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**Question Paper Code: 31062**

B.E. / B.Tech. DEGREE EXAMINATION, OCTOBER 2014.

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. Convert  $(673.625)_{10}$  into Hexadecimal number.
2. What are the three Laws of Boolean algebra?
3. Draw the Logic diagram of a half adder and form the truth table.
4. Compare PROM and EPROM.
5. What is a sequential circuit?
6. Give the classifications of Shift Registers.
7. What are the effects due to hazards?
8. Define Flow Table.
9. Write the parameters used to characterise logic families.
10. Write the characteristics of an ECL Circuit.

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Plot the logic expression  $ABCD + ABC'D' + ABC + AB$  on a four variable K-Map; obtain a Simplified expression from the Map. (10)

- (ii) Simplify the expression using K-Map  
 $f(A,B,C,D) = \sum (1,5,7,8,9,10,11,14,15)$ . (6)

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) (i) Explain the design procedure for combinational logic circuits. (6)

- (ii) Explain the Logic implementation of Full Subtractor. (10)

Or

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

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

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

Or

- (b) Explain the working principle of JK Flip – Flop and explain about race around condition in JK flip flop and also explain how it can be avoided. (16)

14. (a) Explain briefly about the asynchronous sequential logic circuit with block diagram. (16)

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) Explain in detail about the operation of  $I^2L$  and write the comparison of typical  $I^2L$  and  $T^2L$  devices. (16)