Seat
No.

S.E. Electronics (E & TC) (Semester – I) Examination, 2014
DATA STRUCTURES AND ALGORITHMS
(2012 Course)

Time : 2 Hours   Max. Marks : 50

Instructions : 1) Answer **Q. 1** or **Q. 2** and **Q. 3** or **Q. 4** and **Q. 5** or **Q. 6** and **Q. 7** or **Q. 8**.
2) Assume suitable data if **necessary**.
3) Write output for programs **where ever** is necessary.
4) Draw neat diagrams/sketches **where ever** is necessary.
5) Do not attach supplement unless it is essential.
6) Figures to the **right** indicate **full** marks.

1. a) Sort the following numbers using Bubble Sort. Show all steps and discuss the time complexity.   **6**

   20 5 18 7 21 6

   b) Explain the term Data Structure and its operations.   **6**

                         OR

2. a) What is a String ? Explain the usage of string functions strcmp and strlen.   **6**

   b) Explain in detail : Index Sequential Search and Local and Global Variables.   **6**

3. a) Write an algorithm with appropriate illustrations to perform the following operations on Singly Linked list (SLL). Delete a node (Start, end, intermediate).   **6**

   b) What is the disadvantage of Linear Queue ? Suggest suitable method to overcome.   **6**

                         OR

4. a) Complete following missing expression in the table.   **6**

Infix	Prefix	Postfix
(A+B*C)/(D+E/F)	---	---
---	+A*BC	---
---	---	ABC+*EF/-

   b) What is a Doubly Linked List ? Compare it with Singly Linked List in terms of pros and cons.   **6**

5. a) Using the following data, draw a Binary Search Tree. Show all steps.   **4**
      10 60 40 28 14 50 5

   b) What is a AVL Tree ? Explain with a suitable example RR and LL rotation.   **4**

   c) Define the following terms with respect to Trees :   **5**
      i)   Root
      ii) Subtree
      iii) Level of node
      iv) Depth of Tree
      v)   Siblings

                         OR

6. a) Define Binary Tree. What are its types ? Explain with suitable figures.   **3**

   b) Write a C function to search element in binary search tree.   **4**

   c) Write inorder, preorder and postorder traversals for the following tree.   **6**
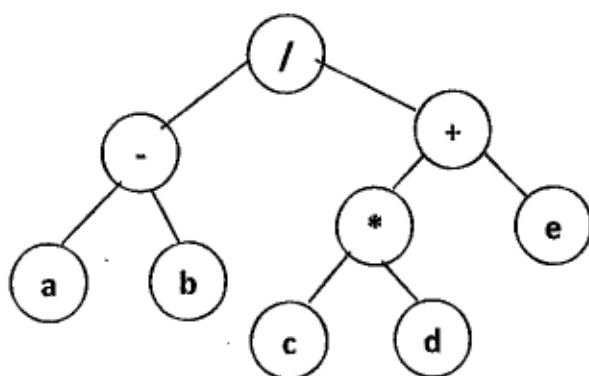

7. a) Write an algorithm for BFS Traversal of Graph.   **4**
   b) Write an algorithm to find in-degree and out-degree of a vertex with a suitable example.   **4**
   c) Write Kruskals algorithm for the given graph hence find minimum spanning tree.   **5**
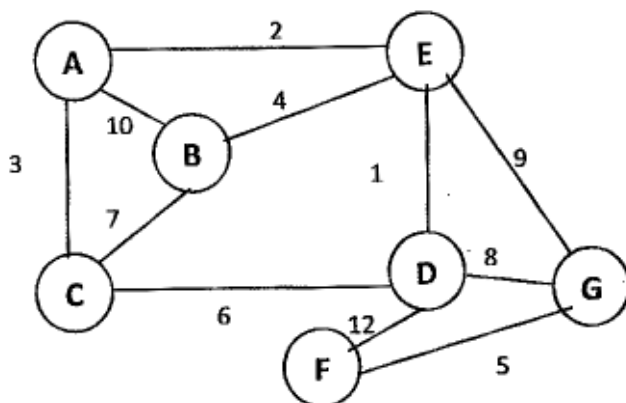
                         OR

8. a) What is a minimum spanning tree ? Explain with suitable example Prims algorithm.   **4**

   b) Represent the following graph using adjacency matrix and adjacency list.   **5**
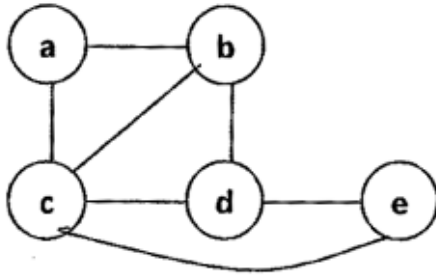
   c) Explain the term topological sorting with a suitable example.   **4**

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