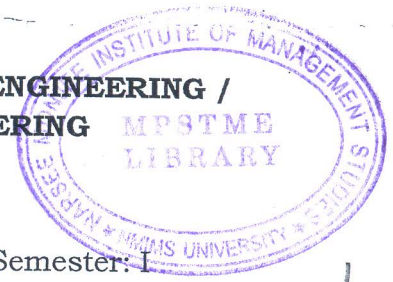


**SVKM's NMIMS**  
**MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING /**  
**SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING**

**Academic Year: 2022-23**



Programme: MCA

Year: I Semester: I

Subject: Data Structures and Algorithms

Date: 07 December 2022

Marks: 100

Time: 10.30 am - 01.30 pm

Durations: 3 (Hrs)

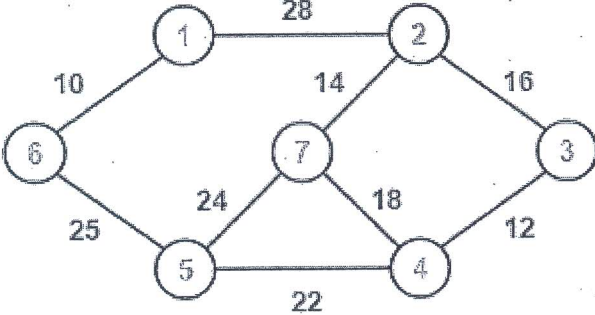
No. of Pages: 2

**Final Examination**

**Instructions:** Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) Question No. 1 is compulsory.
- 2) Out of remaining questions, attempt any 4 questions.
- 3) In all 5 questions to be attempted.
- 4) All questions carry equal marks.
- 5) Answer to each new question to be started on a fresh page.
- 6) Figures in brackets on the right hand side indicate full marks.
- 7) Assume Suitable data if necessary.

<b>Q1</b>		Answer briefly:	
CO-1 ; BL-M	a.	Explain the significance of asymptotic notations with suitable example.	[05]
CO-2 ; BL-L	b.	Discuss at least two applications of queue data structure.	[05]
CO- 2; BL- M	c.	Write and explain the algorithm to search a particular element in a singly linked list. Also display the message if element is not present.	[05]
CO-1 ; BL- L	d.	How do you represent graph data structure in computers memory? Explain with example.	[05]
<b>Q2</b>	a.	Discuss with suitable scenario the significance of stack. Write and explain the algorithm to check whether the balance parenthesis exist in the string or not.	[10]
CO-2; BL- M			
<b>Q2</b>	b.	What are the advantages of doubly linked list? Perform and explain following operations with suitable algorithms on doubly linked list. 1. Insert the element in between 2. Delete the element from a specified location other than first and last location.	[10]
CO-2; BL- H			
<b>Q3</b>	a.	Create a binary searched tree with the help of suitable insert_Node algorithm / program for the following data. 23, 45, 12, 38, 50, 10, 40 and 20. Also discuss the algorithm to display them in order.	[10]
CO-3; BL- H			
<b>Q3</b>	b.	Explain queue representation using linked list with insert and delete operations.	[10]
CO-2; BL- L			

<b>Q4</b> CO-2; BL- H	a. Consider following data and select a suitable data structure to represent it in the memory. 12, 34, 23, 45, 39. Write the algorithm / program to insert element 50 in between. Write the algorithm / program to delete 23 from the selected data structure. Also display final content of the data structure.	[10]
<b>Q4</b> CO-1; BL- M	b. Explain various binary tree traversal algorithms with suitable example.	[10]
<b>Q5</b> CO-1; BL- L	a. Discuss the role of binary tree data structure in solving Huffman encoding application with suitable example.	[10]
<b>Q5</b> CO-2; BL- H	b. What is minimum cost spanning tree (MST)? Apply and explain working principle of Kruskal's algorithm on following graph to find out the MST. 	[10]
<b>Q6</b> CO-4; BL- M	a. Perform and explain binary search algorithm on following data to search 78. Discuss its advantages over linear searching algorithm with respect to complexity analysis. 12, 23, 45, 56, 67, 78, 87, 90, 97.	[10]
<b>Q6</b> CO-4; BL- M	b. Apply and explain merge sort algorithm on the following dataset to sort them in ascending order. Also discuss its worst case time complexity. 23, 45, 12, 67, 22, 15, 78, 56, 34, 49.	[10]
<b>Q7</b> CO-1; BL- L	a. Explain Depth First Search traversal algorithms with suitable example. Discuss its time complexity analysis.	[10]
<b>Q7</b> CO-4; BL- H	b. Write a short note on Hashing	[05]
<b>Q7</b> CO- 1; BL- L	c. Write a short note on classification of data structures.	[05]