

**GUJARAT TECHNOLOGICAL UNIVERSITY****MCA - SEMESTER- 1 EXAMINATION – WINTER 2018****Subject Code: 3610003****Date: 05-01-2019****Subject Name: Program Design techniques****Time: 10.30 am to 1.00 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) (1) Given two variables, a and b, write an algorithm to exchange the values assigned to them. **03**  
 (2) Discuss breaking of problem into sub problems for better design. **04**
- (b) (1) Explain choice of suitable data structure for a better design. **04**  
 (2) Explain array element referencing. **02**  
 (3) What is program and algorithm? **01**
- Q.2** (a) For a given n, devise an algorithm to compute  $1/n!$  **07**  
 (b) Given an integer n devise an algorithm that will find its smallest exact divisor other than one. **07**
- OR**
- (b) Given a set of examination marks of n students, make a count of the number of students that obtained each possible mark. **07**
- Q.3** (a) Discuss all considerations for construction of loops. **07**  
 (b) Explain binary search algorithm. **07**
- OR**
- Q.3** (a) Design an algorithm that accepts a positive integer and reverse the order of its digits. **07**  
 (b) Design an algorithm that counts the numbers which are less than 10 in a given set of numbers. **07**
- Q.4** (a) Discuss program debugging. **07**  
 (b) Write an algorithm to find the maximum number in a set of n numbers. **07**
- OR**
- Q.4** (a) Explain program testing. Take reference of binary search algorithm. **07**  
 (b) Discuss linear recursion. **07**
- Q.5** (a) Write an algorithm to convert the character representation of an integer to its conventional decimal format. **07**  
 (b) Design an algorithm to establish all the primes in the first n positive integers. **07**
- OR**
- Q.5** (a) Explain hash search algorithm. **07**  
 (b) Discuss effects of redundant computations with example for algorithm efficiency. **07**

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