

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER– III (New) EXAMINATION – WINTER 2019****Subject Code: 2131704****Date: 3/12/2019****Subject Name: Digital Logic Circuits****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) What is Race condition? **03**  
 (b) Define : 1) Fan in **04**  
 2) Fan out  
 3) Propagation Delay  
 4) Noise margin  
 (c) State and Prove De Morgan's theorem. **07**
- Q.2** (a) Write a short note on PLA. **03**  
 (b) Convert the following **04**  
 i. Decimal number 256 to Hexadecimal equivalent.  
 ii. Decimal number 648 to octal equivalent.  
 (c) Draw logic diagram, symbol and characteristic table for JK flip-flop. **07**  
 OR  
 (c) Explain positive edge-triggered D flip-flop. **07**
- Q.3** (a) Explain state table, state diagram with example. **03**  
 (b) Design full subtractor using half subtractors. **04**  
 (c) With the help of a neat diagram, explain the working of a two-input TTL NAND gate. **07**  
 OR
- Q.3** (a) Realize Ex-OR gate and NOT gate using NOR gate. **03**  
 (b) Reduce the expression: **04**  
 I.  $A[B + \overline{C}(AB + AC)]$   
 II.  $(A + \overline{BC})(A\overline{B} + ABC)$   
 (c) Explain BCD-to-Seven segment decoder. **07**
- Q.4** (a) Draw neat diagram of 3x8 decoder circuit. **03**  
 (b) Simplify the Boolean function using K-map: **04**  
 $F(w,x,y,z) = \sum m(0,1,2,4,5,6,8,9,12,13,14)$   
 (c) Explain with logic diagram of 4-bit serial-in serial-out shift register. **07**  
 OR
- Q.4** (a) Write a short note on shift register. **03**  
 (b) Write a short note on Arithmetic micro operation in detail. **04**  
 (c) Explain 4-bit ring counter with circuit diagram and waveforms. **07**
- Q.5** (a) Convert SR flip-flop into T flip-flop. **03**  
 (b) Draw neat diagram of 2-bit magnitude comparator circuit. **04**  
 (c) Write the state table and state equation with the state diagram of clocked D flip-flop. **07**  
 OR
- Q.5** (a) Explain 2 bit binary UP counter using JK flip-flops. **03**  
 (b) Distinguish between combinational and sequential switching circuits. **04**  
 (c) Explain Successive Approximation ADC. **07**

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