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Enrollment No: 2303051051232

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech Mid Semester Exam

Semester: 3rd | **Date: 13/08/2024**
Subject Code: 303105201 | **Time: (1hr: 30min)**
Subject Name: Design of Data Structures | **Total Marks: 40**

Sr. No.		Marks
Q.1	**(A) Five One line Questions**	05
	1. What is a self-referential structure, and provide an example?	
	2. What is the minimum number of moves required to solve the Tower of Hanoi problem with n disks?	
	3. Define Data Structures	
	4. What are the applications of Stack?	
	5. What is pointer?	
	(B) Five Fill in the blanks	05
	1. Which of the following is a primitive data structure?	
	a) Array b) Linked List c) Integer d) Stack	
	2. What operation is not typically performed on a data structure?	
	a) Traversing b) Compiling c) Insertion d) Deletion	
	3. Which of the following is not a stack operation?	
	a) Push b) Pop c) Peek d) Enqueue	
	4. What data structure is used to convert infix expressions to postfix expressions?	
	a) Queue b) Array c) Stack d) Linked List	
	5. Which of the following best describes a linked list?	
	a) A data structure where elements are stored in contiguous memory locations	
	b) A collection of elements, called nodes, where each node points to the next node	
	c) A data structure with fixed size elements	
	d) A collection of elements with random access	
Q.2	**Attempt any four(Short Questions)**	12
	(1) Difference between Linear and Non-linear Data Structures	
	(2) Convert the infix expression A+B×(C−D) to postfix notation.	
	(3) Differences between array and linked-list.	

(4) Evaluate Postfix evaluation - 10 5 + 60 6 / * 8 -

~~100 200 + 2 / 5 * 7~~

(5) Explain the concept of a circular queue and its implementation. How does it handle overflow conditions?

Q.3 Attempt any two questions 08

(1) Describe the process of converting an infix expression to postfix notation using a stack with an example. A+B*C

(2) What is Recursion? Explain with example of Factorial of a given number.

(3) What is sorting? Explain about the working of selection sort with example.

Q.4 (A) What is Linked list? Explain types of Linked list. 05

(B) What is a queue in data structures? Explain Operations of Queue. 05

OR

(B) Explain the interpolation search algorithm and illustrate it with an example. 05