K 1036

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2004.

Fifth Semester

Electrical and Electronics Engineering

EE 333 — DIGITAL SYSTEMS

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Add $1A8_{16}$ and $67B_{16}$.

2. Express a 15-bit Hamming code in general.

3. State two absorption properties of Boolean Algebra.

4. State two significant features of tabular method of minimization of Boolean functions.

5. Define noise margin.

6. How many inputs are required for $W = A\overline{B}D + AC\overline{D} + EF$?

7. Define a memory cell. Give an example.

8. What are shift-register counters? List two widely used shift-register counters.

9. What is FPLA?

10. Explain about state reduction.

PART B — ($5 \times 16 = 80$ marks)

11. (i) Generate the following Boolean functions with a PAL with 4 inputs and 4 outputs. (8)

$$Y_3 = \overline{A}B\overline{C}D + \overline{A}BC\overline{D} + \overline{A}BCD + AB\overline{C}D$$
$$Y_2 = \overline{A}BC\overline{D} + \overline{A}BCD + ABCD$$
$$Y_1 = \overline{A}B\overline{C} + \overline{A}BC + A\overline{B}C + AB\overline{C}$$
$$Y_0 = ABCD$$

(ii) Design a four-state down counter using type T design procedures. (8)

12. (a) Perform the following arithmetic using $\overline{9}s$ arithmetic. Compare them.

(i) $835 - 274$

(ii) $429 - 476$ using BCD and Excess 3 codes. (16)

Or

(b) What are codes? Explain the different codes with examples. (16)

13. (a) (i) Discuss about the TTL parameters. (10)

(ii) Draw the TTL inverter circuit. (6)

Or

(b) (i) Implement a 3 to 8 line decoder. (8)

(ii) Implement the logic function $Y(A, B, C) = \Sigma m(1, 2, 7)$ using 74151 A and 74153. (8)

14. (a) Design a Binary to Gray converter. (16)

Or

(b) Simplify the following function using K-map and tabular methods. Compare the methods.

$$F(A, B, C, D) = \Sigma m(4, 5, 6, 7, 8)$$
$$d(A, B, C, D) = \Sigma m(11, 12, 13, 14, 15)$$

Implement using NAND gates. (16)

15. (a) Design a 4-bit synchronous 8421 decade counter with ripple carry. (16)

Or

(b) What is Race-around condition in latches? How is it overcome? Explain. (16)