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ECE

104-5

**Question Paper Code : 21353**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

Third Semester

Electronics and Communication Engineering

EC 2203 / EC 34 / 10144 EC. 304 / 080290010 – DIGITAL ELECTRONICS

(Regulation 2008 / 2010)

(Common to PTEC 2203 – Digital Electronics for Third Semester B.E. (Part-Time)  
Electronics and Communication Engineering – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State De Morgan's theorem.
2. What are Don't care terms?
3. Design a Half subtractor using basic gates.
4. Draw the logic diagram of a 4 line to 1 line Multiplexer.
5. Convert D flipflop to T flipflop.
6. How many flipflops are required to build a binary counter that counts from 0 to 1023?
7. What are the different types of programmable logic devices?
8. Distinguish between PLA and PAL.
9. What are Hazards?
10. Distinguish between a flowchart and an ASM chart.

PART B — (5 × 16 = 80 marks)

11. (a) Minimize the given switching function using Quine – McClusky method.

$$f(x_1, x_2, x_3, x_4) = \sum(0, 5, 7, 8, 9, 10, 11, 14, 15) . \quad (16)$$

Or

- (b) Simplify the given Boolean function into

(i) Sum of products form (8)

(ii) Product of sum form and implement if using basic gates. (8)

$$F(A, B, C, D) = \sum(0, 1, 2, 5, 8, 9, 10).$$

12. (a) Design a BCD adder and explain its working with necessary circuit diagram. (16)

Or

- (b) Design a 4 bit magnitude comparator and draw the circuit. (16)

13. (a) Design a counter to count the sequence 0, 1, 2, 4, 5, 6 using SRFFs. (16)

Or

- (b) Design a 4 bit Asynchronous Ripple counter and explain its operation with timing diagrams. (16)

14. (a) Design using PAL the following Boolean functions.

$$W(A, B, C, D) = \sum(2, 12, 13)$$

$$X(A, B, C, D) = \sum(7, 8, 9, 10, 11, 12, 13, 14, 15)$$

$$Y(A, B, C, D) = \sum(0, 2, 3, 4, 5, 6, 7, 8, 10, 11, 15)$$

$$Z(A, B, C, D) = \sum(1, 2, 8, 12, 13). \quad (16)$$

Or

- (b) Design and explain a 32 × 8 ROM. (16)

15. (a) Design a hazard-free asynchronous circuit that changes state whenever the input goes from logic 1 to logic 0. (16)

Or

- (b) (i) Design a full adder using two half adders by writing verilog program. (10)
- (ii) Write Explanatory notes on Algorithmic state machines. (6)
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