Exam.Code:0915
Sub. Code: 6776

1129

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. I which is compulsory and selecting two questions from each Unit.

x-x-x

I. Answer the following:-

a) What is Big O notation and what is its use?
b) What do you mean by balance factor of a node in AVL tree?
c) What is a complete graph? How many edges are there in a complete graph of n nodes?
d) Differentiate between stacks and queues.
e) What is the idea behind Merge Sort? (5x2)

UNIT – I

II. a) Differentiate between single linked list and doubly linked list. Write an algorithm to search an element in doubly linked list.

b) What is a sparse matrix and how can we represent it using linked list? (7,3)

III. Write an algorithm to convert infix expression into prefix expression. Also, convert the following infix expression into prefix expression: (A/(B-C+D))* ((E-A)*C). (10)

IV. Write an algorithm to perform Heap Sort. Demonstrate different passes of heap sort using following array: 33,66,55,12,45. Also, write its best-case runtime complexity. (10)

UNIT – II

V. a) Differentiate between breadth first traversal and depth first traversal with an example.

b) Differentiate between directed and undirected graph.

c) What is a spanning tree? Which spanning trees are termed as minimum spanning trees? (5,2,3)

VI. a) What is a Binary Tree? Explain the following terms with respect to Binary trees:-
i) Height
ii) Size
iii) Depth. What is the maximum number of nodes possible in a Binary Tree of height h?

b) How is Binary Heap represented? Write an algorithm for insertion in a binary heap. (5,5)

VII. a) What is a hash table? Discuss open addressing techniques to avoid collision during hashing?

b) List the properties of B+ trees. How are they different from B Trees? (5,5)

x-x-x