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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

MCA II Semester Examinations, April/May - 2019 DATA STRUCTURES AND ALGORITHMS

Time: 3hrs

Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all c

Part A is compulsory which carries 25 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

1.a)	Explain the operations of Queue with an example.	[5]
b)	What are the applications of Heap?	[5]
c)	Differentiate between Bubble sort and Insertion sort with an example.	[5]
d)	What are the properties of Red-Black tree?	[5]
e)	Write the flow chart of KMP.	[5]
	PART - B	
	5 × 10 Mai	$\mathbf{ks} = 50$
2.	Write an algorithm to find the reverse of a given number and also its complexit	y of the
	same.	[10]
	OR	
3.	Write an algorithm to find the number of occurrences of All Elements in a Link	ed List.
		[10]
4.	Explain how to represent the graph in the memory with an example.	[10]
	OR G	
5.a)	Explain the realization of a priority Queue using heap.	
b)	Write an algorithm of DFS.	[5+5]
6.	Write an algorithm of Quick Sort.	[10]
	OR	
7.	Insert the following list of elements into the Hash Table by using Quadratic Prob	ing
	(Size of Hash table is 10) 44, 15, 60, 24, 66, 30, 21, 18.	[10]
8.	Construct the AVL - tree of the following list of elements 65, 89, 10, 5, 43,	28, 54.
		[10]
	OR	
9.	Write an algorithm to delete an element from the B-tree.	[10]
10.	Consider $n = 4$ and the identifier set $(a1,a2,a3,a4) = (do, if, int, while)$. The va	lues for
	p's and q's are given as p $(1:4) = (3,3,1,1)$ and $q(0:4) = (2,3,1,1,1)$. Construct the	optimal
	binary search tree.	[10]
	OR	
11.	Apply the all- pairs shortest algorithm to the weighted graph whose adjacency ma	atrix is:
		[10]
	$\begin{bmatrix} 0 & 2 & \infty & 1 & 8 \end{bmatrix}$	
	$\begin{bmatrix} 6 & 0 & 3 & 2 & \infty \end{bmatrix}$	
	$\infty \infty 2 0 3$	

Max.Marks:75

 5×5 Marks = 25

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