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INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)

M.Tech I Semester End Examinations (supplementary) - July, 2018

Regulation: IARE-R16

DATA STRUCTURES AND PROBLEM SOLVING
(CSE)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT – I

1. (a) Explain how insertions and deletions are done in a circular linked list. [7M]
(b) Explain the concept of ADT with the example of the priority queue ADT. [7M]
2. (a) Describe the Big Oh, Omega and Theta notations with an example. [7M]
(b) Explain the operations of insertion and deletion into a max heap with an example. [7M]

UNIT – II

3. (a) What is double hashing? Insert the keys 76,93,40,47,10,55 into a hash table of seven elements using double hashing, using the second hash function $\text{Hash2}(\text{key}) = 5 - (\text{key} \% 5)$ and show the contents of the hash table at each stage. [7M]
(b) Explain with an example how hash table collisions are resolved using linear probing. [7M]
4. (a) What is rehashing? When is rehashing done? [7M]
(b) Explain the linear list representation of dictionaries. Also explain how insertion and search operations are done in such dictionaries. [7M]

UNIT – III

5. (a) How is non-recursive traversal of a binary tree done? Explain with an example [7M]
(b) With an example, trace the working of the Dijkstra's algorithm for single source shortest path problem. [7M]
6. (a) What are threaded binary trees? Give an example. [7M]
(b) Write the algorithm for finding the minimum cost spanning tree proposed by Kruskal. [7M]

UNIT – IV

7. (a) Write an algorithm for insertion of an element into a binary search tree. [7M]
(b) Create a binary search tree by repeated insertion of the following elements : 50, 70, 20, 10, 30, 67, 89, 12, 14. Now, delete element 20 and draw the resultant tree. [7M]

8. (a) How do you find the smallest and largest numbers in a binary search tree? [7M]
(b) What is an AVL tree? Describe when and how an RR rotation is performed in an AVL tree. [7M]

UNIT – V

9. (a) Illustrate Huffman coding for compression with an example. [7M]
(b) What is a red-black tree? Explain the insertion operation into a red-black tree with an example. [7M]
10. (a) What are the B trees and write any three applications of B trees? [7M]
(b) Explain the working of the nearest neighbor query in an R tree. [7M]

