

GUJARAT TECHNOLOGICAL UNIVERSITY
PDDC - SEMESTER-II • EXAMINATION – SUMMER • 2014

Subject Code: X21102**Date: 24-06-2014****Subject Name: Digital Logic Design****Time: 10:30 am - 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)** Do a directed **07**
- 1) $(52)_{10} = (\quad)_2$
 - 2) $(367.52)_{10} = (\quad)_8$
 - 3) $(2598)_{10} = (\quad)_{16}$
 - 4) $(101111010001)_2 = (\quad)_{10}$
 - 5) $(231)_8 = (\quad)_{10}$
 - 6) State Identity Law & Inverse Law.
 - 7) Find 10's complement of $(52520)_{10}$.
- (b)** State and prove De Morgan's Theorems with the help of truth tables. **07**
- Q.2 (a)** Define the following terms: **07**
- 1) Literal
 - 2) Logic gate
 - 3) Fan out
 - 4) Power dissipation
 - 5) Universal gate
 - 6) Propagation delay
 - 7) Register
- (b)** Simplify the following expressions and implement with NAND gate circuits: **07**
- 1) $F(A,B,C,D) = BD + BCD' + AB'CD'$
 - 2) $F(X,Y,Z) = \sum(0,6)$
- OR**
- (b)** Simplify the following Boolean function by using tabulation method: **07**
- $$F(A,B,C,D) = \sum(0,1,2,8,10,11,14,15)$$
- Q.3 (a)** Define combinational logic circuit and implement the full subtractor circuit. **07**
- (b)** Design a BCD to Decimal decoder. **07**
- OR**
- Q.3 (a)** Implement a full adder circuit with a decoder and two OR Gates. **07**
- (b)** Design Mod 10 Counter using J-K Flip flop. **07**
- Q.4 (a)** What is race around condition? Explain the Master-Slave J-K flip-flop. **07**
- (b)** Explain 3-to-8 line decoder with diagram and truth table. **07**
- OR**
- Q.4 (a)** What is Multiplexer? With logic circuit and functional table explain the working of 8-to-1 line multiplexer. **07**
- (b)** Design a 3-bit up binary counter. **07**
- Q.5 (a)** Explain 4-bit bidirectional shift register with parallel load in detail. **07**
- (b)** What is the difference between Latch and Flip-flop? Explain D flip flop in brief. **07**
- OR**
- Q.5 (a)** Explain in brief arithmetic logic unit. **07**
- (b)** What is the difference between hardwired control and micro program control? Write advantages and disadvantages of each method. **07**
