Reg. No. | | | | | | | | | | | | | | |

B.E / B.TECH. DEGREE EXAMINATION, MAY 2023

Third Semester

CS18301 – DATA STRUCTURES

(Computer Science and Engineering)

(Regulation 2018 / Regulation 2018A)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	The students will be familiar with sorting and searching algorithms and appraise its applications.	2
CO 2	The students will be to use list ADT for a variety of applications and classify them.	3
CO 3	The students earn a thorough knowledge in Stack and Queue ADT and will appraise the applications in various real time scenarios.	3
CO 4	The students distinguish linear and non-linear data structures, and appraise the use of Tree ADT.	3
CO 5	The students appraise the usage of graph algorithms for various applications.	4

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	What is called abstract data type? Give an example.	1	1
2.	Define pivot element in quick sort.	1	2
3.	What is called list?	2	1
4.	List any four applications of linked list.	2	2
5.	What is the role of activation record in function call?	3	1
6.	Name the operations of queue with example.	3	2
7.	Define binary tree.	4	1
8.	Mention the process of AVL tree with its operations.	4	2
9.	What is called minimum spanning tree?	5	1
10.	Differentiate between breadth first traversal and depth first traversal.	5	2

PART- B (5 x 14 = 70 Marks)

		Marks	CO	RBT LEVEL
11. (a)	Perform the quick sort on the below listed elements and provide the pseudo code neatly. List = 12, 14, 10, 162, 47, 25, 34, 97, 21, 132	(14)	1	4

(OR)

(b)	Explain about the external sorting. Which sorting techniques is applicable for the external sorting? Solve the below elements using the appropriate technique and provide the pseudo code. List = 10, 88, 24, 241, 34, 214, 51, 67, 8, 124, 22, 225, 245, 167	**(14)**	**1**	**4**
12. (a)	Create a singly linked list and perform the below listed operations. Also provide the pseudo codes.			
	(i) Insert a new node in the middle and end positions of a list.	**(7)**	**2**	**3**
	(ii) Delete a node from the beginning of the list.	**(7)**	**2**	**3**

(OR)

(b)	Explain the circular linked list with all its operations. Provide the pseudo code for the insertion and deletion of a node.	**(14)**	**2**	**3**
13. (a)	How the infix expression is converted into postfix expression using stack Describe the process with suitable example?	**(14)**	**3**	**3**

(OR)

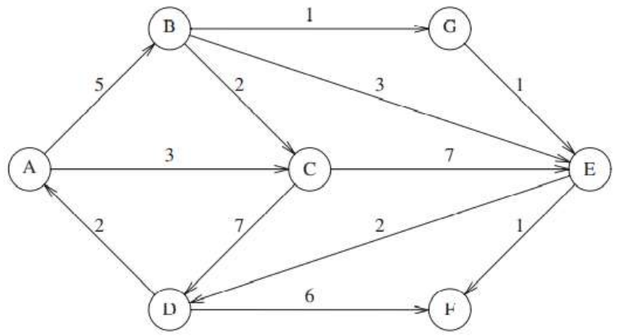
(b)	Demonstrate the working of a queue with the elements (10, 20, 30, 40, 50, 60, 70). Provide the pseudo codes for the enqueue and dequeue operations.	**(14)**	**3**	**3**
14. (a)	Construct a binary search tree with the elements such as: 12, 9, 24, 10, 22, 26, 8, 32. Find the result of in-order, pre-order, and post-order traversals. Show the deletion of the root node.	**(14)**	**4**	**4**

(OR)

(b)	**(i)** Create a B-Tree of order 5 by inserting the following elements. 3, 14, 7, 1, 8, 5, 11, 17, 13, 6, 23, 12, 20, 26, 4, 16, 18, 24, 25 and 19	**(7)**	**4**	**4**
	(ii) Discuss how to insert an element in a AVL tree. Explain with algorithm.	**(7)**	**4**	**4**

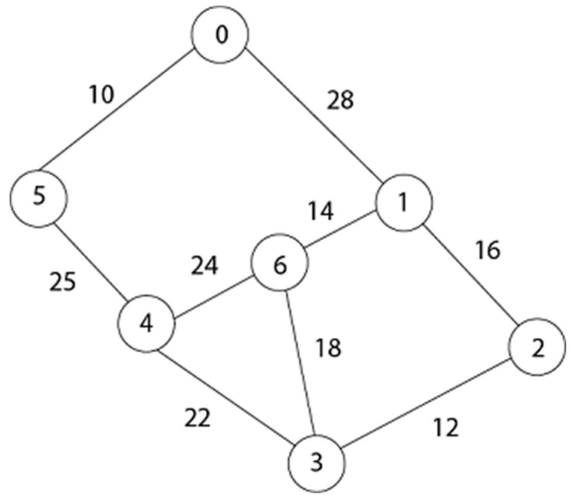
Q. Code: 666370

15. (a) Apply the Dijkstra algorithm on the given graph to find the shortest path between A and E. **(14) 5 4**



(OR)

(b) Construct the minimum spanning tree using prims algorithm. **(14) 5 4**



PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Write about the priority heaps with example. Demonstrate the operations with one example.	**(10)**	**4**	**5**