Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA– SEMESTER –I EXAMINATION –SUMMER-2019

Subject Code:3610003   **Date: 18/05/2019**

Subject Name: Program Design Techniques

Time:02.30 pm to 05.00 pm   **Total Marks: 70**

Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain the following terms:	
		1) Pseudo-random numbers	01
		2) Sorting	02
		3) Exchange of two variables	02
		4) Algorithm Complexity	02
	(b)	Answer the following:	07
		1) How can array elements be accessed?	
		2) Devise an algorithm to find the occurrence of a given number in an array.	
Q.2	**(a)**	How can you break a problem into sub problems? Explain with example.	07
	(b)	Design an algorithm that counts the number of non-negatives and negatives in a given set of numbers.	07
		OR	
	(b)	Design an algorithm to convert binary number to decimal.	07
Q.3	**(a)**	Write a brief account on efficiency of algorithms. Support your answer with appropriate example.	07
	(b)	Given a number n, devise an algorithm to compute its square root.	07
		OR	
Q.3	**(a)**	Write an algorithm to compute sine function $\sin(x)= x/1! - x^3/3! + x^5/5! + ---+ x^n/n!$, where n is accepted as an input.	07
	(b)	Develop an algorithm that accepts a positive number and then reverse the number. For example, Input is 5679 , expected Output is 9765	07
Q.4	**(a)**	Develop an algorithm to compute summation of a set of numbers.	07
	(b)	Differentiate between the top-down and bottom-up design.	07
		OR	
Q.4	**(a)**	What do you understand by program verification? Discuss any three ways by which you can verify your program.	07
	(b)	Design and implement hash searching algorithm.	07
Q.5	**(a)**	Design an algorithm to find the minimum number in a set and its' position where it first occurs.	07
	(b)	Write an algorithm to find the greatest common divisor of two integers.	07
		OR	
Q.5	**(a)**	What is binary search? Explain the strategy for binary search algorithm.	07
	(b)	Devise an algorithm to generate and print Fibonacci series where last number of the series is given as an input.	07

****