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Seat No.	
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[50571-2052

S.E. (Computer Engineering) (First Semester)

EXAMINATION, 2016

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 algorithm and its characteristics. [4]
- (b) Write pseudo c/c++ code to perform simple transpose of sparse matrix. Discuss its time complexity. [6]
- (c) Derive address calculation formula for one-dimensional array with one example. [2]

Or

2. (a) Explain asymptotic notations-Big-O, Theta and omega with one example of each. [6]
- (b) Write pseudo c/c++ code to perform polynomial multiplication using arrays. [6]

P.T.O.

3. (a) Write pseudo c/c++ code to represent doubly linked list as an ADT. [6]

(b) Explain step-by-step conversion using stack for given infix expression to postfix expression : [6]

$$((a/(b-c+d)) * (e-a) * c$$

Or

4. (a) Write pseudo c/c++ code to implement stack as an ADT. [6]
- (b) Write an algorithm to perform the following operations on singly linked list : [6]

- (1) Reverse
- (2) Sort.

5. (a) Write pseudo c/c++ code to represent deque and perform the following operations : [7]

- (1) Create Deque
- (2) Insert
- (3) Delete
- (4) Display.

(b) What is circular queue ? Explain the advantages of circular queue over linear queue. [6]

Or

6. (a) Write pseudo c/c++ code to implement circular queue using arrays. [7]
- (b) Explain applications of priority queue in detail. [6]

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7. (a) Explain quick sort and sort the given list using quick sort : [6]

15, 08, 20, -4, 16, 02, 01, 12, 21, -2

(b) Write an algorithm for Fibonacci search and find out time complexity. [7]

*Or*

8. (a) Explain shell sort and sort the given list using shell sort : [6]  
08, 03, 02, 11, 05, 14, 00, 02, 09, 04, 20

(b) Write short note on stability of sorting. Compare Heap sort and Quick sort with one example and discuss time complexity. [7]