MCS-021(S)

MCA (Revised) / BCA (Revised)
Term-End Examination
December, 2016

00216

MCS-021(S) : 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)   Consider the algorithm given below :

           scanf ("%d", &n);

           for (int i = n; i < = n * n; i = n + 10)

           for (int j = 1; j < = n; j++)

           printf ("%d", n/(i + j);

           Calculate the complexity (with space and
           time) of the above code.   *10*

    (b)   Write an algorithm to implement Doubly
           Linked List.   *10*

    (c)   What is a Circular Queue ? Write an
           algorithm for insertion and deletion in a
           Circular Queue.   *10*

    (d)   What is a Splay Tree ? How does it differ
           from a Tree ?   *10*

2. **(a)** Write an algorithm for insertion sort. Write the step-by-step working of the algorithm for the following set of data :   *10*

25, 86, 1, 16, 95, 37, 56

(b) Define Sparse Matrix. Write an algorithm that accepts a 6×5 sparse matrix and outputs it in 3-tuple representation.   *10*

3. **(a)** Define Binary Tree. What are the traversals in a binary tree ? Explain each traversal with an example.   *10*

(b) Explain Kruskal's algorithm with an example.   *10*

4. **(a)** Discuss various file organisation methods. Also, list the advantages and disadvantages of each.   *10*

(b) What is a Binary Search Tree ? Explain with an example. What are its limitations ?   *10*

5. **(a)** Write an algorithm to implement a stack.   *10*

(b) Write an algorithm that accepts two polynomials as input and prints the resultant polynomial created by the addition of the input polynomials.   *10*