Program:	**S.Y.B.Sc IT**	**Semester:**	**III**	**Program Code:**	**UGIT01**
Course:	**Data Structure for Problem Solving**			**Course Code:**	**NUIT302**
Duration:	**1 Hour**	**Examination Pattern:**	**NEP-Autonomous- External**	**Max. Marks:**	**30**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Draw neat diagrams wherever necessary.
4. CO (Course Outcome), KL (Knowledge Level).

Examination:

REGULAR

Q. 1		**Attempt any THREE of the following.**	[15]	CO's	KL's
	(a)	Define best-case, worst-case, and average-case time complexity. Provide an example of each.		CO2	L1
	(b)	Define Data Structure. Explain the classification of data structures.		CO1	L2
	(c)	Explain the structure of a singly linked list. Provide a C/C++ program or a step-by-step algorithm to insert a node at the end of an SLL.		CO3	L3
	(d)	Compare the different types of queues with respect to their working and applications.		CO1	L4
	(e)	Design and implement a stack-based solution to evaluate a postfix expression. Write a suitable algorithm or C/C++ program and demonstrate it with an example.		CO3	L6
Q. 2		**Attempt any THREE of the following.**	[15]	CO's	KL's
	(a)	Analyze the different tree traversal techniques and compare their traversal sequences for a binary tree.		CO4	L4
	(b)	Design and construct a hash table of size 8 for the values 18, 26, 34, 43, 27, and 51 using the modulo division method. Develop a linear probing strategy to resolve collisions and present the final arrangement of the hash table.		CO2	L6
	(c)	Implement the Binary Search technique to search for an element in an array using a suitable algorithm or C/C++ program. State the condition required for applying Binary Search.		CO3	L3
	(d)	Evaluate the Bubble Sort technique for sorting an array of integers. Write a suitable step-by-step algorithm or C/C++ program and justify its working using a suitable example.		CO3	L5
	(e)	What is hashing in data structures? Explain collision in a hash table and how it can be resolved using the separate chaining method.		CO1	L2

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