorder traversal of binary tree using example. **07**
- (b)** Discuss Manipulation of Arithmetic Expression using Tree in detail. **07**
- Q.4 (a)** Explain Matrix and Linked Representation of Graphs with example. **07**
- (b)** Apply the Prim's and Kruskal algorithm on following graph and find the minimum cost to connect all nodes. **07**



**OR**

- Q.4** (a) Discuss the Dijkstra's Algorithm in detail. **07**  
(b) Define the terms: 1. Graph 2. Tree 3. Mixed Graph 4. Outdegree 5. Elementary Path 6. Adjacent Nodes 7. Loop. **07**

- Q.5** (a) Discuss the binary search algorithm with example. **07**  
(b) Sort the following data using selection sort. Write all the intermediate passes. **07**  
41, 24, 74, 11, 66, 58, 94, 36, 99, 87

**OR**

- Q.5** (a) Apply the quick sort on the following data and sort the following data? Also write the algorithm for the quick sort. **07**  
42, 56, 32, 11, 24, 88, 58, 74  
(b) What is hashing? Discuss collision resolution technique in hashing. **07**

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