QUESTION BANK

Unit-1

1. Explain following terms.
   i. Static data structure
   ii. Dynamic data structure
   iii. Data
   iv. Field
   v. Record
2. Explain the classification of data structure in detail.
3. Define Time complexity with example.
4. Explain best, average, worst case analysis.
5. Compare static memory allocation with dynamic memory allocation.
6. Explain primitive and non primitive data types.
7. Explain difference between linear and non linear data structure with example.

Chapter-2
Array

8. What is array? Why it is referred as a sequential representation?
9. Explain sparse matrix.
10. Explain basic operations on array.
11. Evaluate polynomial 10x7+5x6+3x3-10.where x=2.Also write an algorithm.
12. Application of array.

Chapter-3
Stack

13. What is stack? Define it.
14. List different operations perform on stack.
15. Write an algorithm to perform push operation on stack.
16. Write an algorithm to perform pop operation on stack.
17. Write an algorithm to perform peep operation on stack.
18. Write an algorithm to perform update operation on stack.
19. Write different application of stack
20. Write an algorithm to convert infix expression to postfix with example.
21. Write an algorithm to convert infix expression to prefix with example.
22. Write an algorithm to convert postfix expression to prefix with example.
23. Write an algorithm to convert postfix expression to infix with example.
24. Write an algorithm to convert prefix expression to postfi x with example.
25. Write an algorithm to convert prefix expression to infix with example.

26. Evaluate following prefix expression.
    + * AB – C + C * BA (A=4, B=8, C=12)
27. Convert following expression into postfix & prefix.
    - a – b / c * d + e * f / g
    - (a + b * c / d – e + f / g / (h+i))
    - (a + b) * c + d / (b + a * c) + d
28. Convert following expression into polish notation.
    - (a + b ^ c ^ d) * (e + f / g)
    - a – b / (c * d ^ e)
29. Convert in reverse polish notation & evaluate it.
    - A + B – C * D / E + F $ G / (I + J)
    - A=1, B=2, C=3, D=4, E=6, F=6, G=1, I=3, J=3
30. Evaluate followingexpression.
    - 546 + * 493 / + +
    - 752 + *411 + / -
31. Convert following expression into infix and evaluate it.
    12 7 3 - / 2 1 5 + * +

32. What is recursion? Explain with example.
33. Comparison between iteration & Recursion.
34. Show the stack contents for 3 plates for tower of hanoi problem.

Chapter-4
Queue

35. Consider the following queue, where queue is a circular queue having 6 memory cells. Front=2, Rear=4
    Queue: __, A, C, D, __, __

Describe queue as following operation take place:
    F is added to the queue.
    Two letters are deleted.
    R is added to the queue.
    S is added to the queue.
    One letter is deleted.

36. What is Queue?
37. List out operation perform on queue.
38. List different types of queue.
39. Write an algorithm to insert and delete data on linear queue with example.
40. Write an algorithm to insert and delete data on circular queue with example.
41. Write an algorithm to insert and delete data on double ended queue with example.
42. What are the disadvantages of a linear queue.

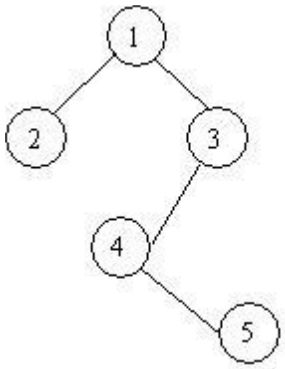
43. Write an application of queue.
44. Different between LIFO and FIFO.

Chapter-5
Link List

45. Limitation of static memory allocation.
46. Explain concept of link list.
47. Advantages and disadvantages of link list.
48. Explain Types of link list.
49. Write an algorithm to insert a node at beginning in singly link list with example.
50. Write an algorithm to insert a node at end in singly link list with example.
51. Write an algorithm to insert a node at specific location in singly link listwith example.
52. Write an algorithm to delete a node at beginning in singly link listwith example.
53. Write an algorithm to delete a node at end in singly link listwith example.
54. Write an algorithm to delete a node at specific location in singly link listwith example.
55. Write an algorithm to insert a node at beginning in doubly link listwith example.
56. Write an algorithm to insert a node at end in doubly link listwith example.
57. Write an algorithm to insert a node at specific location in doubly link listwith example.
58. Write an algorithm to delete a node at beginning in doubly link listwith example.
59. Write an algorithm to delete a node at end in doubly link listwith example.
60. Write an algorithm to delete a node at specific location in doubly link listwith example.
61. Write an algorithm to copy linklistwith example.
62. Write an algorithm to implement stack as link listwith example.
63. Write an algorithm to implement queue as link listwith example.
64. Application of link list.

Chapter-6 Tree

1 Give definition of a) Complete binary tree b) Height of tree
2 What is 2-3 tree?
3 Write a short note on threaded binary tree
4 Create a binary search tree for the following data :
50 ,25 ,75, 22,40,60,80,90,15,30
5 Give traversal order of following tree into inorder, preorder and postorder.



6 Define following terms related to tree with example
(1) Binary tree
(2) Binary search tree
(3) Strictly binary tree
(4) Complete binary tree
7 Construct a tree for the given inorder and postorder traversals
Inorder DGBAHEICF
Postorder GDBHIEFCA
8 Why is Threaded binary tree required? Draw a right in threaded binary treefor the given tree.
9 Construct binary search tree for the following data
10,3,15,22,6,45,65,23,78,34,5
Find its inorder, preorder and postordertravesal
10 Define height of the binary tree. Define height balanced tree with itsadvantages. Construct a height balanced binary tree (AVL tree) for thefollowing data
42,06,54,62,88,50,22,32,12,33
11 Define the following:
1. Complete Binary Tree
2. Almost Complete Binary Tree

	Write an algorithm to delete a node from a binary tree
12	Write a program in any language to create a threaded binary tree
13	Define an AVL tree. Obtain an AVL tree by inserting one integer at atime in the following sequence. 150, 155, 160, 115, 110, 140, 120, 145, 130, 147, 170, 180. Show all the steps.
14	Define the following terms:Path, Cycle, Degree of vertex, Sibling
15	Define tree. Write an algorithm to do in-order traversal and post-order traversals of Binary Search Tree.
16	Create a Binary Search Tree for the following data and do Inorder, Preorder and Postorder traversal of the tree. 40, 65,25, 55, 10,70,30,50,15,80,75
17	Write a non-recursive algorithm for Preorder traversal of a binary tree
18	First insert 10 and then insert 24. After these insertions, delete 37 andthen delete 22 from the following binary search tree. Draw the tree aftereach operation.
19	Explain insertion operation in the 2-3 tree: (i) if the parent has 2 childrenand (ii) if the parent has 3 children.
20	Insert 1, 29, 32 and 13 in the following Height balanced tree. For eachinsertion, draw the balanced tree using AVL rotation
21	What is use of binary search tree? Construct sequential order binary tree (binary search tree) for following values.10,15,17,8,7,9,11,12,13,4,14,5
22	Trace procedure to convert following forest into binary tree
23	Explain the Preorder, Inorder and Postorder traversal techniques of thebinary tree with suitable example
24	Construct the AVL search tree by inserting the following elements inthe order of their occurrence.64, 1, 44, 26, 13, 110, 98, 85
25	Discuss following with reference to trees. (i) Height of the tree (ii) Binary tree (iii)Strictly binary tree(iv) Sibling
26	What are the advantages of Multiway search tree in disc access?Construct B tree of order 5 for the following data 1,7,6,2,11,5,10,13,12,20,16,24,3,4,18,19,14,25
27	Briefly explain advantages of binary search tree. Construct binary search treefor the following elements8,3,11,5,9,12,13,4,6,20
28	The inorder and preorder traversal of a binary tree are d b e a f c g a b d e c f g respectively

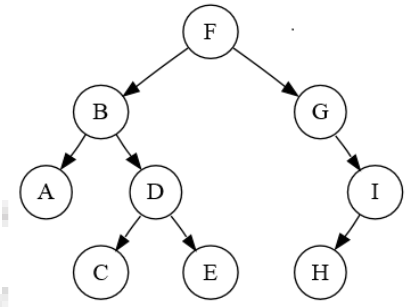
Construct binary tree and find its postorder traversal.

29 Answer the following
1. The height of a binary tree is the maximum number of edges in any root to leaf path. Define the maximum number of nodes in a binary tree of height h.
2. Consider a B-tree in which the maximum number of keys in a node is 5 What is the minimum number of keys in any non-root node?
3. Define threaded binary tree. What are the advantages of threaded binary tree? Give example of threaded binary tree.

30 Define AVL tree. Construct AVL tree for following data
10,20,30,40,50,60,70,80

31 What are the advantages of Multi way search tree over binary search tree?
Construct 2-3 tree for the following data
12, 50, 85, 6, 10, 37, 100, 120, 25, 70

32 Give the preorder and Inorder traversal of the tree given in



33 Given the following traversals create a binary tree from that. Also give the postorder traversal for the same.
preorder = {7,10,4,3,1,2,8,11}
inorder = {4,10,3,1,7,11,8,2

34 Construct a binary search tree for the following sequence. Also do the inorder and postorder traversal for the same
45,56,39,12,34,78,54,67,10,32,89,81

35 Explain AVL tree with the help of an example also show insertion and deletion with the help of an example

36 Write short note on Applications of Trees

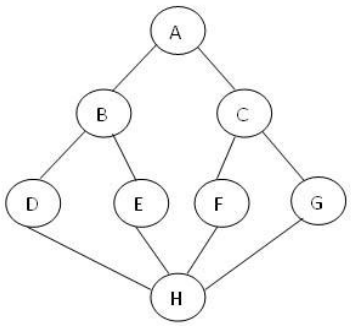
37 Create a Binary Search Tree for the following data and do in-order, Preorder and Post-order traversal of the tree.
50, 60, 25, 40, 30, 70, 35, 10, 55, 65, 5

38 What is Binary Search Tree? Write recursive algorithm/program to

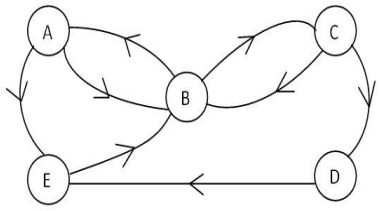
implement in-order and pre-order traversal of the Binary Search Tree

Chapter-7 Graph

1 What is sparse matrix? Explain
2 What is the meaning of height balanced tree? How rebalancing is done inheight balanced tree.
3 What is graph? How it can be represented using adjacency matrix, what is pathmatrix? How path matrix can be found out using adjacency matrix .
4 Explain BFS and DFS with example
5 Write warshall algorithm for graph
6 Consider the graph shown in **.**Find depth-first and breadth first traversals of this graph starting at A
7 Define spanning tree and minimum spanning tree. Find the minimumspanning tree of the graph shown
8 Give example and applications of directed and undirected graphs. Find theadjacency matrix for the graph shown in fig 4
9 Apply Dijkstra's algorithm to find shortest path between vertex A and vertex F5 for the graph shown in **Fig 5.**
10 Compare the efficiencies of BFS and DFS
11 Give the DFS and BFS spanning tree for the graph given below



12 Answer the following for the below given Graph



1. What is the outdegree of node B.
2. Write down a path from node D to node A.
3. Is the above graph a multigraph? Give a reason for your answer.
4. What is the total degree of node A.

13 Define Graph. Write an algorithm to do BFS traversal of a Graph

14 Explain matrix and linked list representation of a Graph. Also compare BFS and DFS methods of Graph Traversal.

15 Write a short note on Weight balanced tree

16 Obtain the adjacency matrix A for the following graph. Find A2. Find outdegree of E and D nodes.

17 What is sparse matrix? Explain memory representation of sparse matrix

18 Write a short on Breadth First Search and Depth First Search in graph.

19 Explain terms: (1) Path (2) Graph (3) Cycle

20 Define : (i) Tree and binary tree (ii) intermediate node and leaf node (iii) Sibling node and adjacent node (iv) path matrix

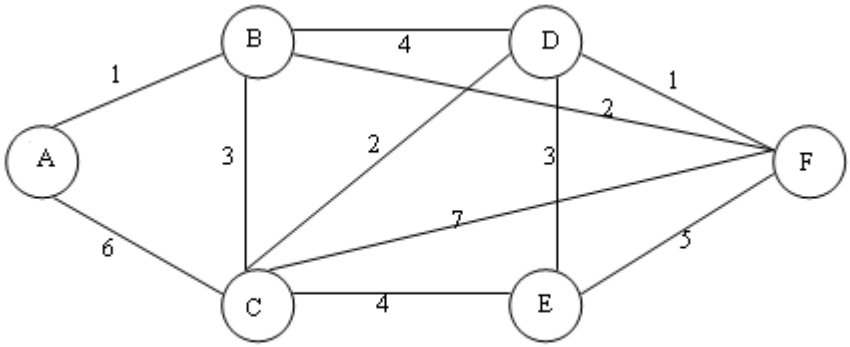
21 Which are the basic traversing techniques of the Graph? Write thealgorithm of any one of them.

22 Discuss following with reference to graphs.
(i) Directed graph (ii) Undirected graph (iii) Degree of vertex (iv)Null graph

23 Explain matrix and linked list representation of a graph

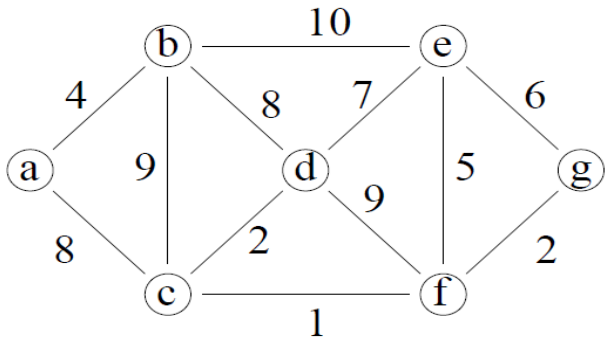
24 Define sparse matrix. Briefly explain representation of sparse matrix with thehelp of link list and array.

25 Define Directed graph, spanning tree and minimum spanning tree. Findminimum spanning tree for the graph shown in Figure 1.



26 The Breadth First Search algorithm has been implemented using the queuedata structure. Find breadth first search for the graph shown in Figure 2 withstarting node M

27 What is a spanning tree? Find the minimum spanning tree for the graph shown in



28 Define the following terms
i) Node
ii) Sibling
iii) Path
iv) Indegree&outdegree of a vertex
v) Connected graph

29 Compare and contrast Prim's and Kruskal's algorithm with the help of an example

30 Define the terms with respect to graph: In-degree, Path,Cycle.

31 Compare BFS and DFS traversal methods for Graph

32 How graph can be represented? Write an algorithm for Breadth First SearchTraversal of a Graph

Chapter-8

1) What is hashing?
2) Explain the different hash functions.
3) What is collision? What are collision resolution techniques?
4) Application of hashing.
5) What is file, record, fields?
6) Explain different file functions.
7) What are various types of files

Chapter-9

1) Explain operations on file

2) Explain types of file
3) Explain indexes sequential file.
4) Explain file access method.
5) Explain cellular partitions.

Chapter-10

1) Explain binary search technique with example.
2) Explain bubble sort, insertion sort, selection sort, quick sort, merge sort with example.