Seat No.	

[5459]-136

S.E. (Electronics/E & TC) (I Semester) EXAMINATION, 2018

DATA STRUCTURES AND ALGORITHMS

(2015 PATTERN)

Time : Two Hours   **Maximum Marks : 50**

N.B. :— (i) Answer Q. No. **1** or Q. No. **2**, Q. No. **3** or Q. No. **4**, Q. No. **5** or Q. No. **6**, Q. No. **7** or Q. No. **8**.

   (ii) Neat diagrams must be drawn wherever necessary.

   (iii) Figures to the right side indicate full marks.

   (iv) Use of calculator is allowed.

   (v) Assume suitable data, if necessary.

1. (a) Sort the following data using merge sort and selection sort :   [6]

   27, 10, 12, 25, 34, 16, 15, 31

   (b) Write a C function with and without pointers to arrays for checking whether the given string is palindrome or not. [6]

Or

2. (a) Explain the following :   [6]

   (i) Call by value

   (ii) Call by reference.

(*b*) Write the following functions in 'C' : [6]

    (*i*) STRCOPY( ) to copy a string to another string using array.

    (*ii*) STRLENGTH( ) to find length of string using array.

    Note : Do not use standard library functions.

3. (*a*) Define Queue and explain any *one* application of queue. [6]

    (*b*) Identify the expressions and convert them into remaining two forms : [7]

    (*i*) a*b/c*d-e/f

    (*ii*) (a+b)/(c+d)

Or

4. (*a*) Differentiate singly linked list and doubly linked list. [6]

    (*b*) Write a 'C' function to delete a number from singly linked list. [7]

5. (*a*) Define binary tree. Name and explain with suitable example the following terms : [6]

    (*i*) Root node

    (*ii*) Left sub tree and right sub tree

    (*iii*) Depth of tree.

    (*b*) Construct the binary search tree (BST) from the following elements : [6]

        10, 60, 40, 28, 14, 50, 5

Or

6. (*a*) Construct the binary search tree from the following elements : [6]

        5, 2, 8, 4, 1, 9, 7

    Also show preorder, inorder and postorder traversal for the same.

(b) Define the following terms with example with respect to Binary Tree : [6]

    (i) Strictly Binary Tree

    (ii) Completely Binary Tree

    (iii) Binary Search Tree

7. (a) Explain with suitable example the techniques to represent a Graph.

    Note : Consider graph of minimum 6 vertices. [6]

(b) What do you mean by adjacency matrix and adjacency list ? Give the adjacency matrix and adjacency list as shown in figure (1). [7]
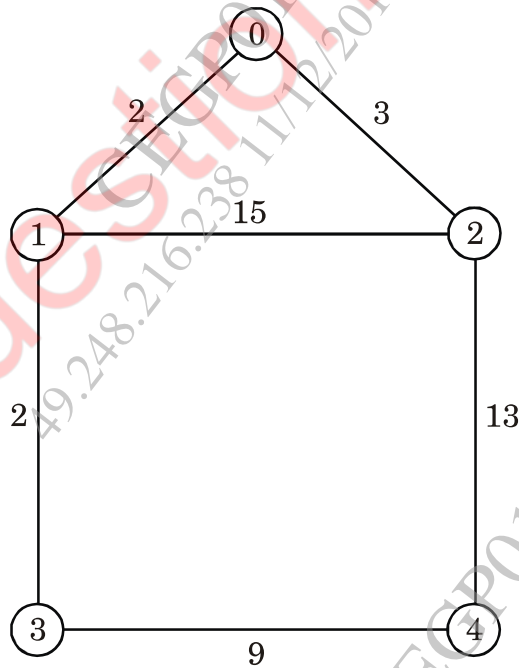

Fig. 1

Or

8. (*a*) Find out the minimum spanning tree of the following graph figure 2 using : [6]
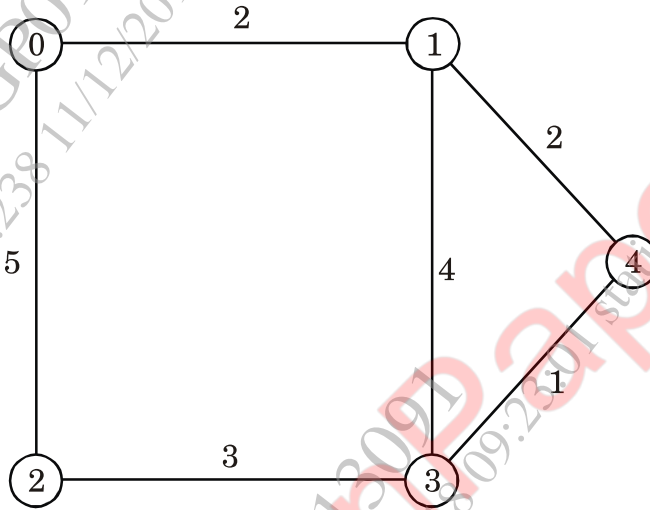   (*i*) Prim's Algorithm
   (*ii*) Kruskal's Algorithm.

Fig. 2

(*b*) Find the shortest path from node 1 to all nodes in the graph shown in figure 3 using Dijkstra's algorithm. [7]
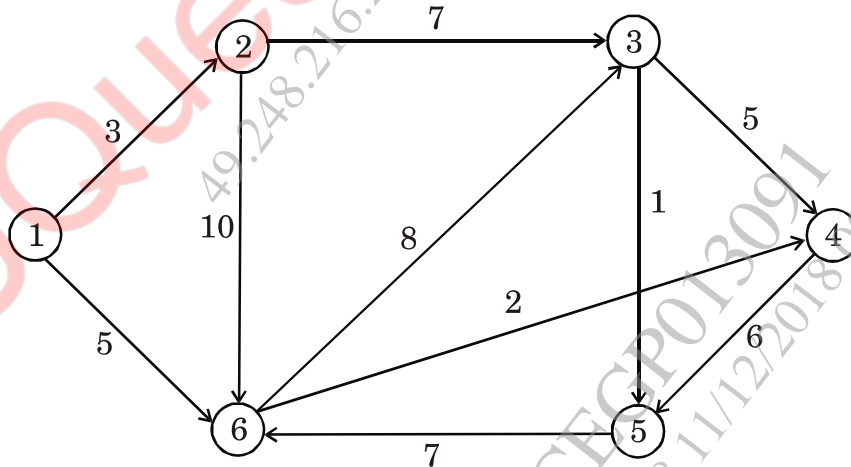

Fig. 3