K26FY0420 Pages: 2 Reg No:.....
Name:.....

Fourth Semester FYUGP Degree (Reg) Examination April 2026

KU4DSCCAP209 - DATA STRUCTURES AND ALGORITHMS

2024 Admission onwards

Time : 1.5 hours Maximum Marks : 50

Section A

Answer any 6 questions. Each carry 2 marks.

1. Define a Stack. What are the two operations performed on stack?
2. Mention the condition for Stack Overflow and Stack Underflow in an array-based implementation.
3. Describe linear data structures? Give two examples.
4. What is the relevance of a sparse matrix?
5. Explain the representation of a linked list in memory with diagram.
6. Define a Hash Table.
7. Why is a queue used in Breadth First Search?
8. Write notes on the concept of height of a tree.

Section B

Answer any 4 questions. Each carry 6 marks.

9. Describe the insertion and deletion operations in a doubly linked list.
10. Write an algorithm to delete a node from a singly linked list.
11. Describe the Selection Sort algorithm with an example
12. Compare BFS with DFS.
13. Show RR rotaion with example
14. Explain different categories of tree.

Section C

Answer any 1 questions. Each carry 14 marks.

15. Explain the concept of a priority queue with an example. Consider a system where elements are inserted with priorities (higher number = higher priority).

Given the following elements with priorities:
A(2), B(5), C(1), D(4), E(3) F(2), G(5) H(2)

(i) Insert the elements into a priority queue in the given order.
(ii)Show how the queue is arranged after each insertion.
(iii) Perform two dequeue operations and show the updated queue each time.
(iii) Explain how elements with the same priority can be handled.

16. Analyze the time complexity of insertion and deletion operations in arrays