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Question Paper Code: 31362

B.E. / B.Tech. DEGREE EXAMINATION, NOVEMBER 2015

Third Semester

Instrumentation and Control Engineering

01UIC302 – DIGITAL LOGIC CIRCUITS AND DESIGN

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. State De Morgan's theorem.
2. What are the three Laws of Boolean algebra?
3. Draw the Logic diagram of a half adder and form the truth table.
4. What are the different types of shift register?
5. What is a sequential circuit?
6. What is Hazards? And list out its types.
7. Define primitive flow table.
8. What are the effects due to hazards?
9. Write the characteristics of an ECL Circuit.
10. Give the classification of logic families.

PART - B (5 x 16 = 80 Marks)

11. (a) Reduce the following using tabulation method and realize the simplified function using only $F(A, B, C, D) = \sum m(14, 12, 10, 8, 6, 4, 3, 2, 1, 0)$. (16)

Or

(b) Using Quine Mccluskey method minimize the following functions.

$$F(x_3, x_2, x_1, x_0) = \sum (0, 5, 7, 8, 9, 10, 11, 14, 15). \quad (16)$$

12. (a) Design full adder circuit and full subtractor circuit using logic gates and explain its function using truth table. (16)

Or

(b) Design a BCD to Excess 3 Code Converter. (16)

13. (a) (i) With a neat diagram explain the working of a master–slave JK flip flop. State its advantages. (10)

(ii) Distinguish between synchronous and asynchronous sequential circuits. (6)

Or

(b) (i) Explain in detail about Parallel in Parallel out shift Register. (8)

(ii) Explain in detail about Serial in Parallel out Shift Register. (8)

14. (a) (i) List and explain the steps used for analyzing an asynchronous sequential circuit. (10)

(ii) When do you get the critical and non-critical races? How will you obtain race free conditions? (6)

Or

(b) (i) Explain the hazards in combinational logic circuit. (10)

(ii) Explain the types of hazards. (6)

15. (a) Explain with the aid of a circuit diagram, the operation of a TTL 3-input NAND gate. (16)

Or

(b) Write a VHDL code for a up/down counter. (16)
