No. of Printed Pages : 3

MCS-021

09104

MCA (Revised) / BCA (Revised)
Term-End Examination
December, 2014

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) Consider the algorithm given below : *10*

(i) scanf ("%d", &n);

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

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

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

Calculate the complexity (both space and time) of the above code by using Big "O" notation.

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

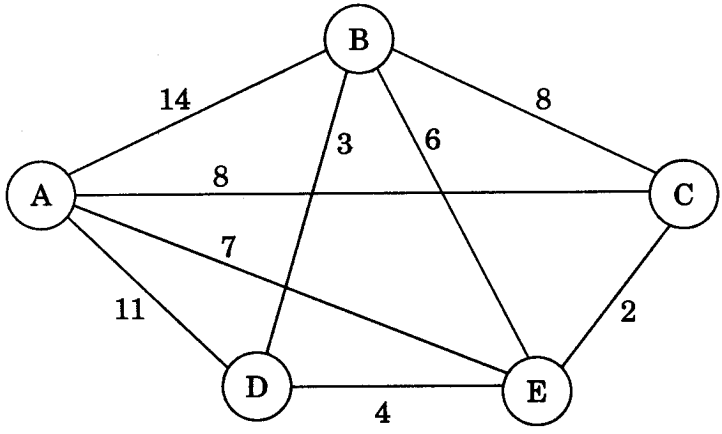
(c) Write an algorithm for Heapsort. Write step by step working of algorithm for the following set of data : *10*

9, 16, 43, 27, 91, 33, 21, 7, 3

(d) Draw AVL tree by inserting the following elements one by one : *10*

7, 13, 27, 9, 11, 14, 8, 37, 24

2. (a) Write Floyd-Warshall's algorithm for computing "All pair shortest path" problem. Show how does your algorithm work for the following graph : *10*



(b) Write an algorithm for inserting a node in a Red-Black tree. Write step by step working of algorithm using an example. *10*

3. (a) Write an algorithm for adding two polynomials. Algorithm should take the two polynomials as input and display the resultant polynomial. *10*

(b) Write an algorithm for array implementation of a circular queue. *10*

4. (a) Write an algorithm to insert and delete a node from a doubly-linked list. *10*

(b) Write an algorithm to insert an element into a B-tree. Make B-tree using your algorithm for the following list of elements : *10*

22, 29, 8, 34, 17, 89, 11, 19

5. (a) Compare any two file organisations. *10*

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