Shirpur Education Society's

R. C. PATEL INSTITUTE OF TECHNOLOGY, SHIRPUR

An Autonomous Institute

(Affiliated to Dr. Babasaheb Ambedkar Technological University, Lonere)

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(स्वायत्त महाविद्यालय)

A.Y. 2022-23-Year-III /Semester-V

Program: B.Tech (ETC ENGG)
Course: **Data Structures & Algorithms (PCET5060T)**
Date: 12/01/2023

Max Marks:75
Time: 10.30am-01.30 pm
Duration: 3 Hrs

END SEMESTER EXAMINATION ODD SEM- V – JAN- 2023

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover page of the Answer Book, which is provided for their use.

(1) This question paper contains two pages.
(2) All Questions are Compulsory.
(3) All questions carry equal marks.
(4) Answer to each new question is to be started on a fresh page.
(5) Figures in the brackets on the right indicate full marks.
(6) Assume suitable data wherever required, but justify it.
(7) Draw the neat labelled diagrams, wherever necessary.

Question No.		Max. Marks
Q1 (a)	Explain asymptotic notations to measure the time complexity. **OR** i. Explain different types of linked list with proper diagrams. ii. What is time complexity and space complexity.	[05] [03] [02]
Q1 (b)	i. What are the characteristics of an algorithm. ii. Explain how stack can be used to reverse a given string with example.	[05] [05]
Q2 (a)	Write queue ADT and also write the algorithm to implement the same using array **OR** Write the algorithm to implement the circular queue. Also list the advantages of using circular queue over linear queue	[10] [10]
Q2 (b)	Differentiate linear and non-linear data structure.	[05]
Q3 (a)	i. What are benefits of ADT? ii. List down the applications of List. **OR** How the stack is implemented by using linked list?	[02] [03] [05]
Q3 (b)	Write an algorithm to implement the following operations on doubly linked list 1) Insert 2) Delete 3) Search 4) Display **OR** Write an algorithm to implement the following operations on circular linked list 1) Insert 2) Delete 3) Search 4) Display	[10] [10]
Q4 (a)	Write the quick sort algorithm and sort the following numbers using quick sort method and write the output after each pass.	[08]

	20, 14, 50, 3, 5, 7, 11 **OR** i. Write a comparison table stating best case, average case and worst-case time complexity of any five sorting methods. ii. Sort the following numbers using insertion sort and write the output after each pass. 5, 4, 1, 3, 2.	[04] [04]
Q4 (b)	What is hashing? Explain different hashing methods with example.	[07]
Q5 (a)	**Solve any two.** i. Write a short note on collision resolution technique. ii. Write a short note on Threaded binary Tree. iii. Explain Depth First Search algorithm with example. iv. Explain Prim's algorithm to find Minimum spanning Tree.	[05] [05] [05] [05]
Q5 (b)	Construct the binary tree for the following preorder and inorder traversal Preorder: A B D G E C F Inorder : D G B E A C F	[05]