

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-III (NEW) EXAMINATION – SUMMER 2021

Subject Code:3131102

Date:11/09/2021

Subject Name:Digital System Design

Time:10:30 AM TO 01:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

	MARKS
Q.1 (a) Convert as below	3
(i) $(10101010)_2 = ()_8 = ()_{16}$	
(ii) $(673.10)_8 = ()_2$	
(iii) $(ACE)_{16} = ()_{10}$	
(b) Show that NAND & NOR are universal gates	4
(c) Minimize the following function in SOP minimal form using K-Maps: $F(A, B, C, D) = m(1, 2, 6, 7, 8, 13, 14, 15) + d(3, 5, 12)$	7
Q.2 (a) Explain SOP & POS form.	3
(b) Implement the 8×1 MUX using two 4×1 MUX.	4
(c) Design a 4 bit binary to gray code converter and implement using EX-OR gates only.	7
OR	
(c) Design a combination circuit to display 0 to 9 on seven segment.	7
Q.3 (a) State and prove De Morgan's theorem	3
(b) Implement Full Adder using 3×8 decoder.	4
(c) Explain about JK & RS Flip Flop circuit using its symbol, block diagram, truth table and characteristics equation.	7
OR	
Q.3 (a) Distinguish between combinational and sequential logic circuits.	3
(b) Implement the following Boolean function $F(w, x, y, z) = \Sigma (2, 3, 5, 6, 11, 14, 15)$ with a multiplexer.	4
(c) Explain Bidirectional Shift Register with parallel load.	7
Q.4 (a) Derive excitation tables for R-S, J-K and T flip-flops.	3
(b) Implement T flip flop using D flip flop.	4
(c) What is a PLA circuit? Explain in details about it.	7

OR

- Q.4 (a)** What is sample & Hold? **3**
- (b)** Compare TTL, ECL and CMOS Logic. **4**
- (c)** Explain Master Slave JK flip-flop with truth table and circuit diagram **7**
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- Q.5 (a)** Define Noise margin, Propagation delay, fan-in and fanout **3**
- (b)** Design 3-bit synchronous up counter using T flip flop **4**
- (c)** Explain about a synchronous counter using 3 bits. **7**
- OR**
- Q.5 (a)** Explain any one D/A converter. **3**
- (b)** Draw and explain Ring counter **4**
- (c)** Describe the operation of 4-bit bidirectional shift register with logic diagram **7**
