

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-III (NEW) EXAMINATION – WINTER 2020****Subject Code:3131704****Date:09/03/2021****Subject Name:Digital Electronics****Time:10:30 AM TO 12:30 PM****Total Marks:56****Instructions:**

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Define the following: **03**
 i. Noise Margin
 ii. Propagation Delay
 (b) Show that NAND and NOR are universal gates. **04**
 (c) Perform the following conversions: **07**
 i. Binary to Decimal: $(1010.011)_2$
 ii. Hexadecimal to Decimal: $(2AF.31)_{16}$
 iii. Decimal to Binary: $(345.75)_{10}$
 iv. Hexadecimal to Binary: $(306.D)_{16}$
- Q.2** (a) Explain the basic principle of working of 4:1 Multiplexer. **03**
 (b) Explain DeMorgan's Theorem with a suitable example. **04**
 (c) Simplify the 4 variable Boolean expression using K-Map: **07**
 $F(W, X, Y, Z) = \sum_m(0,3,4,5,8,10,11,12,13,14)$
- Q.3** (a) Differentiate between sequential logic and combinatorial logic. **03**
 (b) What is Parity Generator? Discuss different types of parity generators. **04**
 (c) Design a full adder circuit using half adders and OR gate. **07**
- Q.4** (a) What the applications of flip flop? **03**
 (b) What are Finite State Machines? Discuss its applications in digital systems. **04**
 (c) Explain the workings of a J-K flip flop with the relevant circuit diagram and truth table. **07**
- Q.5** (a) What is a ripple counter? **03**
 (b) Discuss D-type flip flop. **04**
 (c) Explain shift registers in detail. **07**
- Q.6** (a) Write a short note on Arithmetic and Logic Unit. **03**
 (b) State the advantages of ECL (Emitter Coupled Logic) over TTL (Transistor-Transistor Logic). **04**
 (c) Give the classification of memories and explain the following: **07**
 i. RAM
 ii. ROM
 iii. EEPROM
- Q.7** (a) What is meant by magnitude comparator? **03**
 (b) Write applications of Multiplexers and Demultiplexers. **04**
 (c) Explain Master-Slave J-K flip flop with relevant diagram and truth table. **07**
- Q.8** (a) Explain arithmetic and logic micro-operations. **03**
 (b) How does an encoder differ from a decoder? **04**
 (c) Discuss ring counter with the relevant diagram. **07**
