KAMARAJ COLLEGE (Autonomous)

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(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

(3 Pages) **Reg. No:……**

Question Code: 26E01103 **Course Code : 24UMCS31**

UG Degree - End Semester Examinations, April 2026

Third Semester

B.Sc., COMPUTER SCIENCE

Data Structure and Algorithms

(For those who joined in July 2024 onwards)

Time : 3Hours **Maximum : 75 Marks**

PART – A (10 × 1 = 10 Marks)

Answer ALL Questions

Choose the correct answer :

CO:1 K:1 1. _____ is a collection of data elements organized in a specified manner and accessing functions are defined to store and retrieve data elements.

(a) Data Structure (b) Pop

(c) Stack (d) ADT

CO:1 K:1 2. A _____ is a data structure in which elements, known as nodes are connected in a circular manner.

(a) Single Linked list. (b) Linked List

(c) Double linked list. (d) A singly Circular linked list

CO:2 K:1 3. An expression is a collection of _____ and _____ that represents a specific value.

(a) Push, Pop (b) Front, Rear

(c) Stack, queue (d) Operators, Operands.

CO:2 K:1 4. _____ operation is used to display the top element of the stack without removing the element from the stack.

(a) Push (b) Pop

(c) Peep (d) Empty

CO:3 K:1 5. The total number of edges from leaf node to a particular node in the longest path is called as _____ of the node.

(a) Height (b) Depth

(c) Sibling (d) Root

CO:3 K:1 6. _____ means “visiting all nodes at once”.

(a) B-Tree (b) AVL Tree

(c) B+Tree (d) Traversal Tree

CO:4 K:1 7. Backtracking is possible from a dead end in _____

(a) BFS (b) DFS

(c) Prism (d) Kruskal

CO:4 K:2 8. Any connected graph is called as an _____ if and only if all its vertices are of even degree.

(a) Euler Graph (b) Euler Circuit

(c) Topological Sort (d) Biconnectivity

CO:5 K:1 9. _____ is an extension of insertion sort.

(a) Radix Sort (b) Bubble Sort

(c) Shell Sort (d) Selection Sort

CO:5 K:1 10. Probing is the process of lookup and storage of the keys in hash table using _____

(a) Open addressing (b) Close addressing

(c) Two way header (d) One way header.

PART – B (5 X 5 = 25 Marks)

Answer ALL Questions choosing either (a) or (b).
Answer should not exceed 250 words.

CO:1 K:3 11. (a) Compare linked list with arrays.

(OR)

(b) List and explain the operation performed in singly linked list.

CO:2 K:4 12. (a) Analyse the concept of queue and also write algorithm to insert and delete an element in a queue.

(OR)

(b) List out the advantages, disadvantages and applications of circular queue.

CO:3 K:4 13. (a) Explain in detail about threaded binary tree with suitable example.

(OR)

(b) Analyse the basic terminologies of a tree.

CO:4 14. (a) Explain in detail about various types of graphs.

K:3

(OR)

(b) Explain in detail about topological sorting.

CO:5 15. (a) Construct the algorithm for shell sort with example.

K:6

(OR)

(b) Build an algorithm to sort n numbers using bubble sort.

PART – C (5 X 8 = 40 Marks)

Answer ALL Questions choosing either (a) or (b).

Answer should not exceed 500 words.

CO:1 16. (a) Explain about the doubly circular linked list.

K:6

(OR)

(b) Construct the procedure to add two polynomials using linked list.

CO:2 17. (a) Determine the concept of stack and also write algorithm to push and pop an element in a stack.

K:3

(OR)

(b) How is an infix expression converted to postfix expression? Convert the expression A+B*C+(D*E+F)*G to Postfix form.

CO:3 18. (a) Discuss about the binary tree traversal with suitable example.

K:3

(OR)

(b) Elaborate the concept of binary tree.

CO:4 19. (a) Discuss about the graph traversal with suitable example and algorithm.

K:3

(OR)

(b) Explain in detail about Euler circuit and Biconnectivity.

CO:5 20. (a) Elaborate the linear search with example program.

K:3

(OR)

(b) Discuss on the hashing techniques.