

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. $F(A,B,C,D) = \Sigma(0,1,4,7,13,14) + d(5,8,15)$
- 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. $F(A,B,C,D) = \Sigma(0, 1, 3, 6, 8, 10, 12, 15)$
- 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.
