SUBJECT CODE- 481
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(CSE/IT) Examination Nov/Dec 2015
Data Structures using C
(Revised)

[Time: Three Hours]   [Max. Marks: 80]

"Please check whether you have got the right question paper."
N.B   i) Q.No.1 from section A and Q.No.6 from section B are compulsory.
ii) Attempt any two questions from each section from remaining questions.

Section A

Q.1   Solve any five   10
a) What parameters are use to analyze performance of any algorithm?
b) Define data type and abstract data type.
c) What is multi-dimensional array
d) Differentiate between structure and union
e) Assume queue of size of size 3. Show diagrammatic, representation for following operations: Add(20), Add(30). Add(40), delete(), Add(50). Indicate front & rear pointer.
f) Represent given polynomial using linked list: $A = 10x^4 + x^2 + x + 5$
g) What is circular queue?
h) Convert following expression in prefix and postfix form. $(A + B) * (C - D)/E$

Q.2   a) Define algorithm. Explain various criteria's every algorithm should satisfy   07
b) Write ADT for stack   08

Q.3   a) Explain various functions used for dynamic memory allocation and deallocation.   08
b) What is queue? Explain operations on queue with algorithm   07

Q.4   a) Analyze the difference between stack implementation using array with stack implementation using linked list.   08
b) Write C program for transpose of sparse matrix.   07

Q.5   a) Evaluate given postfix expression using stack   07
2   3   4 $* 2 /+$
b) Write C function to perform following operations on linear linked list.   08
i)   Insert a node in front of list
ii)   Delete a note from list.

Section-B

Q.6   Solve any five: 10
a) How to represent tree using left child right sibling representation
b) Define strictly binary tree. Give example.
c) Construct binary tree for a given sequence of preorder and inorder
Preorder: $FAEKCDHGB$
Inorder: $EACKFHDBG$
d) Explain following terms:
i)   Directed graph ii) complete graph
e) Explain height biased leftist tree
f) Define binomial heap
g) Give properties of red-block tree
h) What is optimal binary search tree?

K-2015

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Q.7 a) Write an algorithm to perform the following operations on binary search tree   08
        i)   Insert a key
        ii)   Search a key
     b) Explain Fibonacci heap with example   07

Q.8 a) Explain winner tree and loser tree with example.   07
     b) Construct height –balanced (AVL) tree by assuming insertions in the following order: 14, 17, 11, 7, 53, 4, 13   08

Q.9 a) Explain   08
        i) Properties of binary tree
        ii) Array representation of binary tree
     b) Show the possible binary search trees for the key set (q_1, q_2, q_3, q_4)=(2, 5, 10, 15) with equal probabilities   07
        $p_i = q_i = 1/q$ For all i and j. Calculate cost of each tree. Determine OBST.

Q.10 a) Explain bottom –up splay tree with example.   07
     b) Construct max heap for following key values: 7, 16, 49, 82, 5, 31, 6, 2, 44   08

K-2015