

MODEL PAPER – 1
B.Sc Computer Science
Paper: Paper: Data Structures Using C
Time: 3 Hours | Max Marks: 80

SECTION – A (Short Answer Questions)

Answer any EIGHT questions ($8 \times 4 = 32$)

1. Define algorithm and its characteristics
 2. What is time and space complexity?
 3. Define asymptotic notations
 4. What is an array ADT?
 5. Define stack and its operations
 6. What is a queue?
 7. Define linked list
 8. What is hashing?
 9. Define binary tree
 10. What is AVL tree?
 11. Define graph and its types
 12. What is binary search?
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◆ SECTION – B (Essay Type Questions)

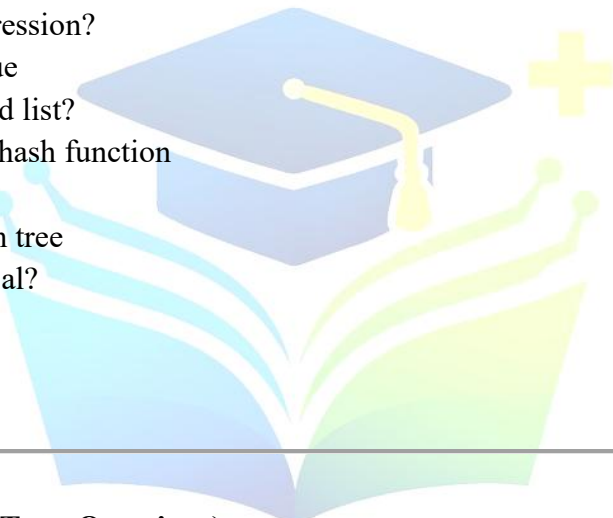
Answer ALL questions ($4 \times 12 = 48$)

13. (a) Explain algorithm analysis with time and space complexity and asymptotic notations
OR
(b) Explain arrays and write a program for sparse matrix representation
14. (a) Explain stack operations and write algorithm for postfix expression evaluation
OR
(b) Explain queue operations and circular queue with examples
15. (a) Explain binary trees and tree traversals with examples
OR
(b) Explain binary search tree operations (insertion, deletion, searching)
16. (a) Explain sorting techniques (merge sort, quick sort)
OR
(b) Explain graph traversals (DFS and BFS) with examples

MODEL PAPER – 2
B.Sc Computer Science
Paper: Paper: Data Structures Using C
Time: 3 Hours | Max Marks:80

◆ **SECTION – A (Short Answer Questions)**

Answer any EIGHT questions ($8 \times 4 = 32$)

1. Define time complexity with example
 2. What are asymptotic notations?
 3. Define stack and list its operations
 4. What is postfix expression?
 5. Define circular queue
 6. What is singly linked list?
 7. Define hashing and hash function
 8. What is binary tree?
 9. Define binary search tree
 10. What is DFS traversal?
 11. Define quick sort
 12. What is merge sort?
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◆ **SECTION – B (Essay Type Questions)**

Answer ALL questions ($4 \times 12 = 48$)

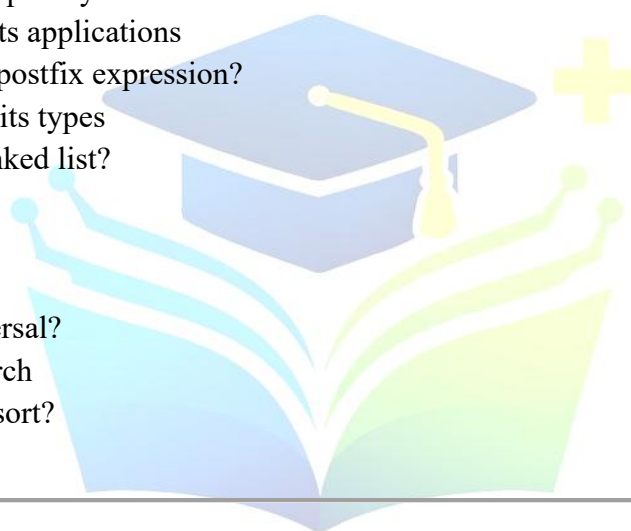
13. (a) Explain time and space complexity with asymptotic notations
OR
(b) Explain stack operations and write algorithm for infix to postfix conversion
14. (a) Explain circular queue with operations and example
OR
(b) Explain linked list operations (insertion and deletion)
15. (a) Explain binary tree traversals (inorder, preorder, postorder) with example
OR
(b) Explain binary search tree operations (insertion, deletion, searching)
16. (a) Explain DFS and BFS graph traversals with example
OR
(b) Explain quick sort and merge sort with example

MODEL PAPER – 3
B.Sc Computer Science
Paper: Paper: Data Structures Using C
Time: 3 Hours | Max Marks: 80

◆ **SECTION – A (Short Answer Questions)**

Answer any EIGHT questions ($8 \times 4 = 32$)

1. Define algorithm and its properties
2. What is space complexity?
3. Define stack and its applications
4. What is infix and postfix expression?
5. Define queue and its types
6. What is doubly linked list?
7. Define hash table
8. What is heap?
9. Define AVL tree
10. What is BFS traversal?
11. Define binary search
12. What is insertion sort?



◆ **SECTION – B (Essay Type Questions)**

Answer ALL questions ($4 \times 12 = 48$)

13. (a) Explain asymptotic notations and analyze time complexity of an algorithm
OR
(b) Explain arrays and sparse matrix representation
14. (a) Explain stack using arrays and write algorithm to evaluate postfix expression
OR
(b) Explain queues and circular queues with operations
15. (a) Explain binary trees and tree traversals with example
OR
(b) Explain AVL trees and explain insertion operation

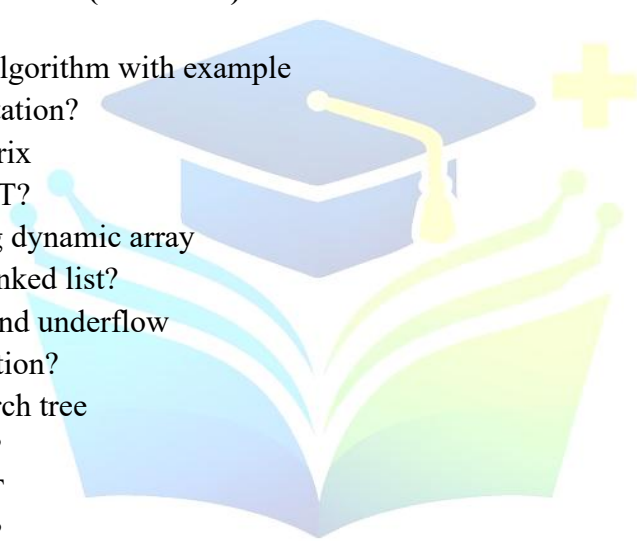
16. (a) Explain graph traversals (DFS and BFS) with example
OR
(b) Explain sorting techniques (heap sort and merge sort)

MODEL PAPER – 4
B.Sc Computer Science
Paper: Paper: Data Structures Using C
Time: 3 Hours | Max Marks:80

SECTION – A (Short Answer Questions)

Answer any EIGHT questions ($8 \times 4 = 32$)

1. Define recursive algorithm with example
2. What is Big-O notation?
3. Define sparse matrix
4. What is string ADT?
5. Define stack using dynamic array
6. What is circular linked list?
7. Define overflow and underflow
8. What is hash function?
9. Define binary search tree
10. What is heap sort?
11. Define graph ADT
12. What is shell sort?



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◆ **SECTION – B (Essay Type Questions)**

Answer ALL questions ($4 \times 12 = 48$)

13. (a) Explain recursive algorithms and analyze their complexity
OR
(b) Explain array ADT and representation of sparse matrix
14. (a) Explain stack using dynamic arrays and write algorithm to check well-formed parentheses
OR
(b) Explain linked lists (singly and circular) with operations
15. (a) Explain binary search tree and write algorithms for insertion and deletion
OR
(b) Explain heaps and heap sort with example

16. (a) Explain hashing techniques and collision handling methods

OR

(b) Explain searching and sorting (linear search, binary search, insertion sort)

MODEL PAPER – 5

B.Sc Computer Science

Paper: Paper: Data Structures Using C

Time: 3 Hours | Max Marks:80

SECTION – A (Short Answer Questions)

Answer any EIGHT questions ($8 \times 4 = 32$)

1. Define time complexity and Big-Theta notation
2. What is pattern matching?
3. Define stack ADT
4. What is infix to postfix conversion?
5. Define deque (double-ended queue)
6. What is doubly linked list?
7. Define collision in hashing
8. What is AVL tree rotation?
9. Define minimum spanning tree
10. What is Kruskal's algorithm?
11. Define linear search
12. What is merge sort?

◆ SECTION – B (Essay Type Questions)

Answer ALL questions ($4 \times 12 = 48$)

13. (a) Explain asymptotic notations (Big-O, Big-Theta, Big-Omega) with examples

OR

(b) Explain string ADT and pattern matching techniques

14. (a) Explain stack operations and write algorithm for reversing a string using stack

OR

(b) Explain queue, circular queue, and deque with operations

15. (a) Explain AVL trees and rotations with example

OR

(b) Explain graphs and minimum spanning trees (Prim's and Kruskal's algorithms)

16. (a) Explain searching techniques (linear and binary search) with examples

OR

(b) Explain sorting techniques (quick sort and shell sort)

UNIT WISE IMPORTANT QUESTIONS

UNIT – I (Algorithms, Arrays, Stacks)

- Define algorithm and explain its properties ★★★★★
- Explain time and space complexity ★★★★★
- Describe asymptotic notations ★★★★★
- Explain array ADT ★★★★★
- Sparse matrix representation ★★★★★
- Explain stack ADT and operations ★★★★★
- Postfix expression evaluation ★★★★★
- Infix to postfix conversion ★★★★★
- Parenthesis checking using stack ★★★★★
- Reverse a string using stack ★★★★★

UNIT – II (Queues, Linked Lists, Hashing)

- Define queue and operations ★★★★★
- Circular queue with diagram ★★★★★
- Applications of queue ★★★★★
- Singly linked list operations ★★★★★
- Doubly linked list ★★★★★
- Insertion and deletion in linked list ★★★★★
- Circular linked list ★★★★★
- Hashing and hash functions ★★★★★
- Collision handling techniques ★★★★★

UNIT – III (Trees, Graphs)

- Binary tree and its types ★★★★★
- Tree traversals (inorder, preorder, postorder) ★★★★★
- Binary search tree operations ★★★★★
- BST insertion and deletion ★★★★★
- AVL trees and rotations ★★★★★
- Graph representation ★★★★★
- DFS traversal ★★★★★
- BFS traversal ★★★★★
- Minimum spanning tree (Prim's/Kruskal's) ★★★★★

■ UNIT – IV (Sorting, Searching)

- Linear search ★★★★★
- Binary search ★★★★★★
- Insertion sort ★★★★★
- Merge sort ★★★★★★
- Quick sort ★★★★★★
- Heap sort ★★★★★
- Shell sort ★★★★★
- Comparison of sorting techniques ★★★★★



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