SVKM'S NMIMS

MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT ENGINEERING / SCHOOL OF TECHNOLOGY MANAGEMENT ENGINEERING

Program: B. Tech Integrated (Computer) Year: III Semester : V

AcademicYear: 2022-2023

Subject: Basic Data Structures

Date : 31 January 2023

Marks: 100

Time: 10.00 am - 1.00 pm

Durations: 3 (Hrs)

No. of Pages: 03.

Re-Examination (2022-23)

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.	Explain the difference between array and linked list data structure with examples.	

CO- 2;
BL-1
	b.	Consider the following recursive function. What is the value of the recursive_function if called as recursive_function(5). Show the working for the justification.
		void recursive_function(int n)
		{
		if(n == 0)
		return;
		else
		{	

		cout<<" " <<n;
		recursive_function(n-1);
		cout<<" "<<n;
		}
		}	

CO-3 ; BL-2	c.	Explain Priority Queue.	
CO-4 ; BL-3	d.	A card game player arranges his cards and picks them one by one. With which sorting technique can you compare this example? Apply the identified sorting technique on the given array and show all the passes. 51 14 8 45 67 83 27	
Q2 CO-3; BL-3 CO-2; BL-3		A) Write a program to implement an ADT of Stack B) The professor, Ms. Anne at NMIMS wants to analyze data of 10 students' marks scored during mid-term test for the subject of Basic Data Structure. Write a C\C++ program that stores roll_no, name and marks of 10 students using structure and array of objects. The program must support below functionalities. (Use concept of structure and array of objects) 1. Storing details of 10 students provided by the user. 2. Identify the roll_no of a student having highest marks.	[20]
Q3 CO-3; BL- CO-3;BL-		A) Convert the given infix expression in to postfix using stack and show the details of stack at each step of conversion: Expression: ((A-B)+D/((E+F)*G)) Also, evaluate the expression if: A=7, B=5, D=6, E=1, F=1, G =2 B) Write a C/C++ program to implement linear queue using array.	[20]

Q4 CO-3; BL- CO-4; BL-3		A) Write a C/C++ program to implement below functionalities for singly linked list: • Deletion from the end • Insertion at the specific position • Display B) Sort the following elements using selection sort and also write a function for selection sort 145 63 17 108 21 9 37 19	[20]
Q5 CO-3; BL-2 CO-3; BL-6		A) Draw and explain different types of Linked lists. B) Write a program to reverse a string using stack.	[20]
Q6 CO-2; BL-4 CO-3; BL-3		A) i) Let A be a two-dimensional array declared as follows: A: array [10] [15] of double; Assuming that each integer takes one memory location, the array is stored in row-major order and the first element of the array is stored at location 300, what is the address of the element A [8][13]? Show the calculation. ii) *Each recursion creates new variables at different memory locations.* Is the statement correct? Justify. B) What is a Header in a linked list? Write a function to insert a new node at the beginning of a singly linked list	[20]
Q7 CO-3; BL-3 CO-4; BL-3		A) Write a program to implement queue using linked list B) How binary search is different from linear search? Apply binary search to find item 40 in sorted array: 11,22,30,33,40,44,55,60,66,77,80,88,99	[20]