

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-III (NEW) EXAMINATION – WINTER 2017

Subject Code: 2131004

Date: 21/11/2017

Subject Name: Digital Electronics

Time: 10:30 AM to 01:00 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) Define: 1) Fan in 2) Noise Margin 3) Propagation Delay **03**
- (b) State and prove De’Morgan theorem. **04**
- (c) Discuss Universal gates. Obtain AND, OR gate using NAND and NOR gates. **07**
- Q.2**
- (a) Perform following subtraction using 2’s complement method. **03**
- $(11010)_2 - (10000)_2$
- (b) Converts the following nos. **04**
- (i) $(52)_{10} = ()_2$ (ii) $(436)_8 = ()_{16}$ (iii) $(5C7)_{16} = ()_{10}$
- (iv) $(11011.101)_2 = ()_{10}$
- (c) Draw the truth table of full adder and implement using minimum number of logic gates. **07**
- OR**
- (c) Explain Excess-3 code and Gray Code. **07**
- Q-3**
- (a) Show that $AB'C + B + BD' + ABD' + A'C = B + C$ **03**
- (b) Express the Boolean function $F = AB + A'C$ in a product of maxterm. **04**
- (c) Reduce the expression in SOP and POS form using K-map. **07**
- $F(A,B,C,D) = \sum_m (1,5,6,12,13,14) + d(2,4)$
- OR**
- Q-3**
- (a) Explain briefly 3 to 8 line decoder. **03**
- (b) What is multiplexer? With logic circuit and function table explain the working of 4 to 1 line multiplexer. **04**
- (c) Simplify the following Boolean function by means of the Tabulation Method. **07**
- $F(A,B,C,D) = \sum(1,2,3,5,6,7,8,9,12,13,15)$

- Q-4** (a) Give comparison of TTL and CMOS family. **03**
 (b) Give the comparison between synchronous and asynchronous counters. **04**
 (c) Explain working of master-slave JK flip-flop with necessary logic diagram, state equation and state diagram. **07**
- OR**
- Q-4** (a) Draw logic diagram, graphical symbol and Characteristic table for clocked D flip-flop. **03**
 (b) Design 4-bit ripple counter using negative edge triggered JK flip flop. **04**
 (c) With necessary sketch explain Bidirectional Shift Register with parallel load. **07**
- Q-5** (a) Distinguish between combinational and sequential logic circuits. **03**
 (b) Explain Moore machine. **04**
 (c) Compare ROM, PLA and PAL. **07**
- OR**
- Q-5** (a) Describe magnitude comparator. **03**
 (b) Explain the types of finite state machines. **04**
 (c) Explain the problem associate of an asynchronous state machine with the help of one example. **07**
