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Question Paper Code: BCS002



**INSTITUTE OF AERONAUTICAL ENGINEERING**  
(Autonomous)

M.Tech I Semester End Examinations (Supplementary) - July, 2017

Regulation: IARE-R16

**DATA STRUCTURES AND PROBLEM SOLVING**  
(Computer Science and Engineering)

Time: 3 Hours

Max Marks: 70

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Answer ONE Question from each Unit  
All Questions Carry Equal Marks  
All parts of the question must be answered in one place only

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**UNIT – I**

- (a) Differentiate between linear and non-linear data structures with an example each. [7M]  
(b) Explain the queue ADT by using arrays. [7M]
- (a) How do you analyze the space complexity of an algorithm? [7M]  
(b) Illustrate the steps to delete a given element from a doubly linked list. [7M]

**UNIT – II**

- (a) How is collision resolution done using separate chaining in hash tables? [7M]  
(b) Explain with suitable example how hash table collisions are resolved using quadratic probing. [7M]
- (a) Explain the usage of hash tables to represent a dictionary. [7M]  
(b) What is open addressing? Explain with an example. [7M]

**UNIT – III**

- (a) Explain the binary tree ADT. Write different tree traversals with an example. [7M]  
(b) What is a threaded binary tree? Give an example. [7M]
- (a) What is a graph? Explain any three graph representations. [7M]  
(b) Write an algorithm for the breadth first search of a graph. [7M]

**UNIT – IV**

- (a) What is the difference between a binary search tree and a binary tree? How do you find the parent of a given node in a binary search tree? [7M]  
(b) How do you find the smallest and largest numbers in a binary search tree? [7M]
- (a) What is an AVL tree? Explain different rotations involved in it. [7M]  
(b) Create an AVL tree by repeated insertion of the following elements : [7M]  
50, 20, 21, 15, 35.

**UNIT – V**

9. (a) Illustrate the KMP algorithm with an example. [7M]  
(b) Draw the Huffman code tree for the following data source with five symbols: [7M]

*Symbol* *Frequency*

A        24

B        12

C        10

D        8

E        8

What is the length of the data source before and after coding consider 3 bits per character

10. (a) What is a B tree? Explain the insertion operation into a B tree with an example. [7M]  
(b) Explain the working of join and range queries in an R tree. [7M]

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