Reg. No.



MANIPAL INSTITUTE OF TECHNOLOGY

VI SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

END SEMESTER EXAMINATIONS, APRIL 2018

SUBJECT: DATA STRUCTURES & ALGORITHM [ELE 4018]

REVISED CREDIT SYSTEM

'S	Date: 26 th April 2018	Max Marks: 50
3	Date. 20 April 2010	IVIAN. IVIAI NS. JU

Time: 3 Hour **Instructions to Candidates:**

- ✤ Answer ALL the questions.
- Missing data may be suitably assumed.
- What is the time complexity of the following codes? 1A.

Code-1	Code-2					
int i, j;	int i, j;					
for (i = 0; i < 10; i++) {	for (i = 0; i < 10; i++) {					
for (j = 1; j <= 10; j = j * 2) {	for (j = 0; j < 10; j ++) {					
Application code	Application code					
}	}					
}	}					

- 1B. Determine the big- O notation for the following:
 - $5 n^{5/2} + n^{2/5}$ i.
 - ii. $6 \log(n) + 9 n$
 - $3 n^4 + n \log(n)$ iii.
 - $5 n^2 + n^{3/2}$ iv.
- 1C. Let an array be represented by A[L ... U] where, the lower bound L = -15 and the upper bound U = 64. The array is stored in a memory with starting address 459. Assume that the word size of each element is 2.
 - i. If one word of memory is equal to 2 bytes, then how much memory is required to store the entire array?
 - ii. What is the address of A[50]?
- 2A. Write an algorithm, with detailed comments, that reads a list of integers (not arranged in any order) from the keyboard using single linked list and, prints the greatest and the smallest numbers in the list.
- 2B. Write an algorithm, with detailed comments, to delete a node from a double linked list if the key (say, KEY) is found. If the key is not found then a message "KEY NOT FOUND" should be displayed. Let the address of the 1st node be stored in HEADER. (04)

(06)

(04)

(04)

(02)

- 3A. Show detailed stack operation involved in converting the arithmetic expression (A +**B**) C - (**D** * **E**) / **F** to postfix notation.
- Postfix representation of an arithmetic expression is ABC * D /+ . Show detailed stack 3B. operation involved in the evaluation of the expression. Take A = 2, B = 3, C = 4, D = 6 (03)
- A queue is maintained in an array, Q[1 ... N]. Let FRONT and REAR represent the front 3C. and rear locations respectively. Write separate subroutines for ENQUEUE() and DEQUEUE() operations. Also check for "Queue is full" during engueue operation and "Queue is empty" during dequeue operation. (03)
- 4A. The inorder and postorder traversals of a binary tree are shown in the table below. Construct the binary tree.

Inorder	N1	N2	N3	N4	N5	N6	N7	N8	N9
Postorder	N1	N3	N5	N4	N2	N8	N7	N9	N6

- A Binary Search Tree (BST), containing integer data, is implemented using linked list. 4B. Write an algorithm, with detailed comments, to insert an integer at appropriate location in the tree.
- 4C. Write down the steps to create a max heap tree with the following numbers 33, 42, 67, 23, 44, 49, 74. (03)
- Explain the depth first search (DFS) traversal for the graph shown in Fig. 5A below. (06) 5A.
- 5B. Write down the adjacency matrix of the graph shown in Fig. 5B below. Draw the linked list representation of the graph. Write down the adjacency matrix if a new node, v8, is inserted between nodes v1 and v4. (04)



Fig.5B

(02)

(05)

(04)