Total No. of Questions—**8**] [Total No. of Printed Pages—**3**

Seat No.	

[5252]-563

S.E. (Computer Engineering) (I Semester) EXAMINATION, 2017

DATA STRUCTURES AND ALGORITHMS

(2015 PATTERN)

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

N.B. **:—** (*i*) Attempt **Q.1** or **Q.2**, **Q.3** or **Q.4**, **Q.5** or **Q.6** and **Q.7** or **Q.8.**

(*ii*) Neat diagrams must be drawn wherever necessary.

(*iii*) Assume suitable data, if necessary.

1. (*a*) Define and explain the following terms : [3]

(*a*) Data structure

(*b*) ADT

(*c*) Algorithm

(*b*) Give pseudo C/ C++ code to concatenate two strings. [3]

(*c*) Explain the Greedy strategy with suitable example. Comment on its time complexity. [6]

Or

2. (*a*) Define and explain the following terms : [4]

(*a*) Linear data structure

(*b*) Non-linear data structure

(*c*) Time complexity

(*d*) Space complexity

(*b*) What is sparse matrix ? Explain with suitable example. [2]

(*c*) Explain the Asymptotic notation Big O, Omega and Theta with suitable example. [6]

P.T.O.

3. (*a*) Write a pseudo C/C++ code to delete intermediate node from singly linked list. [3]

(*b*) Explain Generalized linked list with example. [3]

(*c*) What is stack ? Write an ADT for stack. [6]

Or

4. (*a*) What is recursion ? Explain use of stack for recursion. [4]

(*b*) Explain the stepwise conversion using stack for the given infix expression to the postfix expression : [2]

A * (B + C) * D

(*c*) Write pseudo C/ C++ code to represent Singly linked list as an ADT. [6]

5. (*a*) Define the following terms with example : [6]

(*a*) Dequeue

(*b*) Priority queue

(*c*) Linear queue

(*b*) Write a pseudo C/C++ code to implement circular queue using arrays. [7]

Or

6. (*a*) Explain linear queue and circular queue with suitable example. Give the advantages of circular queue over linear queue. [6]

(*b*) Explain priority queue. Give pseudo C/C++ code for array implementation of priority queue. [7]

7. (*a*) Sort the following numbers using Merge sort. [6]

55, 85, 45, 11, 34, 05, 89, 99, 67

Discuss its time complexity and space complexity.

(*b*) Explain sequential search and binary search with appropriate example and compare their time complexity and space complexity. [7]

Or

8. (*a*) Explain the algorithm of Quick sort with suitable example. Discuss its time complexity and space complexity. [6]

(*b*) Explain heap sort and sort the given list using heap sort :[7]
18, 13, 12, 22, 15, 24, 10, 16, 19, 14, 30.