E 262

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2003.

Third Semester

Information Technology

IF 242 — DIGITAL SYSTEM DESIGN

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. What is meant by weighted and non-weighted coding?

2. Convert A3BH and 2F3H into binary and octal respectively.

3. List out atleast 2 characteristics of ECL circuit.

4. Implement the switching function $Y = B\overline{C} + \overline{A}\,B + D$.

5. Draw 4 bit binary parallel adder.

6. What are the advantages of PGA?

7. What are the various types of triggering of FFS?

8. What are the advantages of shift registers?

9. What is meant by VHDL and what is its advantage?

10. What is meant by Race?

PART B — ($5 \times 16 = 80$ marks)

11. (i) Simplify the Boolean function $F(A, B, C, D) = \sum_m (1, 3, 7, 11, 15) + \sum_d (0, 2, 5)$. If don't care conditions are not taken care, what is the simplified Boolean function. What are your comments on it? Implement both circuits. (10)

(ii) Obtain the canonical sum of product form of the function $Y(A, B, C) = A + BC$. (6)

12. (a) (i) Implement $Y = \overline{AB} + A + (\overline{B + C})$ using NAND gates only. (5)

(ii) Implement $Y = (A + C)(A + \overline{D})(A + B + \overline{C})$ using NOR gates only. (5)

(iii) Write a short note on logic gates. (6)

Or

(b) Realize a BCD to Excess 3 code conversion circuit starting from its truth table. (16)

13. (a) (i) What is the need of Arithmetic circuits? (4)

(ii) Design a full subtractor. (8)

How is it different from a full adder? (4)

Or

(b) (i) How is the design of combinational and sequential logic circuits possible with PLA? (8)

(ii) How is FPGA useful in the implementation of logic circuits? (8)

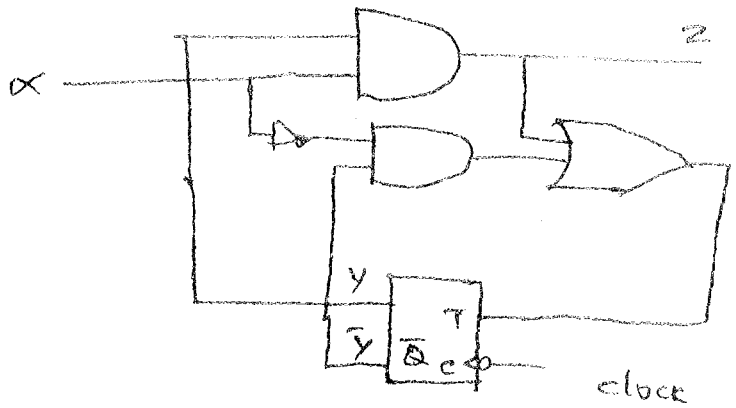
14. (a) Draw the state diagram and characteristic equation of T FF, D FF and J–K FF. (16)

Or

(b) (i) Discuss a decade counter and its working principle. (10)

(ii) Draw an asynchronous 4 bit up-down counter and explain its working. (6)

15. (a) (i) Analyse the synchronous sequential circuit shown in fig. (12)



(ii) Mention the two models in a sequential circuits and distinguish between them. (4)

Or

(b) (i) What are the problems in asynchronous circuits? (4)

(ii) How can essential hazards and static hazards eliminated? (12)