

Total No. of Questions—8]

[Total No. of Printed Pages—4

Seat No.	
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**[5152]-534**

**S.E. (E & TC/Electronics) (First Semester) EXAMINATION, 2017**  
**DATA STRUCTURES AND ALGORITHMS**  
**(2015 PATTERN)**

**Time : Two Hours****Maximum Marks : 50****N.B. :-** (i) Neat diagrams must be drawn wherever necessary.

(ii) Figures to the right indicate full marks.

(iii) Assume suitable data, if necessary.

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

142 317 45 222 187

(b) What will be the output of the following code ? Justify your answer. [6]

```

for(i=0;i<4;i++)
{
    for(j=0;j<4;j++)
    {
        a[i][j]=20 * (i+j);
        printf("%d",a[i][j]);
    }
    printf("\n");
}
printf("%d%d",i,j);

```

P.T.O.

Or

2. (a) 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.
- (b) Explain Algorithm Binary search with example. [6]
3. (a) Convert the given infix expression to postfix expression using stack. [5]  
 $(a^b)^*c-d/d$   
 Note : \$ = Exponent operator
- (b) Define Queue and explain any *one* application of Queue. [4]  
 (c) Differentiate Singly Linked List and Doubly Linked List. [4]
- Or
4. (a) Write a 'C' function to delete a number from singly linked list. [5]  
 (b) Explain Stack operations PUSH and POP with example. [4]  
 (c) Compare array and linked list. [4]
5. (a) Construct the binary search tree from the following elements :  
 12, 8, 25, 14, 9, 6, 18.  
 Also show preorder, inorder and postorder traversal for the same. [6]

- (b) Define Binary Tree. Name and explain with suitable example the following terms :
- (i) Root node
  - (ii) Left sub-tree and Right sub-tree
  - (iii) Depth of tree. [6]

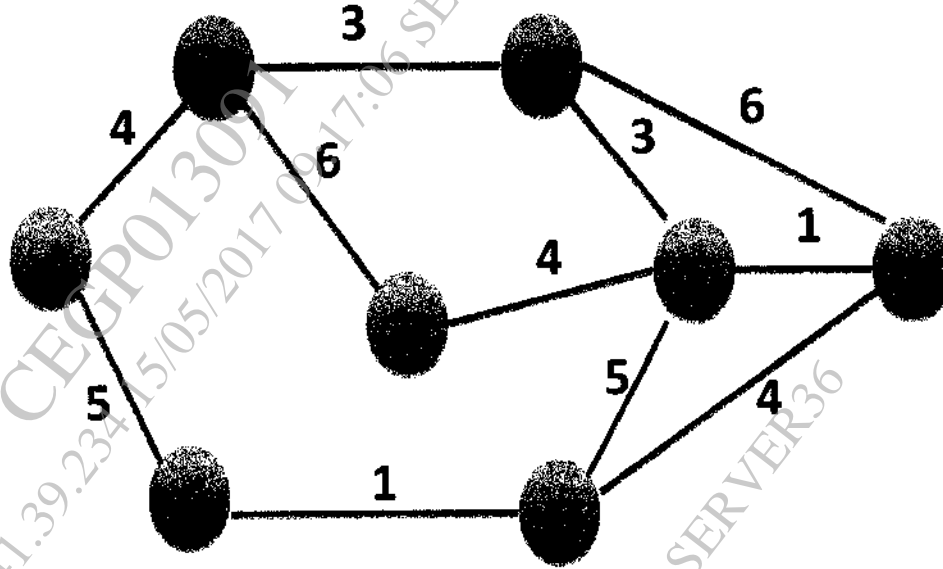
*Or*

6. (a) Define the following terms with example with respect to Binary Tree :
- (i) Strictly Binary Tree
  - (ii) Completely Binary Tree
  - (iii) Binary Search Tree. [6]
- (b) Explain the different cases to delete an element from binary search tree. [6]
7. (a) Explain with suitable example, BFS and DFS traversal of a graph. [6]
- (b) What is MST ? Explain with suitable example Kruskal's Algorithm to find out MST. [7]

*Or*

8. (a) Explain with suitable example the techniques to represent a Graph.
- Note : Consider Graph of minimum 6 vertices. [6]

(b)

**Fig. 1**

Find shortest path from node A to all nodes in the graph shown in Fig. 1 using Dijkstra's algorithm. [7]