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

Seat
No.

[5559]-183

S.E. (Computer Engineering) (I Sem.) EXAMINATION, 2019

DATA STRUCTURES AND ALGORITHMS

(2015 PATTERN)

Time : Two Hours　　　　　　　　Maximum Marks : 50

N.B. :— (*i*) Attempt 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*) Draw neat diagrams wherever necessary.

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

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

1. (*a*) Write pseudo C/C++ code to perform simple transpose of

sparse matrix. [4]

(*b*) State the characteristics of an algorithm. [2]

(*c*) What is complexity analysis of an algorithm ? Explain the notations

used in the complexity analysis. [6]

Or

2. (*a*) What is sparse matrix ? Explain its representation with an

example. [4]

P.T.O.

(b) Define : [2]

    (i)   ADT

    (ii) Data structure.

(c) Solve the recurrence relation : [6]

$$a_r - 10a_{r-1} + 9a_{r-2} = 0$$

with initial conditions $a_0 = 3$ and $a_1 = 11$.

3. (a) Explain polynomial representation using linked list with an example. [3]

(b) Define : [3]

    (i)   Recursion

    (ii) Stack

    (iii) Linked List.

(c) Explain process of conversion of an infix expression to postfix expression using stack : [6]

    A * (B − C)/E ^ F + G.

Or

4. (a) Explain use of backtracking in 4-Queen's problem. [4]

(b) Explain the concept of Generalized linked list. [2]

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

5. (*a*) Write pseudo C/C++ code to implement a simple queue using linked list. [6]

    (*b*) Explain Deqeue with the insert and delete operations performed on it. [7]

Or

6. (*a*) Write pseudo C/C++ code to implement a circular queue using arrays. [6]

    (*b*) What is Priority queue ? Describe the operations on priority queue and explain its applications. [7]

7. (*a*) Write pseudo C/C++ code for radix sort. [6]

    (*b*) Write an algorithm for searching an element using binary search. Discuss the time complexity of algorithm in best case and worst case [7]

Or

8. (*a*) Explain insertion sort algorithm and sort the given list using insertion sort : [6]

       7, 4, 10, 6, 3, 12, 1, 8, 2, 15, 9, 5.

    (*b*) Explain merge sort algorithm using divide and conquer strategy with an example. State its time complexity and space complexity. [7]