

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-III (OLD) EXAMINATION – WINTER 2017

Subject Code:130701

Date:14/11/2017

Subject Name: Digital Logic 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.

- Q.1 (a)** With neat logical diagram and truth table explain all the basic gates including NAND, NOR, EX-OR, and EX-NOR gate. **07**
- (b)** Do as directed. **07**
- 1) $(673.124)_8 = ()_2$
 - 2) $(4522.25)_{10} = ()_2$
 - 3) $(FACE)_{16} = ()_{10}$
 - 4) $(10101010)_2 = ()_8 = ()_{16}$
 - 5) Subtract using 2's complement method. $(10010)_2 - (10011)_2$
 - 6) $(10101101)_2 = ()_{\text{gray}}$
 - 7) $(8620)_{10} = ()_{\text{BCD}} = ()_{2421}$
- Q.2 (a)** Simplify the following Boolean function using K-map and implement it. **07**
- 1) $F(w,x,y,z) = (0,1,2,4,5,6,8,9,12,13,14)$
 - 2) $F(w,x,y) = (0,1,3,4,5,7)$
- (b)** Explain how NAND and NOR gates can be utilized as universal gates to implement all the basic gates. **07**
- OR**
- (b)** What is a combinational circuit? Why it is required in digital circuits? Explain construction and working of R-S flip flop in detail. **07**
- Q.3 (a)** Design and implement 3 bit odd parity generator circuit. **07**
- (b)** Design a 4 bit binary to gray code converter and implement using EX-OR gates only. **07**
- OR**
- Q.3 (a)** Design a 3 bit full adder circuit and implement it using a half adder circuit. **07**
- (b)** Discuss in detail shift registers. **07**
- Q.4 (a)** With logical diagram and functional table explain the operation of 4 to 1 line multiplexer. **07**
- (b)** With logical diagram and functional table explain the operation of 3 to 8 line decoder. **07**
- OR**
- Q.4 (a)** Design a 4 bit binary up counter. **07**
- (b)** Explain in detail master slave J-K flip flop. **07**
- Q.5 (a)** With respect to register transfer logic explain inter register transfer with necessary diagrams. **07**
- (b)** Write a detailed note on semiconductor memory and PLD **07**
- OR**
- Q.5 (a)** Write a short note on arithmetic, logic and shift micro operations. **07**
- (b)** Discuss micro program control in detail. **07**
