

Reg. No. :

Question Paper Code : 71376

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015.

Third Semester

Computer Science and Engineering

CS 2202/CS 34/EC 1206 A/080230012/10144 CS 303 — DIGITAL PRINCIPLES
AND SYSTEM DESIGN

(Common to Information Technology)

(Regulation 2008/2010)

(Common to PTCS 2202 – Digital Principles and System Design for B.E. (Part-Time)
Second Semester – CSE – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Convert the binary number 10111011 into gray code.
2. What is mean by duality in Boolean algebra?
3. Give the truth table for half adder and write the expression for sum and carry.
4. Write any two advantages of HDL.
5. Write the HDL data flow description of four bit adder.
6. Differentiate between encoder and decoder.
7. Write the characteristics equation of a JK flip flop.
8. Define: Shift register.
9. What is an implementation table?
10. Write short notes on Static-1 hazard.



PART B — (5 × 16 = 80 marks)

11. (a) Minimize the expression using K-map and Quine Mccluskey method.
 $Y = A'BC'D' + A'BC'D + ABC'D' + ABC'D + AB'C'D + A'B'CD'$. (16)

Or

- (b) (i) Simplify the following using tabulation method.
 $Y(w, x, y, z) = \sum m(1, 2, 3, 5, 9, 12, 14, 15) + \sum d(4, 8, 11)$. (10)
- (ii) Implement the following Boolean function with NAND-NAND logic
 $F(A, B, C) = \sum m(0, 1, 3, 5)$. (6)

12. (a) (i) Explain the design procedure for combinational circuits with suitable examples. (8)
- (ii) Briefly explain about VLSI design flow with flowchart. (8)

Or

- (b) Design a logic circuit for converting excess-3 code to 8421 code and explain. (16)
13. (a) Implement the following Boolean function using 8:1 multiplexer. (16)
 $F(A, B, C, D) = A'BD' + ACD + B'CD + A'C'D$

Or

- (b) Implement the following Boolean functions using PAL. (16)
- $w(A, B, C, D) = \sum m(0, 2, 6, 7, 8, 9, 12, 13)$
- $x(A, B, C, D) = \sum m(0, 2, 6, 7, 8, 9, 12, 13, 14)$
- $y(A, B, C, D) = \sum m(2, 3, 8, 9, 10, 12, 13)$
- $z(A, B, C, D) = \sum m(1, 3, 4, 6, 9, 12, 14)$.

14. (a) Design a sequential circuit with two T flip flops A and B, one input x and one output z is specified by the following next state and output equation is
- $A(t+1) = BX' + B'X$
- $B(t+1) = AB + BX + AX$
- $Z = AX' + A'B'X$

- (i) Draw the logic diagram of the circuit
- (ii) List the state table for the sequential circuit.
- (iii) Draw the corresponding state diagram. (16)

Or

- (b) (i) Draw and explain the parallel in serial out shift register and explain. (8)
 - (ii) Draw the block diagram of Johnson counter and explain. (8)
15. (a) Design an asynchronous sequential circuit with two input x and y and with one output z whenever y is 1, input x is transferred to z . when y is 0, the output does not change for any change in x . (16)

Or

- (b) (i) Define: Hazards. (2)
- (ii) Explain about:
 - (1) Static Hazards (5)
 - (2) Dynamic Hazards (5)
 - (3) Essential Hazards. (4)

