Reg. No.

MANIPAL INSTITUTE OF TECHNOLOGY

* A Constituent Institution of Manipal University

VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

END SEMESTER EXAMINATIONS, NOVEMBER 2017

SUBJECT: DATA STRUCTURES AND ALGORITHMS [ELE 4018]

REVISED CREDIT SYSTEM

Time	e: 3 Hours Date: 21 November 2017 Max	. Marks: 50	
Instructions to Candidates:			
	 Answer ALL the questions. 		
	 Missing data may be suitably assumed. 		
	 Algorithms must be written in pseudocode 		
1A.	List the naming conventions to be followed while writing a software code.	(03)	
1B.	What are the guidelines for asymptotic analysis of iterative algorithms?	(03)	
1C .	Write an iterative and recursive algorithm to implement binary search on a sorted arra	y. (04)	
2A.	Solve the following recurrences: (assume T (0) = T (1) = 1)		
	a. $T(n) = 2T(n-1)$		
	b. $T(n) = T(n-1) + 5$		
	c. $T(n) = T(n/3) + 1$ (Assume n is a power of 3).	(03)	
2B.	With examples compare built-in and derived data types.	(03)	
2C.	What are the operations that can be performed on an array? Write algorithms to illu them.	strate (04)	
3A.	Write an algorithm to implement a linked list data structure.	(04)	
3B.	Using the linked list defined in Q3A. implement an ordinary queue data structure w supported operations.	ith all (03)	
3C.	Convert the following expression into postfix notation using stacks showing all necesses: ((8+4) x $3^2 - (9+8) x 2$) / 4 x 2	essary	
	Evaluate the postfix expression using stacks to obtain the result for the expression.	(03)	
4A.	Create a binary search tree for the following sequence of data, A =[12, 3, 45, 7, 90, 56, 15, 9]. Perform In-order, Pre-order and Post-order traversals on the binary search tree. the tree after each item is inserted.	1, 66, Show (03)	
4B.	Illustrate the solution of a 4x4 Sudoku puzzle using graph coloring technique.	(03)	
4C.	Write an algorithm to obtain minimum spanning tree using Prim's algorithm. Trac algorithm for the graph shown in Fig. 4C.	ce the (04)	

5A.	Write an algorithm to merge two sorted arrays. Illustrate how this algorithm is used to solve sorting of arrays using divide-and-conquer technique.	(03)
5B.	Illustrate how recursive divide-and-conquer algorithm to find Fibonacci numbers is improved in terms of time complexity using dynamic programming technique.	(03)
5C.	Write an algorithm using dynamic programing technique to find the all pairs shortest path for the graph shown in Fig. 4C. Also obtain the adjacency matrix with shortest path for different pairs of vertices.	(04)



Fig. 4C