VR17 Reg. No: | | | | | | | | | | |

VELAGAPUDI RAMAKRISHNA

SIDDHARTHA ENGINEERING COLLEGE

(AUTONOMOUS)

II/IV B.Tech. DEGREE EXAMINATION, NOVEMBER, 2018

Third Semester

INFORMATION TECHNOLOGY

17IT3303 DATA STRUCTURES

Time: 3 hours ***Max. Marks: 70***

Part-A is compulsory

Answer One Question from each Unit of Part - B

Answer to any single question or its part shall be written at one place only

PART-A

10 x 1 = 10M

1. a. Define space complexity.
   b. What is data abstraction?
   c. Define algorithm.
   d. Write the ADT for queue.
   e. Define circular queue.
   f. Define binary search tree.
   g. What do you mean by balance factor in AVL tree?
   h. What is worst case time complexity of heap sort?
   i. List the properties of a good hash function.
   j. Define left skewed tree and give an example.

PART-B

4 x 15 = 60M

UNIT-I

2. a. Write the binary search implementation in C language and also mention the time complexity of it. **8M**

   b. Write the algorithm for infix to postfix conversion. **7M**

(or)

3. a. Write the ADT for stack and write a C program to implement stack operations. **8M**

   b. Discuss about time complexity. **7M**

UNIT-II

4. a. Write a C program to implement doubly linked list with creation and deletion operations. **8M**

   b. Define queue. Discuss various types of queues and the operations that can be performed. **7M**

(or)

5. a. Define linked list. Discuss various types of linked list. **7M**

   b. Write a C program to add two polynomials using linked list. **8M**

UNIT-III

6. a. Write the recursive binary tree traversal algorithms. **9M**

   b. Discuss various ways of representation of trees. **6M**

(or)

7. a. Write an algorithm for creation and search operations of binary search tree. **7M**

   b. Construct an AVL tree for the list : 1, 7, 2, 9, 4, 6, 3, 10, 5, 11, 13, 17, 12. **8M**

UNIT-IV

8. Write the heap sort algorithm to sort a set of integers. **15M**

(or)

9. a. Explain the need of extendible hashing. **6M**

   b. Explain separate chaining collision resolution technique with an example. **9M**

* * *

VR17 Reg. No: | | | | | | | | | | |

VELAGAPUDI RAMAKRISHNA

SIDDHARTHA ENGINEERING COLLEGE

(AUTONOMOUS)

II/IV B.Tech. DEGREE EXAMINATION, NOVEMBER, 2019

Third Semester

INFORMATION TECHNOLOGY

17IT3303 DATA STRUCTURES

Time: 3hours ***Max. Marks: 70***

Part-A is compulsory

Answer One Question from each Unit of Part-B

Answer to any single question or its part shall be written at one place only

PART-A

10 x 1 = 10M

1. a. Define space complexity.
   b. Illustrate dynamic array.
   c. What is stack ADT?
   d. List the different types of queues.
   e. Write a linked list to store the first 10 prime number.
   f. Is it advantageous to save the address of last node as well in a single linked list? Comment.
   g. Define balance factor in AVL tree.
   h. What are the various tree traversal techniques?
   i. What is the best sorting method if the elements are already sorted?
   j. List any two properties of graphs.

PART-B

4 x 15 = 60M

UNIT-I

2. a. Illustrate the conversion of the following infix expression into postfix as an application of stack: !(A&&!((B<C)||(C>D))). **9M**

   b. Give an overview of system life cycle. **6M**

(or)

3. a. Describe how to perform recursive linear search and comment on the best, average and worst case time complexity and space complexity? **10M**

   b. Justify the need for data abstraction. **5M**

UNIT-II

4. a. Write an algorithm to any three possible insertions in a double linked list. **9M**

   b. What functions of linked list can be used to implement push and pop operations of stack? Explain with a suitable diagram. **6M**

(or)

5. a. What are the advantages of circular linked list over single and double linked list. **6M**

   b. Define queue ADT and write an algorithm to implement basic queue perations. **9M**

UNIT-III

6. a. Construct the binary tree. Inorder and preorder of the binary tree are as follows:
   i) 20, 44, 46, 48, 49, 59, 64, 69, 81, 97
   ii) 59, 44, 20, 49, 46, 48, 81, 69, 64, 97 **9M**

   b. How is insertion done in a B tree? **6M**

(or)

7. a. Demonstrate single rotations and double rotations in AVL trees. **10M**

   b. Compare the performance of searching in a height balanced binary search tree and binary search tree. **5M**

UNIT-IV

8. a. Illustrate deletion of any two elements in a max heap with atleast 10 elements. **9M**

   b. Compare the performance of the following sorting methods:
   i) Quick ii) Merge iii) Heap **6M**

(or)

9. a. Draw a graph of 10 nodes. Represent the graph using adjacency matrix and adjacency list. **8M**

   b. What is Hashing? Explain with an example. **7M**

* * *

VR17 Reg. No: | | | | | | | | | | |

VELAGAPUDI RAMAKRISHNA

SIDDHARTHA ENGINEERING COLLEGE

(AUTONOMOUS)

II/IV B.Tech. DEGREE EXAMINATION, APRIL, 2019

Third Semester

INFORMATION TECHNOLOGY

17IT3303 DATA STRUCTURES

Time: 3 hours ***Max. Marks: 70***

Part-A is compulsory

Answer One Question from each Unit of Part - B

Answer to any single question or its part shall be written at one place only

PART-A

10 x 1 = 10M

1. a. What is data abstraction?

   b. Write any 4 applications of stacks.

   c. Write the postfix expression for the given infix expression: (a+b)*c/d.

   d. Write the structure for double linked list and draw the node.

   e. What is the height of binary search tree?

   f. List the properties of m-way trees.

   g. Define max and min heap.

   h. What is a priority queue?

   i. List the graph representations.

   j. What is collision?

PART-B

4 x 15 = 60M

UNIT-I

2. Evaluate the following expression and convert into postfix expression
A/B*C+D*E –A*C (Assume A = 2, B = 3,C = 4,D = 5) **15M**

(or)

3. a. Discuss Big-O Notation. **5M**

b. Compare linear and binary search algorithms with an example. **10M**

UNIT-II

4. a. Write a C program to implement circular linked list. **10M**

b. Enlist the advantages of double linked lists over single linked list. **5M**

(or)

5. a. Explain how can be polynomial addition done with the help of a linked list? **8M**

b. List and explain applications of queue. **7M**

UNIT-III

6. Find out the inorder, preorder and postorder traversal for a binary tree representing the expression (a+b*c)/(d-e) with the help of functions. **15M**

(or)

7. a. List the properties of B-tree. **5M**

b. Construct the B-tree of order 3 for the following list of elements
1, 7, 2, 9, 4, 6, 3, 10, 5, 11, 13, 17, 12 **10M**

UNIT-IV

8. Write the merge sort algorithm and sort the following list of elements :
14, 17, 24, 26,39, 16, 45, 11, 55, 18, 43, 88 **15M**

(or)

9. Given the values {2341, 4234, 2839, 430, 22, 397, 3920}, a hash table of size 7 and hash function h(x) = x mod 7. Show the resulting tables after inserting the values in the given order with each of these collision strategies. **15M**

* * *

b. Discuss about max heap and min heap, with an example. **9M**

(or)

9. a. What is hashing? Enlist the desirable properties of a hash function. **6M**

b. Sort the given elements in descending order using Merge Sort: Mar, May, Nov, Aug, Apr, Jan, Dec, Jul, Feb, Jun, Oct, Sep **9M**

* * *

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

VELAGAPUDI RAMAKRISHNA

SIDDHARTHA ENGINEERING COLLEGE

(AUTONOMOUS)

II/IV B.Tech. DEGREE EXAMINATION, OCTOBER, 2020

Third Semester

INFORMATION TECHNOLOGY

17IT3303 DATA STRUCTURES

Time: 3hours ***Max. Marks: 70***

Part-A is compulsory

Answer One Question from each Unit of Part-B

Answer to any single question or its part shall be written at one place only

PART-A

10 x 1 = 10M

1. a. Define time complexity.
   b. List any four applications of stack.
   c. Specify Queue ADT.
   d. Mention the conditions to check whether a circular queue is full.
   e. Design a linked list to hold the details of engineering students of various branches.
   f. State the need to hold the address of first node in a Single Linked List.
   g. Enumerate any two properties of binary trees.
   h. Draw an m-way search tree of atleast three levels.
   i. What is a graph? List any applications of graphs.
   j. What is a Priority Queue?

PART-B

4 x 15 = 60M

UNIT-I

2. a. Write an algorithm to evaluate postfix expression and analyse the time complexity. **9M**

   b. Define stack ADT and implement the basic stack operations. **6M**

(or)

3. a. Compare the best, average and worst case performance of Linear Search and Binary Search. **8M**

   b. Justify the need for data abstraction. **7M**

UNIT-II

4. a. Write an algorithm to delete n^{th} node in a Single Linked List. Handle the below cases: **9M**

   i) List is empty

   ii) List is having less than 'n-2' nodes

   iii) List has more than 'n' nodes

   b. What is a circular Queue? Differentiate between queues and circular queues. **6M**

(or)

5. a. Analyse the performance of a linked stack and a stack implemented using array. **6M**

   b. Write an algorithm to implement any three possible deletions in a double linked list. **9M**

UNIT-III

6. a. Write a short note about B trees. **6M**

   b. Illustrate the following on a binary search tree: **9M**

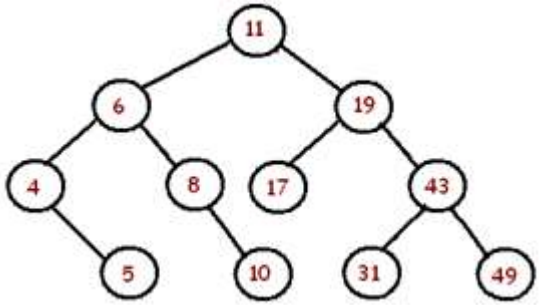
   i) deleting a leaf node

   ii) deleting a node with both children

   iii) deleting a node with only left child

(or)

7. a. Perform inorder, preorder and postorder traversals of the below given binary tree: **9M**



   b. Write about AVL trees. **6M**

UNIT-IV

8. a. Explain any two collision handling methods in hashing. **6M**

VR14 **Reg. No:** | | | | | | | | | | |

VELAGAPUDI RAMAKRISHNA

SIDDHARTHA ENGINEERING COLLEGE

(AUTONOMOUS)

II/IV B.Tech. DEGREE EXAMINATION, OCTOBER, 2019

Third Semester

INFORMATION TECHNOLOGY

14IT3303 DATA STRUCTURES

Time: 3 hours ***Max. Marks: 70***

Part-A is compulsory

Answer One Question from each Unit of Part - B

Answer to any single question or its part shall be written at one place only

PART-A

10 x 1 = 10M

1. a. Define Data abstraction.
   b. List linear and nonlinear data structures.
   c. List the applications of queue.
   d. State the properties of a Binary Tree.
   e. Differentiate Max-heap and Min-heap.
   f. Representation of graph with examples.
   g. Define Hashing.
   h. Define binary search tree with example.
   i. Write the properties of B-Trees.
   j. List types of graphs.

PART-B

4 x 15 = 60M

UNIT-I

2. a. Explain Performance Analysis in detail. **7M**

   b. Write an algorithm for evaluation of postfix expression. **8M**

(or)

3. a. Write an algorithm for insertion operation of singly linked list. **8M**

   b. List the advantages and disadvantages of doubly linked list over singly linked list. **7M**

UNIT-II

4. a. Explain how to create circular linked list and insert nodes at end? **8M**

   b. Write an algorithm to add two polynomials. **7M**

(or)

5. a. Discuss representation of binary tree. **8M**

   b. Explain tree traversals with example. **7M**

UNIT-III

6. a. Explain with an example how to insert an element into max heap? **8M**

   b. Describe the insertion, searching operations on B-Trees. **7M**

(or)

7. a. Explain with an example how to delete an element from max heap? **8M**

   b. Explain any two hash functions with examples. **7M**

UNIT-IV

8. a. State and explain insertion sort with an example. **8M**

   b. Compare different sorting techniques. **7M**

(or)

9. a. State and explain selection sort with an example. **8M**

   b. Explain BFS graphs traversal algorithm with suitable example **7M**

* * *

VR14 Reg. No: | | | | | | | | | | |

VELAGAPUDI RAMAKRISHNA

SIDDHARTHA ENGINEERING COLLEGE

(AUTONOMOUS)

II/IV B.Tech. DEGREE EXAMINATION, NOVEMBER, 2017

Third Semester

INFORMATION TECHNOLOGY

14IT3303 DATA STRUCTURES

Time: 3 hours ***Max. Marks: 70***

Part-A is compulsory

Answer One Question from each Unit of Part - B

Answer to any single question or its part shall be written at one place only

PART-A

10 x 1 = 10M

1. a. List out any two applications of linked lists.
   b. What is Big-O notation?
   c. What are the types of dequeues?
   d. Define tree.
   e. What is binary heap?
   f. What are the applications of queues?
   g. List the binary tree traversals.
   h. What is rehasing?
   i. Define B tree.
   j. What are the various stack operations?

PART-B

4 x 15 = 60M

UNIT-I

2. a. Discuss about stacks using dynamic arrays. **7M**

   b. Write a C program that creates a sorted linked list and elimnate the duplicate nodes from it. **8M**

(or)

3. a. Write a program to merge two linked list into third. **8M**

   b. Convert the given infix expression to postfix expression using stack (a + b * c ^ d) * (e + f / g). **7M**

UNIT–II

4. a. Write a linked list program to implement the addition of two polynomials. **8M**

   b. Discuss about properties of Binary trees. **7M**

(or)

5. a. Explain inserting an element into a Binary search tree with example. **8M**

   b. For the given inorder and postorder traversals, construct a binary tree

   Postorder: H D E B F G C A

   Inorder : H D B E A F C G. **7M**

UNIT-III

6. a. What is a Heap? Give examples of Max and Min Heap and write their applications. **7M**

   b. Write an algorithm for an AVL tree considering all the cases. **8M**

(or)

7. a. Show the result of inserting 2, 1, 4, 5, 9, 3, 6, 7 into an empty AVL tree. **7M**

   b. Constuct a B-Tree of order 5 for the following data.54, 4, 44, 3, 6, 7, 8, 12, 33, 56, 87, 52, 53, 9, 17, 28, 26, 16. **8M**

UNIT-IV

8. a. Explain shell short procedure to sort the following elements 75, 25, 11, 18, 95, 85, 72, 66, 55, 42 **8M**

   b. Write the algorithm for Merge sort. **7M**

(or)

9. a. Explain various types of hasing techniques. **8M**

   b. How do you represent graphs in computer applications? Explain with suitable examples. **7M**

* * *

VR14 Reg. No: | | | | | | | | | | |

VELAGAPUDI RAMAKRISHNA

SIDDHARTHA ENGINEERING COLLEGE

(AUTONOMOUS)

II/IV B.Tech. DEGREE EXAMINATION, MARCH/APRIL, 2019

Third Semester

INFORMATION TECHNOLOGY

14IT3303 DATA STRUCTURES

Time: 3 hours ***Max. Marks: 70***

Part-A is compulsory

Answer One Question from each Unit of Part - B

Answer to any single question or its part shall be written at one place only

PART-A

10 x 1 = 10M

1. a. Define algorithm.
   b. What is space complexity?
   c. What are the applications of stack?
   d. What is insertion sort?
   e. Write the structure of a double linked list.
   f. Define Recursion.
   g. What is the time complexity of quick sort?
   h. What is open addressing?
   i. Convert the following infix expression to postfix expression (a+b*c-d)
   j. What are the merits of linked list?

PART-B

4 x 15 = 60M

UNIT-I

2. a. What is stack? What are the operations performed on Stack ADT? **7M**

   b. Write a C program to insert and delete elements from the queue. **8M**

(or)

3. a. Develop an algorithm to convert infix expression to postfix expression. Explain with an example. **9M**

   b. Write short notes on Algorithm Specifications. **6M**

UNIIT-II

4. a. Explain in detail about double linked list. **7M**

   b. What are the different representations of binary tree? **8M**

(or)

5. a. How do we use linked list to perform polynomial addition? **7M**

   b. What are Binary Search Trees? How an element is inserted into a BST? **8M**

UNIT-III

6. a. What are multi-way search trees and explain its significance? **7M**

   b. What are min heap and max heap? **8M**

(or)

7. a. Explain the different rotations of AVL trees. **8M**

   b. How do we delete an element from a Max Heap? **7M**

UNIT-IV

8. a. What is the significance of graph? Explain. **7M**

   b. Illustrate Breadth First Search algorithm with an example. **8M**

(or)

9. a. Explain Merge Sort algorithm by demonstrating with example. **7M**

   b. What is Hashing? Explain hash function. **8M**

* * *

VR14

14IT3303

II/IV B.Tech. DEGREE EXAMINATION, NOVEMBER, 2015

Third Semester

INFORMATION TECHNOLOGY

DATA STRUCTURES

Time: 3hours ***Max. Marks: 70***

Part-A is compulsory

Answer One Question from each Unit of Part-B

PART-A

10 x 1 = 10M

1. a. Define an algorithm.
   b. Define space complexity.
   c. What is polynomial?
   d. Define Binary search tree.
   e. Define AVL Tree.
   f. Difference between tree and binary tree.
   g. What is Graph ADT?
   h. What are priority queues?
   i. Give an example for inorder traversal.
   j. What is hash function?

PART-B

4 x 15 = 60M

UNIT-I

2. a. Differentiate Stack and Queue. Also, discuss various applications of Queues. **7M**

   b. Write a procedure to evaluate infix expression into postfix expression. **8M**

(or)

3. a. Define single linked list and its representations with suitable example. **7M**

   b. Write an algorithm to create, insert and delete an element in Double Linked List. **8M**

UNIT-II

4. a. Write about Circular List representation of polynomials with an example. **8M**

   b. Write recursive algorithms to traverse a binary tree in inorder and postorder. **7M**

(or)

5. a. Write the properties of binary tree and its representations. **7M**

   b. Write a C program to insert and delete a particular node in a binary search tree. **8M**

UNIT-III

6. a. Explain the operations of AVL Tree with suitable example. **8M**

   b. Explain the procedure to insert a node into B-Tree with suitable example. **7M**

(or)

7. a. What is Max Heap? Discuss the procedure to insert an element into Max Heap with an example. **8M**

   b. Write short notes on m-way search tree. **7M**

UNIT-IV

8. a. Discuss about various graph representations. **7M**

   b. Write a procedure for Breadth First Search(BFT) along with an example. **8M**

(or)

9. a. Write a procedure for Heap sort with an example. **8M**

   b. Classify various Hashing Functions. Explain each of them briefly. **7M**

* * *

VR14 Reg. No: | | | | | | | | | | |

VELAGAPUDI RAMAKRISHNA

SIDDHARTHA ENGINEERING COLLEGE

(AUTONOMOUS)

II/IV B.Tech. DEGREE EXAMINATION, OCTOBER, 2018

Third Semester

INFORMATION TECHNOLOGY

14IT3303 DATA STRUCTURES

Time: 3hours ***Max. Marks: 70***

Part-A is compulsory

Answer One Question from each Unit of Part-B

Answer to any single question or its part shall be written at one place only

PART-A

10 x 1 = 10M

1. a. What is data abstraction?
   b. What is time complexity?
   c. List the applications of queue.
   d. What is binary search?
   e. What is circular linked list?
   f. What are the applications of graph?
   g. What is the time complexity of merge sort?
   h. What is separate chaining?
   i. Convert the given infix expression (a+b*c+d) to prefix expression
   j. Define B-tree.

PART-B

4 x 15 = 60M

UNIT-I

2. a. What are queues? What are the operations performed on queue ADT? **7M**

   b. Write a C program to perform insertion and deletion operations on stacks. **8M**

(or)

3. a. What is linked list? Explain different types of linked lists with neat diagrams. **7M**

   b. Write a C program to implement stack using linked list. **8M**

UNIT-II

4. a. How do you use linked list to represent a polynomial? **7M**

   b. What is tree? What are the properties of a binary tree? **8M**

(or)

5. a. Write a recurssive C program to perform inorder, preorder and postorder traversals of a binary tree using recursion. **7M**

   b. How do you perform deletion of a key value from a binary search tree? **8M**

UNIT-III

6. a. What are AVL trees? How AVL tree is better over binary search tree? **5M**

   b. What are priority queues? How are priority queues advantageous over normal queues? **5M**

   c. Write short notes on m-way search trees. **5M**

(or)

7. a. How do you perform insertion of an element into a B-tree? **7M**

   b. How do you insert an element into maxheap? **8M**

UNIT-IV

8. a. What are the different graph representations? **7M**

   b. Illustrate depth first search algorithm with an example. **8M**

(or)

9. a. Explain quick sort algorithm. **7M**

   b. Explain about rehashing and extendable hashing. **8M**

* * *

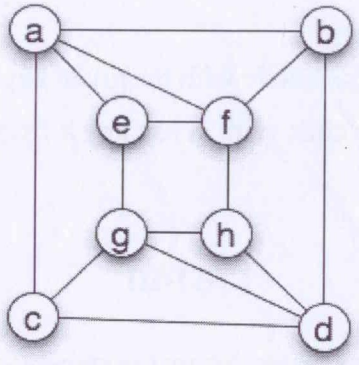


fig.(2)

b. Write and explain Quick sort algorithm. Sort the keys H, L, P, T, W, G, E, C, A in ascending order by applying quick sort. **9M**

(or)

9. a. Explain with merge sort algorithm. Sort the keys 18, 48, 27, 43, 3, 9, 82, 60, 28 in ascending order by applying merge sort. **7M**

b. What is a collision in hashing? Explain with an example two collision resolution techniques. **8M**

* * *

14IT3303

II/IV B.Tech. DEGREE EXAMINATION, APRIL, 2017

Third Semester

INFORMATION TECHNOLOGY

DATA STRUCTURES

Time: 3hours ***Max. Marks: 70***

Part-A is compulsory

Answer One Question from each Unit of Part-B

PART-A

10 x 1 = 10M

1. a. What is an algorithm?
   b. What is the advantage of singly linked list over double linked list?
   c. Differentiate stack and queue
   d. What is min heap?
   e. Write the difference between binary tree and binary search tree.
   f. What is the advantage of an AVL tree over binary search tree?
   g. What is a leaf node?
   h. Represent the following graph as shown in fig.(1) using adjacency matrix representation.

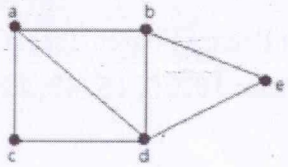


fig.(1)

   i. What is linear search?
   j. What is the need for hashing?

PART-B

4 x 15 = 60M

UNIT-I

2. a. Explain briefly about Stacks. Write functions for push (insert) and pop (remove) operations of stack. **7M**

   b. Let L be a singly linked list. Write algorithms for the following operations on L: **8M**

   i) Deleting a node at the end

   ii) Displaying the keys stored in all nodes

   iii) Inserting a node x with the given key k at a specified position i

(or)

3. a. Write pseudo code to convert the infix expression to postfix. **7M**

   b. Discuss about applications of Queues. **8M**

UNIT-II

4. a. How to represent a polynomial using a singly linked list? Write an algorithm to add two polynomials represented by linked lists. **7M**

   b. Write briefly about Binary Search Tree. Construct a BST for the sequence of elements: 10, 20, 15, 42, 12, 18, 16, 6, 4, 8 and 9. **8M**

(or)

5. a. Explain various representations of a Tree. **6M**

   b. Write algorithms for the following operations on a Binary Search Tree T:

   i) Searching for a node with the given key k in T

   ii) Deleting a node with given key k from T **9M**

UNIT-III

6. a. Define balance factor. Show the step-by-step construction of an AVL tree resulting from the insertion of the following sequence of keys: 100, 80, 50, 20, 30, 10, 90, 70, 40 and 60. **8M**

   b. Define max heap. Show the step-by-step construction of a max heap resulting from the insertion of the following sequence of keys: 6, 5, 3, 1, 8, 7, 2 and 4. **7M**

(or)

7. a. Write short notes on Multi-Way Search Trees. **7M**

   b. What is Priority Queue? Explain with a suitable example implementation of maximum priority queue using max heap. **8M**

UNIT-IV

8. a. Define connected graph. Apply BFS algorithm to the following graph shown in fig.(2) for traversing. **6M**

VR14

14IT3303

II/IV B.Tech. DEGREE EXAMINATION, MAY, 2016

Third Semester

INFORMATION TECHNOLOGY

DATA STRUCTURES

Time: 3hours *Max. Marks: 70*

Part-A is compulsory

Answer One Question from each Unit of Part-B

PART-A

10 x 1 = 10M

1. a. Define Data Abstraction.
   b. List the applications of Stack.
   c. Define a Binary Search Tree.
   d. Define a Max Heap.
   e. List the graph representations.
   f. Define Space Complexity.
   g. Difference between Binary Tree and Binary Search Tree.
   h. What is the basic difference between linear search and binary search?
   i. What is the order of preorder traversal?
   j. Compare and contrast Rehashing and Extendable Hashing.

PART-B

4 x 15 = 60M

UNIT-I

2. a. Explain briefly about the Towers of Hanoi Problem. **7M**

   b. Define Singly Linked List. Explain briefly about Single Linked List operations. **8M**

(or)

3. a. Write a C program to implement stacks using linked list. **8M**

   b. Write a procedure to convert an expression from infix to postfix. **7M**

UNIT-II

4. a. Explain briefly about the Insertion and Deletion operations of Double Linked list with examples. **9M**

   b. List the properties of Binary Tree and explain briefly about the representations of Binary Tree. **6M**

(or)

5. a. Explain about the Searching and Insertion operations of Binary Search Tree. **8M**

   b. Create a Binary Search Tree by inserting 56, 78, 76, 87, 90, 45, 34, 52, 12, 67. **7M**

UNIT-III

6. a. Define an AVL Tree. Explain briefly about the Rotations of an AVL Tree. **10M**

   b. Write a C program to insertion an element into Max Heap. **5M**

(or)

7. a. Define B Trees and describe briefly about the insertion and deletion operations of B Trees. **10M**

   b. Write short notes on M-way Search Trees. **5M**

UNIT-IV

8. a. Write a C Program to implement Depth First Search. **8M**

   b. Explain procedure to implement Quick Sort with an example. **7M**

(or)

9. a. Write a C program to implement a Binary search. **8M**

   b. Explain briefly about Extendable Hashing. **7M**

* * *