Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–III (Old) EXAMINATION – WINTER 2019

Subject Code: 130701   **Date: 26/11/2019**
Subject Name: Digital Logic Design
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)** Convert following Decimal Number to Hex, Binary and octal Number.   **07**
    1) 157.786   2) 937.125
   (b) Justify the statement: "NAND and NOR gates are universal gates."   **07**

Q.2 **(a)** Expand A+BC'+ABD'+ABCD to minterm and maxterm.   **07**
   (b) Obtain the simplified expressions in SOP for the following Boolean function   **07**
using K-Map method. And implement it using NAND gate.
F(A,B,C,D) = ABC+AB'C+BCD'+A'CD
OR
   (b) Simplify the following Boolean function by means of the tabulation method and   **07**
implement it using NAND gate. F(A,B,C,D) = Σ(0,1,4,7,13,14) +d(5,8,15)

Q.3 **(a)** Design a 1:16 demultiplexer using 1:8 demultiplexer.   **07**
   (b) Draw a truth table and logic circuit to realize the following Boolean function   **07**
using multiplexer. F(A,B,C,D)= Σ (0, 1, 3, 6, 8, 10, 12, 15)
OR
Q.3 **(a)** With neat logic diagram, explain Universal shift register.   **07**
   (b) Design 4-bit BCD adder using two 4-bit binary parallel adders.   **07**

Q.4 **(a)** Draw the characteristics and excitation table of JK flip flop. Design Conversion   **07**
circuit of JK Flip flop to SR Flip flop.
   (b) Design 3-bit binary synchronous counter using JK Flip Flop.   **07**
OR
Q.4 **(a)** Define following parameters related to logic family and Compare all the logic   **07**
families based on these parameters :(i) Propagation Delay (ii) Fan-out
(iii) Fan-in (iv) Noise margin.
   (b) Draw the state diagram of BCD ripple counter, develop it's logic diagram and   **07**
explain the operation of circuit.

Q.5 **(a)** Draw the block diagram of a processor unit with control variables and explain   **07**
its operation.
   (b) Discuss the differences between hard wired control & micro program control.   **07**
State their merits and demerits.
OR
Q.5 **(a)** Explain Register transfer micro operation and arithmetic micro operation.   **07**
   (b) Explain bus organization for four processor register and ALU connected   **07**
through common buses.

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