Q. Code:986865

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

B.E./ B.TECH. DEGREE EXAMINATIONS, MAY 2024

Third Semester

IT18304 – DATA STRUCTURES AND ALGORITHMS

(Information Technology)

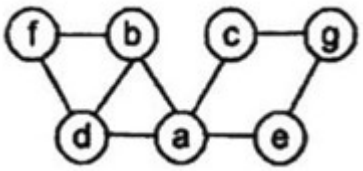
(Regulation2018/2018A)

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

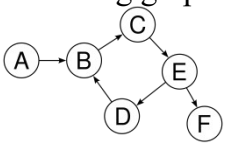
COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Apply the concepts of ADT to design efficient algorithms.	**3**
CO 2	Select suitable linear data structures to solve computational problems.	**4**
CO 3	Choose appropriate non-linear data structures to solve computational problems.	**4**
CO 4	Develop solution for real world problems using hashing, Sorting, and Searching algorithms.	**3**
CO 5	Experiment the use of appropriate data structures and design efficient algorithms to develop software applications.	**5**

PART- A(10x2=20Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Identify the types of Data Structures suitable for the following scenarios i. Representing the list of Names of 10 students in a class. ii. A college bus moving between different routes in working days.	**1**	**3**
2.	Outline the operations performed in list ADT?	**1**	**2**
3.	Write the routine to push an element into a stack.	**2**	**3**
4.	Write the routine to delete an element from a queue.	**2**	**3**
5.	Summarize the significance of balance factor in AVL trees.	**3**	**2**
6.	List the applications of tree.	**3**	**1**
7.	Compare weighted graph and unweighted graph with examples.	**3**	**2**
8.	Compute in degree and out degree of the following graph 	**3**	**3**
9.	Compare and contrast linear search and binary search.	**4**	**2**
10.	Examine the conditions in which collision occur during insertion in hashing. Give example.	**4**	**4**

PART- B (5x 14=70Marks)

		Marks	CO	RBT LEVEL
11. (a)	Simulate and explain the steps involved in insertion and deletion into a singly linked list.	**(14)**	**1**	**3**
	(OR)			
(b)	Demonstrate how polynomial manipulations are performed with lists?	**(14)**	**1**	**3**
12. (a)	Devise an algorithm to evaluate arithmetic expressions using stacks.	**(14)**	**2**	**4**
	(OR)			
(b)	Analyse how circular queues are implemented with an example.	**(14)**	**2**	**4**
13. (a)	Organise the following elements in a binary search tree: 2,5,17,4,12,45,8,14,35,40,19. Display the elements of the binary search tree using preorder. post order and inorder traversal.	**(14)**	**3**	**4**
	(OR)			
(b)	Analyse the result of inserting 3,1,4,6,9,2,5,7 into an initially empty AVL tree. Also show the result of deleting the root.	**(14)**	**3**	**4**
14. (a)	Apply prims's algorithm to find the minimum spanning tree of the following graph. Also write its pseudo code. 	**(14)**	**3**	**3**
	(OR)			
(b)	Illustrate single source shortest path algorithm with suitable example.	**(14)**	**3**	**3**
15. (a)	Demonstrate Bubble Sort for the sequence -3, -1, -4, 1, -5, -9, 2, 6, 5	**(14)**	**4**	**3**
	(OR)			
(b)	Demonstrate searching operations using linear and binary search with an example.	**(14)**	**4**	**3**

PART- C (1x 10=10Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Given Input {437, 132, 617, 411, 429, 966, 199} and a hash function h(X) = X (mod 10) . Construct hash table for the following i. Separate chaining hash table ii. Open addressing hash table using linear probing iii. Rehashing using the following second hash function h2(X) = 7 – (X mod 7)	**(10)**	**5**	**5**