P P SAVANI UNIVERSITY

Third Semester of B.Tech Examination

November 2022

SECE2031 Data Structures

30.11.2022, Wednesday **Time: 10:30 a.m. To 1:00 p.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

Q - 1	Define following terms.(Any Five)	**[05]**	**CO**	**BTL**
(i)	Define Sparse Matrix.		**CO2**	**BTL1**
(ii)	Enlist applications of Stack.		**CO2**	**BTL3**
(iii)	List out advantages of linked list.		**CO2**	**BTL2**
(iv)	Define Dynamic Memory Allocation.		**CO2**	**BTL1**
(v)	Numbers of passes required to sort n number of elements using bubble sort?		**CO5**	**BTL4**
(vi)	Maximum numbers of swaping required to sort n number of elements using selection sort?		**CO5**	**BTL4**
Q-2(a)	Distinguish between stack and queue with an example.	**[05]**	**CO2**	**BTL2**
Q-2(b)	Define Recursion. Write a recursive program to implement factorial of a number.	**[05]**	**CO2**	**BTL3**
	OR			
Q-2(b)	Define Data Structure. Enlist types of Data Structures and explain array data structures in detail.	**[05]**	**CO1**	**BTL1**
Q-3(a)	Convert the given infix expression into postfix expression using stack data Structure. (a+b)*(c+d)/f	**[05]**	**CO2**	**BTL5**
Q-3(b)	Write a program to implement insertion and deletion operation in circular queue data structure.	**[05]**	**CO3**	**BTL3**
	OR			
Q-3(a)	Convert the given infix expression into prefix expression using stack data Structure. (a+b)*(c+d)/f	**[05]**	**CO2**	**BTL5**
Q-3(b)	Write an algorithm to insert element at first position in singly linked list and delete specific node from singly linked list.	**[05]**	**CO3**	**BTL3**
Q - 4	Attempt any one.	**[05]**		
(i)	Write a program to implement Insertion sort and explain it with an example.		**CO4**	**BTL3**
(ii)	Write a program to implement Linear Search and explain it with an example.		**CO4**	**BTL3**

SECTION – II

Q - 1	**Answer the Following:**	**[05]**		
(i)	Which scheme uses a randomization approach? a) hashing by division b) hashing by multiplication c) universal hashing d) open addressing		**CO2**	**BTL2**
(ii)	How many children does a binary tree have? a) 2 b) any number of children c) 0 or 1 or 2		**CO2**	**BTL2**

d) 0 or 1

(iii)	What is the result of the following operation? **Top (Push (S, X))** a) X b) X+S c) S d) XS	CO2	BTL2
(iv)	In linked list each node contains a minimum of two fields. One field is data field to store the data second field is? a) Pointer to character b) Pointer to integer c) Pointer to node d) Node	CO2	BTL1
(v)	if the elements "A", "B", "C" and "D" are placed in a queue and are deleted one at a time, in what order will they be removed? a) ABCD b) DCBA c) DCAB d) ABDC	CO2	BTL2
Q-2(a)	**Answer in Short.**	**[05]**	
(i)	List out few of the Application of tree data-structure?	CO2	BTL2
(ii)	Differentiate between file and structure storage structure.	CO2	BTL2
(iii)	Define Height of tree?	CO2	BTL1
(iv)	What are the two methods of binary tree implementation?	CO2	BTL1
(v)	Define Graph?	CO2	BTL1
Q-2(b)	What is hashing? Explain hash collision and any one collision resolution technique.	[05]	CO2 BTL1
	OR		
Q-2(b)	State and explain time analysis for linear search and binary search method.	[05]	CO4 BTL2
Q-3(a)	Write a program to implement stack insertion and deletion operations using Linked list.	[05]	CO3 BTL3
Q-3(b)	Explain Threaded binary trees with suitable examples. Discuss Advantages & Disadvantages.	[05]	CO2 BTL1
	OR		
Q-3(a)	Write an algorithm for INSERT operation to insert a node at a given position in a Link list	[05]	CO3 BTL3
Q-3(b)	State and explain types of hash function in hashing.	[05]	CO2 BTL1
Q - 4	**Attempt any one.**	**[05]**	
(i)	Explain Sequential Files and Indexed Sequential Files Structures	CO2	BTL1
(ii)	Write an algorithm for DELETE operation in a Binary search tree.	CO3	BTL3

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CO : Course Outcome Number BTL : Blooms Taxonomy Level

Level of Bloom's Revised Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create