SHRI GNANAMBICA DEGREE COLLEGE, MADANAPALLE

(AUTONOMOUS)

PROGRAMME: BSC (COMPUTER SCIENCE)

II YEAR-III-SEM

COURSE: DATA STRUCTURES USING C

QUESTION BANK

Unit 1

Short Answer Questions:

1. What is algorithm? Explain its characteristics?
2. What is the algorithm analysis?
3. What is an array?
4. What is the difference between data types and data structures?
5. List any four types of data structures with one example each?
6. What is a pointer?

Long Answer Questions:

1. Define an algorithm. What are the essential characteristics of an algorithm?
2. What is a data structure? Differentiate between primitive and non-primitive data structures.
3. Differentiate between data types and data structures.
4. What is an arrays ? Write algorithms to perform the following operations on a one-dimensional array: (a) Traversal, (b) Insertion at a specific position.
5. What is an arrays ? Explain types of array with example

Unit 2

Short Answer Questions:

1. What is a linked list? How is it different from an array?
2. How is a linked list represented in memory?

3. What are the advantages of using linked lists over arrays?
4. What is a singly linked list?
5. How does a doubly linked list works?
6. What is a circular singly linked list?
7. What is a circular doubly linked list.

Long Answer Questions:

1. What is a linked list? Explain how it is represented in memory..
2. What is a linked list? Explain different types of linked list
3. What is a singly linked list? Explain inserting a node at the beginning of a singly linked list. With advantages and dis advantages
4. Explain a doubly linked list with example.
5. What is a circular singly linked list with example .

Unit 3

Short Answer Questions:

1. What is a stack? Mention its two basic operations.
2. How is a stack represented using an array and a linked list?
3. List the applications of stacks.
4. What is a queue?
5. List the operations performed on a queue.
6. How can a queue be implemented using a linked list?
7. What is a circular queue?

Long Answer Questions:

1. What is a stack? Describe the array and linked list representations of stacks with examples.
2. What is a stack explain PUSH and POP operations on a stack implemented using arrays. With example
3. What is the Tower of Hanoi problem? With example

4. What is a queue? Describe how queues are implemented using arrays and linked lists.
5. What is a circular queue? Explain how it resolves the limitation of a simple linear queue. Illustrate with array representation.
6. Discuss applications of queues and stacks, explaining how the working of them with example

Unit 4

Short Answer Questions:

1. What is the linear search and applications
2. Compare linear search and binary search based on efficiency and applicability.
3. Write the algorithm for binary search
4. What is the selection sort and applications?
5. How does bubble sort work?
6. Explain about Quick Sort.
7. What is the Merge Sort and advantages, disadvantages?

Long Answer Questions:

1. What is linear (sequential) search with example. Advantages and disadvantages
2. Explain binary search with example. Advantages and disadvantages?
3. Describe the selection sort ?. Explain how it works with an example and mention its drawbacks
4. What is bubble sort? Explain how it works with an example and mention its drawbacks.
5. Write the algorithm for insertion sort. Explain how it works with an example and mention its drawbacks
6. Explain the working of quick sort using the divide-and-conquer approach. Also, mention its time complexities for best, average, and worst cases.
7. Describe merge sort. Explain how it works with an example and mention its drawbacks

Unit 5

Short Answer Questions:

1. What is a binary tree?
2. List any two properties of binary trees.
3. How is a binary tree represented using arrays and linked structures?
4. Explain binary tree traversals
5. Define a graph. What is the difference between a directed and an undirected graph?
6. Define the following terms in context of graphs: vertex, edge, degree, path.

Long Answer Questions:

1. Define a binary tree. Explain the different types of binary trees, Application, Advantages Disadvantages.
2. What is a Binary Search Tree (BST)? Explain the basic operations (insertion, deletion, searching) on a BST and examples
3. Define a graph. Explain the key terms associated with graphs such as vertex, edge, adjacency, degree, and path.
4. Explain the sequential (adjacency matrix) and linked (adjacency list) representations of graphs. Compare their advantages and disadvantages.
5. Describe the Breadth-First Search (BFS) and Depth-First Search (DFS) traversal methods for graphs. Write algorithms for both and illustrate with examples.