Code No: 123BP **R15**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016
DATA STRUCTURES
(Common to CSE, IT)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) What is linked list? Write advantages of doubly linked list over singly linked list. [2]
b) What is recursion? Give the properties of a recursive definition of an algorithm. [3]
c) What is a stack? List the applications of stack. [2]
d) Show the detailed contents of stack to evaluate the given postfix expression. [3]
{1 2 3 + * 3 2 1 - + *}
e) Define a graph. List different graph traversal techniques. [2]
f) What are binary trees? Mention different types of binary trees with example. [3]
g) What is hashing? [2]
h) What is sorting? What is searching? [3]
i) Define AVL tree? Give example. [2]
j) What is B-tree of order m? Draw a B-tree of order 3. [3]

PART-B

(50 Marks)

2.a) What is amortized complexity? Explain different methods to arrive at amortized costs for operations.
b) Write a C program to implement insertion to the immediate left of the K^{th} node in singly linked list. [5+5]

OR

3. Given an ordered linked list whose node is represented by 'key' as information and 'next' as link field. Write a C program to implement deleting number of nodes (consecutive) whose 'key' values are greater than or equal to 'K_{min}' and less than 'K_{max}'. [10]

4.a) Write a C program to implement multiple stacks using single array.
b) Convert the infix expression a / b – c + d * e – a * c into postfix expression and trace that postfix expression for given data a = 6, b = 3, c = 1, d = 2, e = 4.[5+5]

OR

6.a) Construct a binary tree having the following traversal sequences:
Preorder traversal: A B C D E F G H I
Inorder traversal: B C A E D G H F I

b) Implement Depth First Search (DFS) algorithm. [5+5]

OR

7.a) Define a Max Heap. Construct a max heap for the following:
{12, 15, 9, 8, 10, 18, 7, 20, 25}

b) What is a graph? Explain various representations of graphs. [5+5]

8.a) Write an algorithm for Heap sort.

b) Apply selection sort on the following elements:
{21, 11, 5, 78, 49, 54, 72, 88} [5+5]

OR

9. What is collision? Explain different collision resolution techniques with examples. [10]

10.a) Build an AVL tree with the following values:
{15, 20, 24, 10, 13, 7, 30, 36, 25, 42, 29}

b) Write Knuth-Morris-Pratt pattern matching algorithm. [5+5]

OR

11. Write short notes on:
a) Red-Black trees b) splay trees c) b-trees. [3+3+4]

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