VR Siddhartha Engineering College
Department of Information Technology

INFORMATION TECHNOLOGY

20IT4303: ADVANCED DATA STRUCTURES AND ALGORITHMS
ASSIGNMENT-1 QUESTION BANK
A.Y:2021-22/Sem-2

Q.No		Question	Course Outcome	BTL
1	a	Define a splay tree. Explain the difference between Bottom-Up and Top-Down Splay trees.	CO1	Understand
	b	Create a Top-Down splay tree with the following elements and delete 8 and 2 in the sequence from the constructed tree. Data: 15,8,18,16,13,19,4,2,11,20	CO1	Apply
2	a	Define a RED-BLACK tree and write about insertion and deletion in RED-BLACK tree.	CO1	Understand
	b	Create RED-BLACK tree for the following data and delete 5 and 1 in the sequence from the constructed tree. Data: 4,6,3,1,5,7,8,2,9,10	CO1	Apply
3	a	Define a Treap and write about insertion and deletion in Treaps	CO1	Understand
	b	Create Max Treap for the following data and delete 14/20 and 1/1 in th esequence. Data: 10/12, 5/16, 3/11, 14/20, 15/5, 21/25, 1/1, 2/6, 9/30, 30/50	CO1	Apply
4	a	How to apply the performance analysis to an algorithm. Explain the two methods used for performance analysis.	CO1	Understand
	b	Write an algorithm for the following task and analyze its time and space complexity. **Task:** Take the input from the user as 0's and 1's in an array and find the largest sub array which contains equal no.of 0's and 1's. **Example 1:** Input: 1,0,1,1,1,0,0 Output: 1 to 6 **Example 2:** Input: 0,0,1,1, 0 Output: 0 to 3	CO1	Apply

		Example 3: Input: 1,1,1,1 Output: NO such sub array		
5	a	Write about different asymptotic notations used to express the time complexity of the algorithms.	CO1	Understand
	b	Prove that the following inequalities are correct. $10n^3 + 15n^4 + 100n^2 2^n = O(100n^2 2^n)$ $33n^3 + 4n^2 = \Omega(n^2)$ $33n^3 + 4n^2 = \Omega(n^3)$	CO1	Apply