

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. **07**
- (1) algorithm
 - (2) recursion
 - (3) sorting
 - (4) modularity
 - (5) linear search
 - (6) efficient algorithm
 - (7) program verification
- (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**
