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Seat No.	
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[5152]-563

S.E. (Comp.) (First Semester) EXAMINATION, 2017
DATA STRUCTURES AND ALGORITHMS
(2015 PATTERN)

Time : Two Hours

Maximum Marks : 50

1. (a) Show that $f'(x) = 0$ (x^3) if function $f(x)$ is defined as
 $f(x) = 5x^3 + 6x^2 + 1$ [3]
 - (b) Differentiate between linear and non-linear data structure with example. [3]
 - (c) Explain divide and conquer strategy with example. Also comment on the time analysis. [6]
- Or*
2. (a) Explain fast Transpose of sparse matrix with suitable example. Discuss time complexity of fast transpose. [6]
 - (b) Explain polynomial representation using arrays with suitable example. [3]
 - (c) Derive recurrence relation to represent set of natural numbers giving remainder one when divided by three. [3]
3. (a) Represent the following polynomial by using-generalized linked list : [3]
 $(a, b (c, d (e, g), h) (f))$
 - (b) Write an algorithm for postfix evaluation with suitable example. [6]
 - (c) Write a pseudo C code to reverse singly linked list. [3]

P.T.O.

Or

4. (a) Convert the following prefix expression into postfix. $* + a - bc / - de + - fgh$ [3]
- (b) Write an algorithm to convert infix expression to postfix expression. [6]
- (c) Write an algorithm to delete intermediate node from Doubly linked list. [3]
5. (a) What is circular queue ? Explain the advantages of circular queue over linear queue. [6]
- (b) Write pseudo C/C++ code to represent queue as an ADT. [7]

Or

6. (a) Explain array implementation of priority queue with all basic operations. [6]
- (b) Write pseudo C/C++ code to implement circular queue using linked list. [7]
7. (a) Explain quick sort and sort the given list using quick sort : 39, 09, 81, 45, 90, 27, 72, 18 [6]
- (b) Write an algorithm for binary search. Derive recurrence relation and find out time complexity of the search. [7]

Or

8. (a) Explain heap sort and sort the given list using heap sort : 08, 03, 02, 11, 05, 14, 00, 02, 09, 04, 20. [6]
- (b) Write a short note on stability of sorting. Compare bubble sort, insertion sort and selection sort with one example and discuss time complexity. [7]