

[Time: 3 Hours]

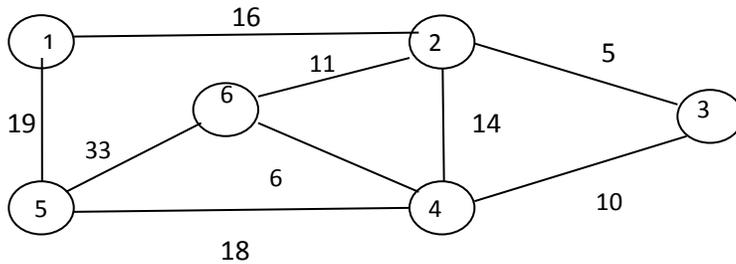
[Marks:80]

Please check whether you have got the right question paper.

- N.B:**
1. **Question No. 1 is compulsory.**
 2. **Attempt any four out of remaining six questions.**
 3. **Figures to the right indicate marks.**

- Q1. a. Write an algorithm for Shell sort. Consider the set of 8 numbers as: 10, 210, 4, 81, 865, 6, 50, 85 . Show to sort the elements using Shell sort. 10
- b. Define the circular linked list data structure. Write algorithms to: 10
- i. Insert a node in the circular linked list
 - ii. Reverse the circular linked list

- Q2 a. Define a stack. Explain the working of the stack. Evaluate the following infix expression using the stack: 08
 $(45+12)*76/2+(4*21)$
- b. Define Minimum spanning tree. Give minimum spanning tree using Prim's algorithm for the graph given below: 07



- Q3 a. Define an AVL tree. Give the algorithm for rotate right. Construct an AVL tree for the following data: 10, 20, 30, 15, 25, 17, 100, 120, 110 08
- b. Define a Queue. Give algorithms to 07
- i. Insert an element in a queue
 - ii. Display elements in the queue

- Q4 a. What is a network? Define shortest path. Give Dijkstra's algorithm to find the shortest path explains with an example. 08
- b. Define a Heap. Apply heap sort algorithm showing all steps on following data: 10 2 80 55 110 75 85

- Q.5 A What is a stack? Explain the working of a stack. Give the algorithms for push () ,pop() and peak() 08
- B Define hasing. Apply fold shift and fold boundary hashing with linear probing as the collision resolution technique on following data by considering array size as 100. 189890,671234,767856,784534,909345,67453 07

- Q.6 A What is graph? Explain breadth first search and depth first search on a graph with an example. 08
- B Define binary search tree (BST) construct a binary search tree showing all steps for the following traversals and derive the post order traversal. 07
- In order traversal: 4 7 2 1 5 3 6
- Pre order traversal: 1 2 4 7 3 5 6

Q.7 A Write short note on any 3

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- 1 Asymptotic notations
 - 2 Binary search
 - 3 Graph storage structures
 - 4 Priority queue
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