

**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**

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