BRAINWARE UNIVERSITY

Term End Examination 2018 - 19

Programme – Diploma in Computer Science & Engineering

Course Name - Data Structures & Algorithm

Course Code - DCSE203

(Semester – 2)

Time allotted: 3 Hours   **Full Marks : 70**

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

Group –A

(Multiple Choice Type Question)   10 x 1 = 10

1. *Choose the correct alternative from the following*

(i)   In a stack, if a user tries to remove an element from empty stack it is called

   a. Underflow   b. Empty collection

   c. Overflow   d. Garbage Collection

(ii) The prefix notation is also known as

   a. Polish notation   b. Reverse polish notation

   c. Reverse notation   d. None of these

(iii) If the elements 'A', 'B', 'C' and 'D' are placed in a queue and are deleted one at a time, in what order will they be removed?

   a. ABCD   b.   DCBA

   c. DCAB   d.   ABDC

(iv) What are the advantages of arrays?

   a. Easier to store elements of   b. Used to implement other data
       same data type   structures like stack and queue
   c. Convenient way to represent   d. All of the mentioned
       matrices as a 2D array

(v) malloc() function returns null value, it means

    a. Memory is not allocated   b. Memory is allocated but no data entered.

    c. Both (a) and (b)   d. None of these

(vi) How many stacks are required for applying evaluation of infix expression algorithm?

    a. One   b. Two

    c. Three   d. Four

(vii) When an element is inserted in queue, the position of front

    a. Increased   b. Decreased

    c. Unchanged   d. Get value -1

(viii) The data structure required to check whether an expression contains balanced parenthesis is?

    a. Stack   b. Queue

    c. Array   d. Tree

(ix) What is the speciality about the inorder traversal of a binary search tree?

    a. It traverses in a non increasing order   b. It traverses in an increasing order

    c. It traverses in a random fashion   d. None of the mentioned

(x) Tree is a

    a. Linear data structure   b. Non-linear data structure

    c. Either (a) and (b) depending on situation   d. None of these

Group – B

(Short Answer Type Questions)   3 x 5 = 15

Answer any *three* from the following

2. Describe the advantages of circular queue over linear queue with proper example.   5

3. Describe the properties of stack and show push() and pop() operations with suitable example.   5

4. Write an algorithm of insertion sort.   5

5. What is strictly and complete binary tree? Describe with a proper diagram.   5

6. Describe dynamic memory allocation.   5

Group – C

(Long Answer Type Questions)   3 x 15 = 45

Answer any *three* from the following

7. (a) Write an algorithm to insert a node at end of a linked list.   5

    (b) Convert the following infix expression into postfix form using stack   7
         a + (b * c - (d / e ^ f) * g) * h

    (c) Explain Big-θ notation.   3

8. (a) Write the algorithm of Enqueue() and Dequeue() operations in Linear Queue.   6

    (b) Draw the expression tree of the following expression and then show the preorder traversal.   5
         E=(a – b) / ((c* d) + e)

    (c) Describe 'degree of an element' and 'degree of a tree' with proper example.   4

9. (a) Simulate bubble sort with the following data   5

         44, 30, 50, 33, 20, 60, 55

    (b) Write an algorithm of linear search.   5

    (c) Describe different features of algorithm.   5

10. (a) Construct the Binary Search Tree, if the elements are in the order: 5
         62, 73, 37, 24, 52, 92, 95, 84, 53, 39, 42, 45, 50

    (b) Delete the following nodes in order and show each steps: 4

         i.   Node with 42
         ii. Node with 52

    (c) Construct binary tree from the following traversal   6

         Inorder: D B F E A G C L J H K

         Postorder: D F E B G L J K H C A

11.   Write short notes on any *three* from the following   3 x 5

    (a) Hashing

    (b) Linear data structure

    (c) Circular Queue

    (d) Dynamic memory allocation

    (e) Data type