

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEM-III Examination May 2012

Subject code: 130701

Subject Name: Digital Logic Design

Date: 09/05/2012

Time: 02.30 pm – 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) Convert the Decimal Number 250.5 to base 3, base 4, base 7 & base 16. **04**
- (b) Given Boolean function **05**
- $$F = x y + x' y' + y' z$$
1. Implement it with only OR & NOT gates
 2. Implement it with only AND & NOT gates
- (c) Design the Combinational Circuits for Binary to Gray Code Conversion. **05**

Q.2

- (a) Determine the Prime Implicants of following Boolean Function using Tabulation Method. **07**
- $$F(A,B,C,D,E,F,G) = \sum (20, 28, 38, 39, 52, 60, 102, 103, 127)$$
- (b) Explain Design Procedure for Combinational Circuit & Difference between Combinational Circuit & Sequential Circuit. **04**
- (c) Express following Function in Product of Maxterms **03**
- $$F(x,y,z) = (xy + z)(y + xz)$$

Q.3

- (a) Construct 4*16 Decoder with help of 2*4 Decoder. **05**
- (b) Discuss 4 bit BCD Adder in Detail. **05**
- (c) Explain Master Slave Flip Flop through J.K Flip Flop **04**
- OR

Q.3

- (a) Design Sequential Circuit with J.K. Flip Flops to satisfy the following state equation. **07**
- $$A(t+1) = A' B' C D + A' B' C + A C D + A C' D'$$
- $$B(t+1) = A' C + C D' + A' B C'$$
- $$C(t+1) = B$$
- $$D(t+1) = D'$$
- (b) Explain 4 bit Magnitude Comparator. **07**

Q.4

- (a) Explain 4bit binary ripple counter. **07**
- (b) Explain Arithmetic addition and arithmetic subtraction. **04**
- (c) Briefly explain processor unit with a 2-port memory **03**

P.T.O.

OR

Q.4

- (a) Define the different mode of operation of registers & explain any two in details. **07**
- (b) How many flip flops are required to build a shift register to store following numbers. **04**
- i) Decimal 28
 - ii) Binary 6 bits
 - iii) Octal 17
 - iv) Hexadecimals A
- (c) Explain Macro operations Versus micro operations **03**

Q.5

- (a) Explain 4-bit up-down binary synchronous counter. **07**
- (b) Explain common cathode types seven segments displays. **03**
- (c) Simplify the following Boolean function using K-Map. **04**
- $$F = A'B'C' + B'CD' + A'BCD' + AB'C'$$

OR

Q.5

- (a) Explain Johnson Counters. **07**
- (b) Write the Comparisons between Hard wired control and micro programmed Controls. **03**
- (c) Design a combination circuits for a full adder. **04**

===== Best of Luck =====