Code No.: R22CS203ES	R22	H.T.No.			8	R						

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
I–B.TECH–II–Semester End Examinations (Supply) – December - 2025
DATA STRUCTURES
(Common for ECE, CSE, IT)

[Time: 3 Hours] **[Max. Marks: 60]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 10 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(10 Marks)**

1.	a)	Write the basic structure of a node in a singly linked list in C.	[1M]
	b)	Mention the differences between arrays and linked list.	[1M]
	c)	Define a dictionary in the context of data structures.	[1M]
	d)	List different types of hashing techniques.	[1M]
	e)	What are the rules of coloring in Red-black tree?	[1M]
	f)	Define a Binary Search Tree.	[1M]
	g)	What is the time and space complexity of BFS and DFS?	[1M]
	h)	Differentiate adjacency matrix and adjacency list.	[1M]
	i)	What are the uses of compresses tries?	[1M]
	j)	What is the bad character rule?	[1M]

PART-B **(50 Marks)**

2.	Write a C program to insert a node at the beginning of a singly linked list.	[10M]
	OR	
3.	Explain the working of a queue using the array implementation.	[10M]
4.	Given a hash function h(k) = k mod 10, insert the keys {12, 22, 32, 42} using linear probing and show the resulting table.	[10M]
	OR	
5.	Compare and contrast the different open addressing techniques: linear probing, quadratic probing, and double hashing.	[10M]
6.	Given a sample AVL tree, explain how height is maintained during insertion.	[10M]
	OR	
7.	Draw a BST formed by inserting the keys: 40, 20, 60, 10, 30, 50, and 70.	[10M]
8.	Illustrate how a max-heap is created from an array.	[10M]
	OR	
9.	Discuss how Merge Sort can be adapted for external sorting with large datasets.	[10M]
10.	Given the text: "ababcabcabababd" and the pattern: "ababd", apply KMP and show the match process.	[10M]
	OR	
11.	Describe suffix tries with example.	[10M]

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