

SVKM'S NMIMS

MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING

Academic Year: 2022-2023

Program: B.Tech Integrated

Stream: Computer

Year: III Semester: V

Subject: Basic Data Structures

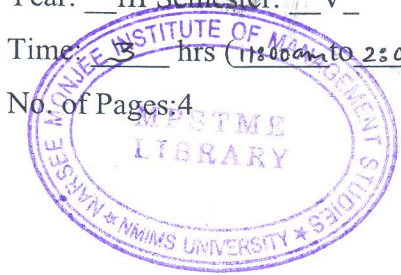
Time: 3 hrs (11:00 am to 2:00 pm)

Date: 15/06/23

No. of Pages: 4

Marks: 100

Special Re-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.

Q1		Answer briefly:	[20]
CO-3 ; BL-2	a.	State two applications of linked lists and compare them with the array data structure, highlighting their respective advantages and disadvantages.	
CO-2 ; BL-1	b.	State a problem that can be solved using recursion and explain the recursive approach to solving it step-by-step. with example.	
CO-3;	c.	Explain dequeue operation on circular queue.	

BL-2			
CO-4; BL-3	d.	<p>Consider a scenario where you need to store information about books in a library. Each book has attributes such as title, author, publication year, and ISBN.</p> <p>State which data structure will be used for the above condition and why?</p>	
Q2  CO-3  BL-3  CO-2  BL-3		<p>A) Write a program to push and pop an element from the stack.</p> <p>B) Write a program in C/C++ that takes an array of integers as input and finds the maximum and minimum values in the array.</p>	[20]
Q3  CO-3; BL-4   CO-3; BL-6		<p>A. Convert the given infix expression in to postfix using stack and show the details of stack at each step of conversion:</p> <p>Expression: <math>A*(B*C+D*E)+F</math></p> <p>B. Develop a program for ADT of a Linear Queue.</p>	[20]
Q4  CO-3; BL-6		<p>A) Develop a C/C++ program to insert a new node in the given linked list considering all cases of insertion</p>	[20]

CO-4; BL-4		B) Write a C/C++ program to show Selection sort, also explain its working with the help of one example.	
Q5  CO-3;BL-2  CO-3; BL-6		<p>A) Explain doubly linked list in detail with the help of diagram.</p> <p>B) Write a program to implement a stack using a linked list.</p>	[20]
Q6  CO-2;BL-4          CO-3; BL-3		<p>A)</p> <p>i) Consider a two-dimensional array named "B" declared as follows:</p> <p>B: array[7][12] of int;</p> <p>Assuming that each integer takes one memory location, the array is stored in column-major order, and the first element of the array is stored at location 500. What is the address of the element B[4][9]? Show the calculation.</p> <p>ii) Discuss the advantages and disadvantages of using pointers in programming.</p> <p>B) Explain the concept of a node in a linked list. What information does a node contain, and how are nodes connected to form a linked list?</p>	[20]

		Write a C/C++ code to insert a new node at the beginning of a singly linked list.	
Q7 CO-3; BL-3  CO-4; BL-3		<p>A) Develop a C/C++ program to implement queue using linked list.</p> <p>B) Describe the key requirements for performing a binary search on a sorted list.</p> <p>Given a sorted array: 2, 5, 7, 9, 11, 14, 17, 21, 25, 28, 30, 33, 36, 40, 42, 45, 48, 51, 54, 56.</p> <p>Apply the binary search algorithm to find the index of the element 36 in the array.</p>	[20]