Exam.Code:0915
Sub. Code: 33421

2076

B.E. (Computer Science and Engineering)

Third Semester

CS-301: Data Structures

Time allowed: 3 Hours Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

x-x-x

I. **a)** What are the advantages of linked lists over arrays?

b) State the basic operations that can be performed on queue.

c) State the properties of a Binary Tree.

d) What is hashing? What do you mean by hash functions?

e) How a heap differs from binary tree? (5x2)

Section - A

II. **a)** Define a doubly linked list. Write an algorithm to inserting a node after a given element in a doubly linked list.

b) What is space and time complexity of an algorithm. Discuss Big O notation in detail. (2x5)

III. **a)** What do you understand by queue data structure? Explain Enqueue and Dequeue operations on a Linear queue.

b) Given the following arithmetic expression in infix notation as (6,4)

(7 – 5) *(9 / 2)

Translate this expression into postfix notation using stack.

IV. **a)** Write a program to sort an array of integers in ascending order using Insertion sort method of sorting.

b) Explain the basic idea of Quicksort using suitable example. (6,4)

P.T.O.

Section - B

V. **a)** For a binary tree T, the Preorder and Inorder traversal sequence are as follows:

Preorder: A, B, L, M, K, N, P, Q
Inorder: L, B, M, A, N, K, Q, P

i) Draw the Binary Tree
ii) What is the Postorder traversal sequence?

b) What is an AVL Tree? Insert the following elements into AVL tree: (2x5)
2,3,4,5,6,7,8,9,10,11,12,13,14,15,17

VI. **a)** What is heap? Discuss Reheapify downward operation with suitable example.

b) What is the difference between B trees and B^+ trees? Discuss the operation of insertion a key value into B tree using suitable example. (2x5)

VII. **a)** Define graphs. Discuss breadth first search algorithm in detail.

b) What do you understand by collision resolution? Discuss Linear Probing method of collision resolution. (2x5)

x-x-x