CS/MCA/Even/2nd Sem/MCA-203/2014

2014

Data Structure with C

Time Allotted : 3 Hours *Full Marks : 70*

The figure in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable

Group - A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following: 10X1=10

   i) The tree traversal technique in which the root is traversed after its children is known as
      a) Post-order traversal b) Pre-order traversal
      c) In-order traversal d) None of these

   ii) Maximum number of nodes possible at level 4 of a binary tree is
      a) 8 b) 4 c) 16 d) 32

   iii) Stack works on
      a) LIFO b) FIFO
      c) Both a) and b) d) None of these

   iv) A linked list follows
      a) Random access mechanism
      b) Sequential Access mechanism

c) No access mechanism

d) None of these

v) Balanced parenthesis of an arithmetic expression can be validated by using which data structure

a) Stack b) Queue c) Tree d) Linked list

vi) The postfix notation is also known as

a) Polish notation b) Reverse polish notation

c) Reverse notation d) None of these

vii) For any non-empty binary tree T. If n is the number of nodes and e is the number of edges, then the relation between e and n is

a) $e = n - 1$ b) $e = n + 1$ c) $e+1 = -n$ d) $e = n$

viii) The sparse matrix is a matrix whose

a) Most of the elements are non-zero

b) Most of the elements are zero

c) Half of the elements are zero and half are non-zero

d) None of these

ix) Complexityof binary searching is

a) O(n) b) O (log n)

c) O (n log n) d) O (1)

x) When the malloc() function returns NULL value it means

a) Memory is not allocated

b) Memory is allocated but no data entered

c) Both (a) & b)

d) None of these

Group - B
(Short Answer Type Questions)
Answer any *three* of the following

3x5=15

2. a) What are the differences between BFS and DFS?
   b) What is hashing? Why it is used? 3+2
3. Construct a Binary tree with the following preorder and inorder sequences and then find the postorder sequence.
   Preorder : A B C D F H J M KE G I LN
   Inorder : A D J M H K F C IN L G E B 5
4. Write a C function to delete a node from any position of a singly linked list. 5
5. a) Define 0, Ω, notations.
   b) $T(n) = 4n^2 + 3n\log n$. Express T(n) in order (O) notation. 3+2
6. What is hashing? Why it is used? Explain the chaining method of collision resolution in hashing. 5
7. Draw the B-tree of order 3 created by inserting the following data arriving in sequence: 5
   92. 24 6 7 11 8 22 4 5 16 19 20 78

Group - B
(LongAnswer Type Questions)
Answer any *three* of the following

3x15=45

8. a) What is a linked list? What are its advantages over arrays? Also state its disadvantage over array. 5
   b) Write a C-function to delete a node from a singly linked list by taking the position from the user. The position

can be first, last, or any other position between these two. 10

9. a) Write a C-function to add two polynomials represented as a singly linked lists of Non-zero terms. 7

   b) Write a C non-recursive function to implement prefix treversal of a binary tree. 8

10. a) Convert the following infix expression to corresponding postfix expression.

   4+3*10/6+7-4/2+5^3 6

   b) Implement a sparse by an efficient data structure and illustrate the implementation by an example. 9

11. a) What is binary search tree? 2

   b) Construct the binary search tree if the elements are in the order:

   60, 75, 25, 66, 50, 55, 45, 40, 35, 57, 30 4

   c) Delete the following nodes in order and show each step. 2+2+2=6

   i) Node with 55 ii) Node with 66

   iii) Node with 50

   d) What is the difference between circular queue and double ended queue? 3

12. Write short notes on *any three* of the following: 5x3=15

   a) Graph and their representation in computer

   b) Non-linear data structure

   c) Quick sort

   d) Breadth first search

   e) Prim's Algorithm

____x-x-x____