MCA (Revised) / BCA (Revised)

Term-End Examination

June, 2018

MCS-021 : DATA AND FILE STRUCTURES

*Time : 3 hours*   *Maximum Marks : 100*

(Weightage 75%)

Note : *Question number 1 is **compulsory**. Attempt any **three** questions from the rest. All algorithms should be written nearer to 'C' language.*

1. (a) What is data structure ? Explain different types of data structures with examples.   *10*

   (b) Write an algorithm for adding an element to a circular queue and removing an element from a circular queue using arrays.   *10*

   (c) Write an algorithm for converting the following infix expression into postfix expression using a stack :   *10*

   A + (B * C – (D/E ^ F) * G) * H

   (d) (i) What is asymptotic notation ? Explain the big 'O' notation.   *5*

        (ii) Explain three different applications of stacks with the help of examples.   *5*

2. Write the function to implement recursive version of pre-order, in-order and post-order traversals of Binary trees. *20*

3. (a) Draw Binary search tree that results from inserting into an initially empty tree record with keys given below in order :

E, A, S, Y, Q, U, E, S, T, I, O, N and then deleting Q. *10*

(b) Write a program in 'C' to insert and delete elements from a circular queue using a linked list. *10*

4. (a) (i) Compare any two different sorting techniques. *5*

(ii) How does static allocation differ from dynamic allocation of memory ? *5*

(b) (i) Find the incidence matrix of the following graph : *5*
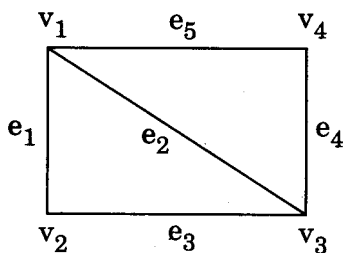
Figure

(ii) Draw all non-similar trees with exactly six nodes. *5*

5. Write short notes on the following :   *4×5=20*

   (a)   AVL Tree

   (b)   Priority Queue

   (c)   Operation on Stack

   (d)   Hash Function