SRM VALLIAMMAI ENGINEERING COLLEGE
(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF INFORMATION TECHNOLOGY

QUESTION BANK

III SEMESTER

1908301 - Data Structures and Algorithms

Regulation – 2019

Academic Year 2022 – 2023(Odd Semester)

Prepared by

Ms.S.Sandhya, Assistant Professor (O.G) / IT

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DEPARTMENT OF INFORMATION TECHNOLOGY

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SUBJECT : 1908301 - Data Structures and Algorithms

SEM / YEAR: III Sem / II Year

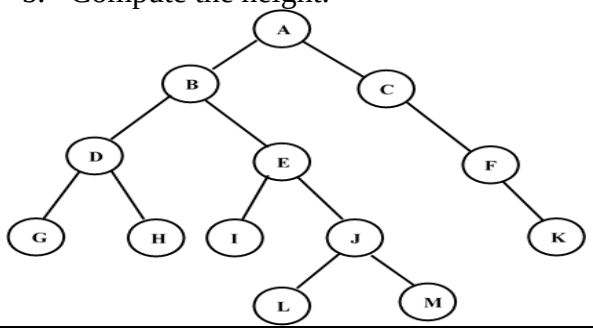
UNIT I - LINEAR DATA STRUCTURES – LIST			
Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation — singly linked lists- circularly linked lists- doubly-linked lists – applications of lists –Polynomial Manipulation – All operations (Insertion, Deletion, Merge, Traversal).			
PART - A			
Q.No	**Questions**	**BT Level**	**Competence**
1.	Define ADT. Give any two examples.	BTL1	Remembering
2.	Define list. Mention any two operations that are performed on a list.	BTL1	Remembering
3.	List out the areas in which data structures are applied extensively.	BTL1	Remembering
4.	Define data structure with example.	BTL1	Remembering
5.	What is circular linked list?	BTL1	Remembering
6.	List out the advantage of circular linked list.	BTL1	Remembering
7.	Distinguish between linear and nonlinear data structures.	BTL2	Understanding
8.	Interpret the advantages and disadvantages of linked lists over arrays.	BTL2	Understanding
9.	Differentiate arrays and linked lists.	BTL2	Understanding
10.	Give an example for linked list application.	BTL2	Understanding
11.	Examine a doubly linked list with neat diagram.	BTL3	Applying
12.	Illustrate the basic operations carried out in a linked list.	BTL3	Applying
13.	Show the ways in which list ADT can be implemented.	BTL3	Applying
14.	Compare calloc() and realloc() function and mention its application in linked list.	BTL4	Analyzing
15.	Analyze and write a routine to find position of given element in singly linked list.	BTL4	Analyzing
16.	Analyze and write the linked list representation of a polynomial: $p(x)=4x^3+6x^2+7x+9$	BTL4	Analyzing
17.	Should arrays or linked lists be used for the following types of applications? Support your justification. 1. Many search operations in sorted list. 2. Many search operations in unsorted list.	BTL5	Evaluating
18.	Compare between linear linked list and circular linked list.	BTL5	Evaluating
19.	Design a routine to delete an element in a linked list.	BTL6	Creating
20.	Develop an algorithm for insertion operation in a singly linked list.	BTL6	Creating

21.	Identify the objectives of studying data structures.	BTL3	Applying
22.	Examine the advantages of modularity.	BTL4	Analyzing
23.	Define data structures.	BTL2	Understanding
24.	Why ADT is called an abstract system?	BTL5	Evaluating
PART - B			
1.	Describe in detail about Polynomial manipulation in linked list. (13)	BTL1	Remembering
2.	What is a linked list? Describe the suitable routine segments for any four operations. (13)	BTL1	Remembering
3.	Examine the algorithms to implement the doubly linked list and perform all the operations on the created list. (13)	BTL1	Remembering
4.	Identify the array implementation of list and show all its operations. (13)	BTL1	Remembering
5.	Discuss the creation of a doubly linked list and write routine to insert an element in doubly linked list and delete an element in doubly linked list. (13)	BTL2	Understanding
6.	i) State the polynomial representation for $6x^3+9x^2+7x+1$ using linked list. Write procedure to add and multiply two polynomial and explain with suitable example. (7) ii) What are the ways to insert a node in linked list? Write an algorithm for inserting a node before a given node in a linked list.(6)	BTL2	Understanding
7.	Differentiate single linked list and doubly linked list with an example. (13)	BTL2	Understanding
8.	Explain the application of linked list in detail. (13)	BTL3	Applying
9.	Consider an array A[1: n] Given a position, write an algorithm to insert an element in the Array. If the position is empty, the element is inserted easily. If the position is already occupied the element should be inserted with the minimum number of shifts.(Note: The elements can shift to the left or to the right to make the minimum number of moves). (13)	BTL3	Applying
10.	Analyze and write procedure for circular linked list with create, insert, delete, display operations. (13)	BTL4	Analyzing
11.	Explain the various operations of the list ADT with examples. (13)	BTL4	Analyzing
12.	Analyze the doubly linked list and circular linked list. Mention its advantages and disadvantages. (13)	BTL4	Analyzing
13.	Explain the steps involved in insertion and deletion into a singly linked list. (13)	BTL5	Evaluating
14.	Develop a C program for linked list implementation of list. (13)	BTL6	Creating
15.	Illustrate the merge operation in circular linked lists. (13)	BTL2	Understanding
16.	Identify the operation of traversing linked list. Write the algorithm and give an example. (13)	BTL3	Applying
17.	Explain the insertion operation in linked list. How nodes are inserted after a specified node. (13)	BTL5	Evaluating
PART – C			

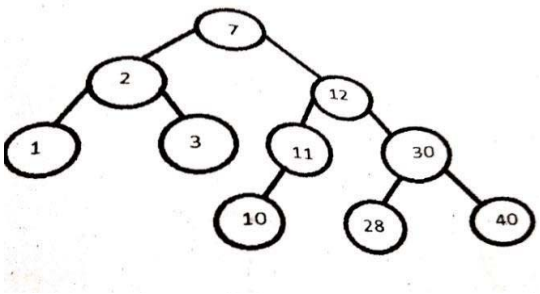
1.	Recommend an algorithm to add two polynomials represented by linked representation. Apply the function for the following input. $A=3x^2+2x^1+1, B=8x^2+3x^1+10$ (15)	BTL5	Evaluating
2.	Compose an algorithm to i) Reverse the elements of a single linked lists. (5) ii) count the number of nodes in a given singly linked list. (5) iii) Searching the element from linked list. (5)	BTL6	Creating
3.	Given an list 100, 200, 300, 400, generalize the steps and write routine to delete a node from the beginning of the linked list, deletion of last node in a list and deletion of middle node in a list. (15)	BTL5	Evaluating
4.	i) Develop a program to merge two sorted linked list (P & Q-assume that they are available) to get a single sorted list S. Eg. P:1→2→45→56 Q:3→24→56→63→66 (10) ii) Write a non-recursive procedure to reverse a singly linked list. (5)	BTL6	Creating
5.	Formulate an algorithm to insert a node at the beginning of list. (15)	BTL6	Creating

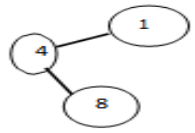
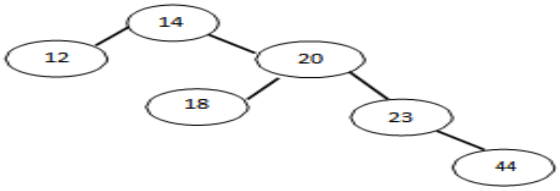
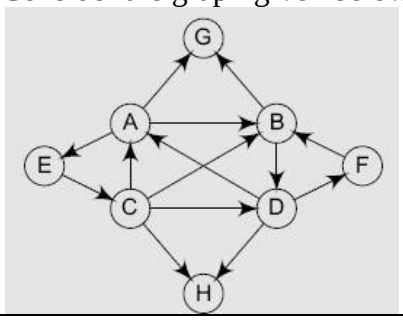
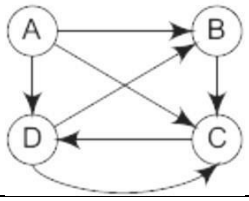
UNIT II - LINEAR DATA STRUCTURES – STACKS, QUEUES			
Stack ADT – Operations - Applications - Evaluating arithmetic expressions- Conversion of Infix to postfix expression - Queue ADT – Operations - Circular Queue – Priority Queue - deQueue – applications of queues.			
PART - A			
Q.No	**Questions**	**BT Level**	**Competence**
1.	Define stack and specify the operations	BTL1	Remembering
2.	List any four applications of stack?	BTL1	Remembering
3.	Given the prefix for an expression. Write its postfix: ++A*BCD and +*AB*CD	BTL2	Understanding
4.	Given a infix expression convert it into postfix expression using stack a+b*(c^d-e)^(f+g*h)-i	BTL2	Understanding
5.	Discuss the postfix and prefix forms of the expression? A+B*(C-D)/(P-R)	BTL2	Understanding
6.	Illustrate the purpose of top and pop?	BTL3	Applying
7.	What causes underflow of stack? How it could be avoided?	BTL4	Analyzing
8.	How to implement stack using linked list.	BTL4	Analyzing
9.	Summarize the rules followed during the infix to postfix conversions.	BTL5	Evaluating
10.	Generalize a routine to return top element in a stack using linked list.	BTL6	Creating
11.	Define double ended queue.	BTL1	Remembering
12.	List the applications of a queue.	BTL1	Remembering
13.	What are priority queues? What are the ways to implement priority queue?	BTL1	Remembering
14.	What is circular queue?	BTL1	Remembering
15.	Circular queue is better than standard linear queue, Why?	BTL2	Understanding
16.	Classify the different types of queues.	BTL3	Applying
17.	Show a routine to perform enqueue operation in a queue.	BTL3	Applying

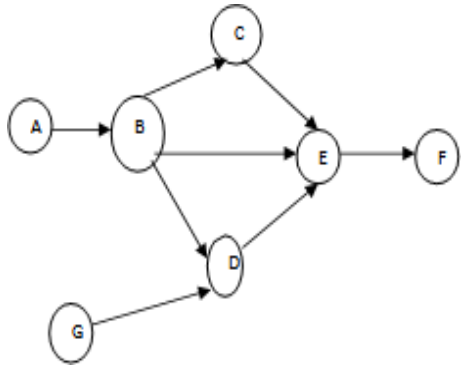
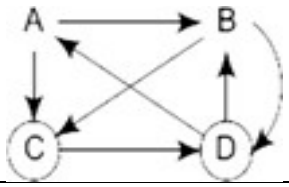
18.	Differentiate between double ended queue and circular queue.	BTL4	Analyzing
19.	For railway reservation the queue data structure is preferred –Justify.	BTL5	Evaluating
20.	Develop an algorithm for deleting an element in a double ended queue.	BTL6	Creating
21.	Convert A*(B+D)/E-F*(G+H/K) into postfix expression.	BTL3	Applying
22.	Write a routine to make an Empty Queue using array implementation.	BTL4	Analyzing
23.	Mention the advantages of representing stacks using linked lists than arrays	BTL2	Understanding
24.	What is the need for Priority queue?	BTL5	Evaluating
	PART – B		
1.	Describe about stack ADT using array in detail. (13)	BTL1	Remembering
2.	i) Give an algorithm for push and pop operations on stack using a linked list with an example. (8) ii) Describe the function to examine whether the stack is full() or empty(). (5)	BTL1	Remembering
3.	Write algorithm to check if the parenthesized arithmetic expression contains balanced parenthesis and to convert such expression to postfix form and evaluate it. Illustrate with example. (13)	BTL2	Understanding
4.	Give an algorithm to convert an infix expression to a postfix expression using stack with suitable example. (13)	BTL2	Understanding
5.	Illustrate the application of stack with an example.	BTL3	Applying
6.	Show the procedure to convert the infix expression to postfix expression and steps involved in evaluating the postfix expression. Convert the expression A-(B/C+(D%E*F)/G)*H to postfix form. Evaluate the given postfix expression 9 3 4 * 8 + 4 / -. (13)	BTL3	Applying
7.	Explain how to evaluate the following arithmetic expressions using stacks. i) **6 2 3 + - 3 8 2 / + * 2 ^ 3 +** (5) ii) **6 2 / 3 - 4 2 * +** (4) iii) **43*67+5-+** (4)	BTL5	Evaluating
8.	Briefly describe the operations of queue with example.	BTL1	Remembering
9.	Describe about implementation of queue ADT using linked list with suitable example. (13)	BTL1	Remembering
10.	Discuss and write a C program to implement queue functions using arrays. (13)	BTL2	Understanding
11.	Explain application of queue with suitable example.	BTL4	Analyzing
12.	What are circular queues. Explain the procedure to insert an element to circular queue and delete an element from a circular queue using array implementation. (13)	BTL4	Analyzing
13.	Analyze the implementation of priority queue.	BTL4	Analyzing
14.	Prepare an algorithm to perform the operations in a double ended queue. (13)	BTL6	Creating
15.	Define an efficient representation of two stacks in a given area of memory with n words and explain.	BTL2	Understanding
16.	Explain the array implementation of queue ADT in detail.	BTL3	Applying

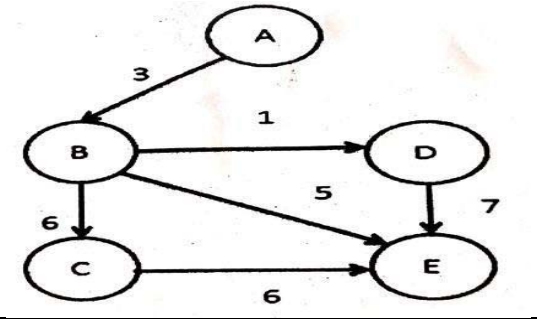
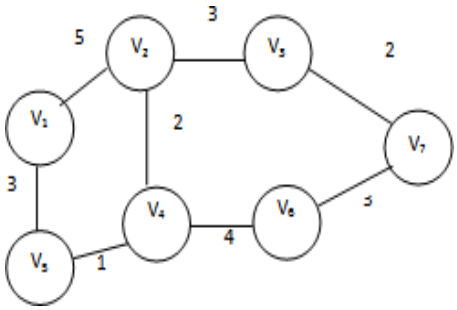
17.	Write a function called 'push' that takes two parameters: an integer variable and a stack into which it would push this element and returns a 1 or a 0 to show success of addition or failure.	BTL5	Evaluating
	PART-C		
1.	Develop a C program for linked list implementation of stack. (15)	BTL6	Creating
2.	Convert the following infix expression into postfix form: i) (A-B)+C*D/E-C (5) ii) (A*B) +(C/D)-(D+E) (5) iii) 14/7*3-4+9/2 (5)	BTL5	Evaluating
3.	A circular queue has a size of 5 and has 3 elements 10, 20 and 40 where F=2 and R=4.After inserting 50 and 60,what is the value of F and R. Trying to insert 30 at this stage what happens? Delete 2 elements from the queue and insert 70, 80 & 90.Assess the sequence of steps with necessary diagrams with the value of F & R. (15)	BTL5	Evaluating
4.	Generalize and develop a function to insert an element into a queue and delete an element from a queue, in which the queue is implemented as a linked list. (15)	BTL6	Creating
5.	What is a DeQueue? Explain its operation with example? (15)	BTL5	Evaluating
	UNIT III - NON LINEAR DATA STRUCTURES – TREES		
	Tree ADT – tree traversals - Binary Tree ADT – expression trees – applications of trees – binary search tree ADT –Threaded Binary Trees- AVL Trees – B-Tree - B+ Tree - Heap – Applications of heap.		
	PART – A		
1.	If the depth of binary tree is k, the maximum number of nodes in the binary tree is 2^k-1. Prove.	BTL 5	Evaluating
2.	Recommend the result of inserting 3,1,4,6,9,2,5,7 into an initially empty binary search tree.	BTL 5	Evaluating
3.	Define a binary tree. Give an example.	BTL 1	Remembering
4.	Create an expression tree for the expression. ((a + ((b/c)*d))- e)	BTL 6	Creating
5.	Differentiate AVL tree and Binary search tree.	BTL 4	Analyzing
6.	Give the various types of rotations in AVL tree during the insertion of a node?	BTL 2	Understanding
7.	For the given tree a. List the siblings for node E b. Compute the height.  	BTL 1	Remembering
8.	What are threaded binary trees? Give its advantages.	BTL 1	Remembering
9.	Define balance factor of AVL Tree.	BTL 1	Remembering
10.	Simulate the result of inserting 2, 1, 4, 5, 9, 3, 6, 7 into an initially empty AVL Tree.	BTL 6	Creating

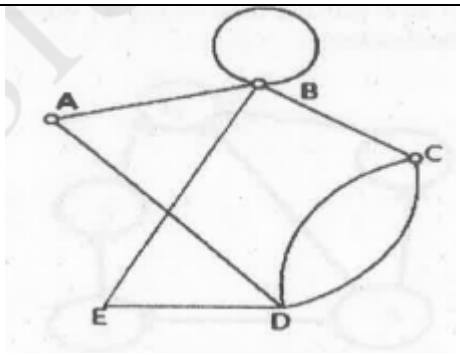
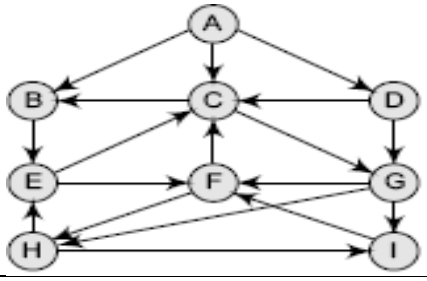
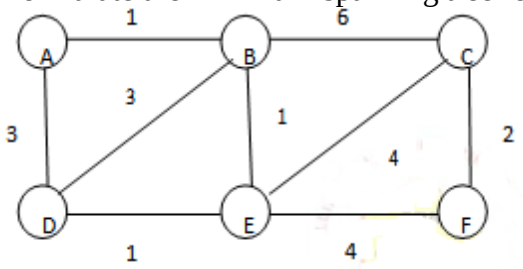
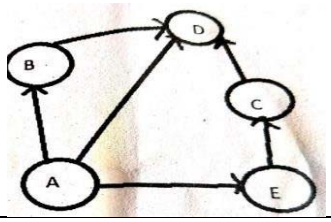
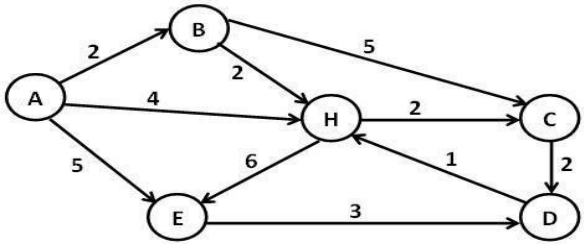
11.	Define an expression tree. Give an example for it.	BTL 2	Understanding
12.	Summarize tree traversal and mention the type of traversals?	BTL 2	Understanding
13.	Differentiate B tree and B+ tree	BTL 2	Understanding
14.	Point out the properties of B+ tree.	BTL 4	Analyzing
15.	Illustrate the benefits of B+ tree.	BTL 3	Applying
16.	List out the various operations that can be performed on B-trees	BTL 1	Remembering
17.	Identify the structural properties of B-Trees.	BTL 1	Remembering
18.	Illustrate the steps in the construction of a heap of records with the following key values:12, 33, 67, 8, 7, 80, 5, 23.	BTL 3	Applying
19.	Analyze the properties of binary heap.	BTL 4	Analyzing
20.	Define a heap and show how it can be used to represent a priority queue.	BTL 3	Applying
21.	Define leaves in a tree.	BTL 2	Understanding
22.	What do you mean by level of the tree?	BTL4	Analyzing
23.	Identify the properties of a binary tree	BTL 3	Applying
24.	Interpret the merits of linear representation of binary trees.	BTL5	Evaluating
PART-B			
1.	Write an algorithm for preorder, inorder and postorder traversal of a binary tree. (13)	BTL 1	Remembering
2.	Explain the following operations on a binary search tree with suitable algorithm i) Find a node (7) ii) Find minimum and maximum elements of BST. (6)	BTL 4	Analyzing
3.	Write an algorithm for inserting and deleting a node in a binary search tree. (13)	BTL 1	Remembering
4.	Describe the concept of threaded binary tree with example. (13)	BTL 1	Remembering
5.	Discuss in detail the various methods in which a binary tree can be represented. Discuss the advantage and disadvantage of each method. (13)	BTL 2	Understanding
6.	i) Create a binary search tree using the following data elements 45, 39, 56, 12, 34, 78, 32, 10, 89, 54, 67, 81 (7) ii) Explain the steps to convert general tree to binary tree? (6)	BTL 5	Evaluating
7.	i) Construct B Tree of order m=5 for the following keys 1, 12, 8, 2, 25, 5, 14, 28, 17, 7, 52, 16, 48, 68, 3, 26, 29, 53, 55, 45 (8) ii) Delete the keys 8 and 55.State the rules for deletion. (5)	BTL 6	Creating
8.	i) Discuss how to insert an element in a AVL tree and explain with algorithm. (7) ii) Explain how deletion can take place in AVL trees with suitable algorithm. (6)	BTL 2	Understanding
9.	i) What are AVL trees? Describe the different rotations defined for AVL tree. (7) ii) Insert the following elements step by step in sequence into an empty AVL tree 63, 9, 19, 27, 18, 108, 99, 81. (6)	BTL 1	Remembering

10.	Analyze the operations of B-tree using 2-3 tree with example. (13)	BTL 4	Analyzing
11.	Discuss about B+ tree in brief with suitable example. (13)	BTL 2	Understanding
12.	Explain the construction of expression tree with example. Give the applications of trees. (13)	BTL 4	Analyzing
13.	Illustrate the construction of binomial heaps and its operations with a suitable example. (13)	BTL 3	Applying
14.	i) Illustrate how the delete operation is performed on binary heap?(7) ii) Write suitable operations for percolate up and percolate down operations in a binary heap. (6)	BTL 3	Applying
15.	Explain Deletion in Binary tree by merging and copying. (13)	BTL2	Understanding
16.	i) Explain how to delete an element from the binary search tree. (7) ii) Write recursive algorithm for pre order traversal. (6)	BTL3	Applying
17.	Construct an expression tree for the expression (a+b*c) + ((d*e+f)*g). Give the outputs when you apply inorder, preorder and postorder traversals. (13)	BTL5	Evaluating
PART-C			
1.	(i) Construct and evaluate a B tree of order 5 by inserting the following: 3,14,7,1,8,5,11,17,13,6,23,12,20,26,4,16,18,24,25 and 18 (10) (ii) Compare and assess B Tree and B+ Tree. (5)	BTL 5	Evaluating
2.	i) Develop a routine for post order traversal. Is it possible to find minimum and maximum value in the binary search tree using traversals? Discuss. (5) ii) Display the given tree using Inorder,Preorder,Postorer traversals (6)  iii) Delete 11 and 10 from the above binary search tree.And display the tree after each deletion. (4)	BTL 6	Creating
3.	i) Draw B-Tree of order m = 5 for the keys {K, O,S,V,M,F,B,G,T,U,W} (5) ii) Delete the keys K and G in order. (5) iii) Justify the number of splits needed for inserts / delete with proper reasons. (5)	BTL 5	Evaluating
4.	**Construct** AVL tree for the followings after rotation. (5+5+5)	BTL 6	Creating

	i.  ii.  iii. 		
5.	How to insert and delete an element into a binary search tree and write down the code for the insertion routine with an example. (15)	BTL 5	Evaluating
UNIT IV - NON LINEAR DATA STRUCTURES - GRAPHS			
Definition – Representation of Graph – Types of graph - Breadth-first traversal - Depth-first traversal – Topological Sort – Bi-connectivity – Cut vertex – Euler circuits – Applications of graphs.			
PART - A			
1.	Define graph.	BTL 1	Remembering
2.	Consider the graph given below. Create the adjacency matrix of it 	BTL 6	Creating
3.	Find out the in-degree and out-degree of each node in the given graph 	BTL 3	Applying
4.	Create an undirected graph and its adjacency matrix for the following specification of a graph G. V(G)=1,2,3,4 E(G) ={ (1,2),(1,3),(3,3),3,4),(4,1)}	BTL 6	Creating
5.	Differentiate BFS and DFS.	BTL 2	Understanding
6.	What is meant by bi-connected graph?	BTL 1	Remembering
7.	Give the purpose of Dijikstra's algorithm.	BTL 2	Understanding
8.	Differentiate cyclic and acyclic graph	BTL 4	Analyzing
9.	Classify strongly connected and weakly connected graph.	BTL 3	Applying
10.	Illustrate an articulation point with example.	BTL 3	Applying
11.	What are the representations of the graph?	BTL 1	Remembering
12.	Define minimum spanning tree. Give an example	BTL 2	Understanding

13.	State the principle of Topological sorting.	BTL 1	Remembering
14.	Explain procedure for Depth first search algorithm.	BTL 4	Analyzing
15.	Analyze the different ways of representing a graph.	BTL 4	Analyzing
16.	Prove that the number of edges in a complete graph of n vertices in n(n-1)/2	BTL 5	Evaluating
17.	Assess the minimum number spanning tree possible for a complete graph with n vertices.	BTL 5	Evaluating
18.	What are Euler circuits?	BTL 1	Remembering
19.	Give two applications of graphs.	BTL 2	Understanding
20.	What is residual graph?	BTL 1	Remembering
21.	When is a graph said to be weakly connected?	BTL 2	Understanding
22.	Discover about bi-connectivity.	BTL4	Analyzing
23.	Identify what is in-degree of a graph.	BTL 3	Applying
24.	Assess out-degree of a graph.	BTL5	Evaluating
	PART-B		
1.	Describe in detail about the following representations of a graph. i) Adjacency Matrix (7) ii) Adjacency List (6)	BTL 1	Remembering
2.	i) Consider the given directed acyclic graph D. Sort the nodes D by applying topological sort on 'D'. (7)  ii.Consider the graph given below and show its adjacency list in the memory. (6)  	BTL 3	Applying
3.	Examine topological sorting of a graph G with suitable example.(13)	BTL 1	Remembering
4.	Differentiate depth-first search and breadth-first search traversal of a graph with suitable examples. (13)	BTL 4	Analyzing
5.	i) Explain with algorithm, How DFS be performed on a undirected graph. (7) ii) Show the algorithm for finding connected components of an undirected graph using DFS, and derive the time complexity of the	BTL 4	Analyzing

	algorithm. (6)		
6.	i) Discuss an algorithm for Breadth first Search on a graph. (7) ii) Give an example based on the algorithm. (6)	BTL 2	Understanding
7.	i) Illustrate Kruskal's algorithm to find the minimum spanning tree of a graph. (7) ii) Trace the algorithm for the following graph. (6)	BTL 3	Applying
8.	Compare any two applications of Graph with your own example.(13)	BTL 1	Remembering
9.	Describe an appropriate algorithm to find the shortest path from 'A' to every other node of A for the given graph. (13) 	BTL 1	Remembering
10.	Discuss the prim's algorithm for minimum spanning tree. Give an example. (13)	BTL 2	Understanding
11.	i) Write a program to find an Euler circuit in a graph. (7) ii) Trace the algorithm for the given graph. (6) 	BTL 5	Evaluating
12.	Develop an algorithm to compute the shortest path using Dijkstra's algorithm. Validate the algorithm with suitable example. (13)	BTL 6	Creating
13.	Explain the depth first approach of finding articulation points in a connected graph with necessary algorithm. (13)	BTL 4	Analyzing
14.	i) Write short notes on Bi-connectivity. (7) ii) Express different types of graphs with example. (6)	BTL 2	Understanding
15.	Explain the various applications of graphs. (13)	BTL2	Understanding
16.	Explain any algorithm for all pairs shortest path problem. (13)	BTL3	Applying
17.	i) Explain in detail about strongly connected components and illustrate with an example. (7) ii) Find an Euler path or Euler circuit using DFS for the following graph (6)	BTL5	Evaluating

			
	PART-C		
1.	Consider the graph G given below. The adjacency list of G is also given. Assume that G represents the daily flights between different cities and we want to fly from city A to I with minimum stops.One alternative is to use a breadth-first search of G starting at node A. (15)  **Adjacency lists** A: B, C, D B: E C: B, G D: C, G E: C, F F: C, H G: F, H, I H: E, I I: F	BTL 5	Evaluating
2.	i) Formulate the minimum spanning tree for the following graph. (8)  ii) For the following graph, In what order are the vertices visited using BFS and DFS starting from vertex A? Where a choice exists, use alphabetical order. (7) 	BTL 6	Creating
3.	Using Dijkstra's algorithm to find the shortest path from the source node A. (15) 	BTL 6	Creating
4.	i) Explain weakly connected graph and strongly connected graph with example. (7) ii) State the various graph traversal algorithm. Explain each in	BTL 5	Evaluating

	detail.(8)		
5.	Define graph. Explain various operations on graphs. (15)	BTL 5	Evaluating
UNIT V - SEARCHING, SORTING AND HASHING TECHNIQUES			
Searching- Linear Search - Binary Search. Sorting - Bubble sort - Selection sort - Insertion sort - Shell sort – Radix sort. Hashing- Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing.			
1.	What is hashing?	BTL1	Remembering
2.	Define extendible hashing and give its significance.	BTL1	Remembering
3.	What is meant by internal and external sorting? Give any two examples for each type.	BTL1	Remembering
4.	List the different types of searching	BTL1	Remembering
5.	Define rehashing.	BTL1	Remembering
6.	Identify the advantage of shell sort over insertion sort.	BTL1	Remembering
7.	How many passes does the of insertion sort algorithm do to sort a list of 5 elements? What happens in its i^{th} pass?	BTL2	Understanding
8.	Give the types of collision resolution.	BTL2	Understanding
9.	Interpret the fastest searching algorithm and give reason.	BTL2	Understanding
10.	Distinguish between linear and binary search technique.	BTL2	Understanding
11.	Classify the different sorting methods.	BTL3	Applying
12.	Apply insertion sort and sort the following elements 3,1,4,1,5,9,2,6,5	BTL3	Applying
13.	Which hashing technique is best and illustrate with an example?	BTL3	Applying
14.	Analyze why do we need a hash table as a data structure as compared to any other data structure?	BTL4	Analyzing
15.	Point out the advantages of using open addressing.	BTL4	Analyzing
16.	Compare the advantage and disadvantage of separate chaining and linear probing?	BTL4	Analyzing
17.	Select the best sorting method out of the following - insertion sort, quick sort and merge sort and give justification.	BTL5	Evaluating
18.	Summarize the open addressing hashing method with an example.	BTL5	Evaluating
19.	Develop an algorithm for a shell sort.	BTL6	Creating
20.	Prepare a simple C Program for a linear search.	BTL6	Creating
21.	How the insertion sort is done with the array?	BTL 2	Understanding
22.	Define searching	BTL4	Analyzing
23.	What do you mean by hash table?	BTL 3	Applying
24.	What do you mean by linear probing?	BTL5	Evaluating
PART-B			
1.	Describe about selection sort with suitable example. (13)	BTL1	Remembering

2.	Examine the algorithm for Insertion sort and sort the following array:39,9,45,6318,81,108,54,72,36. (13)	BTL1	Remembering
3.	List the different types of hashing techniques? Explain them in detail with an example. (13)	BTL1	Remembering
4.	Show the result of inserting the keys 2, 3, 5, 7, 11, 13, 15, 6, 4 into an initially empty extendible hashing data structure with M = 3. (13)	BTL1	Remembering
5.	Write a C program to search a number with the given set of numbers using binary search. (13)	BTL2	Understanding
6.	Interpret an algorithm to sort a set of 'N' numbers using bubble sort and demonstrate the sorting steps for the following set of numbers: 30, 52, 29, 87, 63, 27, 19, 54. (13)	BTL2	Understanding
7.	Discuss the various open addressing techniques in hashing with an example. (13)	BTL2	Understanding
8.	(i) Sort the given integers and Show the intermediate results using shellsort:39,9,81,45,90,27,72,18. (7) (ii) Write an algorithm to sort an integer array using shell sort. (6)	BTL3	Applying
9.	Illustrate with example the open addressing and chaining methods of collision resolution techniques in hashing. (13)	BTL3	Applying
10.	Compare working of binary search and linear search technique with example. (13)	BTL4	Analyzing
11.	Analyze extendible hashing in brief. (13)	BTL4	Analyzing
12.	Explain in detail about separate chaining. (13)	BTL4	Analyzing
13.	Formulate the rehashing technique with suitable example. (13)	BTL5	Evaluating
14.	Prepare an algorithm to sort the elements using radix sort with example. (13)	BTL6	Creating
15.	Distinguish between linear search and binary search. State and explain the algorithms for both the search with example. (13)	BTL2	Understanding
16.	State and explain the shell sort with an example. (13)	BTL3	Applying
17.	Evaluate the working of radix sort with an example. (13)	BTL5	Evaluating
	PART-C		
1.	Mention the different Sorting methods and Explain about any 2 method in detailed Manner. (15)	BTL5	Evaluating
2.	Sort the sequence 96, 31, 27,42,76,61,10,4 using shell sort and radix sort and explain the algorithm for shell sort. (15)	BTL6	Creating
3.	Given input {4371, 1323, 6173, 4199, 4344, 9679, 1989} and a hash function h(x) =x mod 10. Prepare the resulting for the following: i) Open hash table. (3) ii) Open addressing hash table using linear probing. (4) iii) Open addressing hah table using quadratic probing. (4) iv) Open addressing hash table with second hash h2(x)=7- (x mod 7). (4)	BTL6	Creating
4.	i) Write and explain non-recursive algorithm for binary search. (8) ii) Using binary search, search the number 26 from the list of numbers and give the steps. 10,7,17,26,32,92 (7)	BTL5	Evaluating
5.	Explain rehashing and extendible hashing with an example. (15)	BTL5	Evaluating

Staff In-charges **Verified by** **HOD**