Code: 23CS3201, 23IT3201, 23AM3201, 23DS3201

I B.Tech - II Semester – Regular Examinations - JULY 2024

DATA STRUCTURES
(Common for CSE, IT, AIML, DS)

Duration: 3 hours   Max. Marks: 70

Note: 1. This question paper contains two Parts A and B.
      2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.
      3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.
      4. All parts of Question paper must be answered in one place.

BL – Blooms Level   CO – Course Outcome

PART – A

		BL	CO
1.a)	Define abstract data type.	L1	CO1
1.b)	Differentiate binary search and linear search.	L2	CO1
1.c)	Compare implementation of list with arrays and pointers. Which is efficient? Justify your answer in one or two lines.	L2	CO1
1.d)	How self-referential structures are useful in the implementation of linked list data structure.	L1	CO1
1.e)	List the applications of stack.	L1	CO1
1.f)	Give the overflow condition and underflow condition of stack in array implementation.	L1	CO1
1.g)	In the circular implementation of queue, what is the condition to check queue is empty or not?	L1	CO1
1.h)	List the advantages of pointer implementation of queue over array implementation.	L1	CO1
1.i)	Define binary tree.	L1	CO1
1.j)	Describe the purpose of hashing.	L2	CO1

PART – B

			BL	CO	Max. Marks
		UNIT-I			
2	a)	Apply bubble sort on the following elements: 10, 4, 12, 3, 23, 1. Show each iteration very clearly.	L3	CO2	5 M
	b)	Discuss how do we measure the complexity of an algorithm.	L2	CO1	5 M
		OR			
3	a)	Explain selection sort algorithm with suitable example.	L2	CO2	5 M
	b)	Discuss the importance of linear data structures.	L2	CO1	5 M
		UNIT-II			
4	a)	Develop pseudo code to print elements of linked list in reverse order.	L3	CO3	5 M

	b)	Discuss the following operations in circular linked list:
		  i. Insert an element
		  ii. Delete an element
			L2	CO3	5 M

		OR			
5	a)	Compare singly linked list and doubly linked list.	L2	CO1	5 M
	b)	Explain the array implementation of list in detail.	L2	CO1	5 M

UNIT-III

6	a)	Develop algorithm to convert infix expression to postfix expression.	L3	CO3	5 M
	b)	Explain implementation of stack using pointers.	L2	CO1	5 M

OR

7	a)	Explain push() and pop() functions of stack data structure with array implementation.	L2	CO1	5 M
	b)	Describe the process of evaluating post fix expression using stack.	L2	CO3	5 M

UNIT-IV

8	a)	Explain about array implementation of queue.	L2	CO1	5 M
	b)	What is circular queue? What is advantage of circular queue over linear queue? Demonstrate with a scenario.	L2	CO1	5 M

OR

9	a)	Find the list of elements in the queue with following operations in sequence: insert(10), insert(20), delete, insert(30), insert(40), delete. Assume initially queue is empty.	L3	CO3	5 M
	b)	Discuss about pointer implementation of queue.	L2	CO1	5 M

		UNIT-V			
10	a)	Let us consider a simple hash function as "key mod 11" and sequence of keys as 50, 700, 76, 85, 92, 73, 101, 45, 62, 99 with table size 11. Show how these keys will be stored, if we apply quadratic probing in case of collision.	L4	CO4	5 M
	b)	Discuss about insertion and deletion of an element in binary search tree.	L2	CO4	5 M
		OR			
11	a)	Define Binary search tree. Construct binary search tree with following keys: 55,45,65,40,60,70,66,99,2,34	L3	CO4	5 M
	b)	Assume a table has 8 slots. Using chaining, insert the following elements into the hash table. 56,66,18,72,43,65,6,17,10,5,64,16,71, and 15 are inserted in the order. Consider Hash function: h(k) = k mod m, where m=8.	L4	CO4	5 M