IT 2201 - Data Structures And Algorithms

UNIT - I

1. Explain the linked list implementation of list ADT in detail. (16)
2. What is stack? Explain the implementation of stack using array with an example. (16)
3. Explain the cursor implementation of linked list. (16)
4. Write an algorithm for inserting and deleting an element from doubly linked list (8)
5. Write an algorithm for circular queue with example. (8)

UNIT - II

1. Write the algorithm for tree traversals of a binary tree with examples. (16)
2. Write an algorithm to insert an item into a binary search tree and trace the algorithm with items 6, 2, 8, 1, 4, 3, 5 (16)
3. Describe the binary heaps & construct a minheap tree for following :- 5, 2, 6, 7, 1, 3, 8, 9, 4 (8)
4. Write the functions to insert into AVL tree by calling appropriate functions to perform double and single rotations. (16)
5. Explain the algorithm for expression tree with an example. (8)

UNIT-III

1. Show the result of inserting the keys 10111101, 00000010, 10011011, 10111110, 01111111, 01010001, 10010110, 00001011, 11001111, 10011110, 11011011, 00101011, 01100001, 11110000, 01101111 into an initially empty extensible hashing data structure with m=4. (16).
2. Formulate an algorithm to perform union and find operations of disjoint set.
3. Describe about union by rank and union-by-height (8)
explain the path compression with an example. (8)
4. State and explain the dynamic equivalence problem. (16)
5. Explain any two hashing techniques to overcome hash collision (16)
6. If A = {1, 2, 3} and B = {3, 4, 5}, what are the results of (a) Union (A, B, C)
   (b) Intersection (A, B, C)
   (c) Difference (A, B, C)
   (d) Member (1, A)
   (e) Insert (1, A)
   (f) delete (1, A).
   (g) Min (A)? (16)

UNIT-IV

1. write an algorithm to determine the biconnected components in a graph (16).
2. Explain the various representations of a graph with an example. (8)
3. what is topological sort? write an algorithm to perform topological sort. (8)
4. Explain the Dijkstra's algorithm with an example. (16)
5. Explain kruskal's algorithm with an example. (16).

UNIT-V

1. What is greedy algorithm? Give two examples that can be solved using by it and explain them with example. (16)
2. Explain branch and bound with an example (8)
3. What is NP – Completeness? Explain with an example. (16)
4. What is divide-and-conquer algorithm? Formulate an algorithm to multiply n-digit integers using divide and conquer approach (16)
5. Compute running time of merge sort. (8)