Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA – SEMESTER – I • EXAMINATION – SUMMER 2018

Subject Code: 3610003 Date: 24-May-2018

Subject Name: Program Design techniques

Time: 02.30 pm to 5.00 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 following terms. (1) algorithm (2) recursion (3) sorting (4) modularity (5) linear search (6) efficient algorithm (7) program verification	**07**
	(b)	What is binary search? Explain the strategy for binary search algorithm.	**07**
Q.2	**(a)**	Design an algorithm to compute the average of n numbers.	**07**
	(b)	What are the qualities and capabilities of a good algorithm?	**07**
		OR	
	(b)	Explain about the worst and average case behavior of algorithm.	**07**
Q.3	**(a)**	Devise an algorithm to generate and print the first n terms of the Fibonacci sequence where $n \geq 1$.	**07**
	(b)	Design an algorithm to convert binary number to decimal.	**07**
		OR	
Q.3	**(a)**	Given a number n, devise an algorithm to compute its square root.	**07**
	(b)	Given some integer X, compute the value of X^n where n is a positive integer considerably greater than 1.	**07**
Q.4	**(a)**	Design an algorithm to find the maximum number in a set and the position where it first occurs.	**07**
	(b)	Design an algorithm that accepts a positive integer and reverses the order of its digits. For example, for Input : 18274 , Output : 47281	**07**
		OR	
Q.4	**(a)**	Find the position of number x (if it occurs) in an array of n elements.	**07**
	(b)	Design and implement hash searching algorithm.	**07**
Q.5	**(a)**	Explain about the types of recursive algorithms.	**07**
	(b)	Which points should be considered for constructing loops?	**07**
		OR	
Q.5	**(a)**	What are the general considerations for setting up data structures?	**07**
	(b)	Explain stepwise refinement strategy for algorithm design.	**07**

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