EC 213 (R-22)

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II/IV B. Tech. DEGREE EXAMINATIONS, AUGUST - 2024

First Semester

ELECTRONICS AND COMMUNICATIONS ENGINEERING

DIGITAL LOGIC DESIGN

Time : **Three Hours** Maximum : **70** Marks

Answer ONE Question from each Unit. 5x14=70 M

All Questions carry equal marks.

UNIT - I

1. a) Convert the following :

   (i) $(53.625)_{10}$ to $(?)_2$ (ii) $(3FD)_{16}$ to $(?)_2$ (iii) $(A69.8)_{16}$ to $(?)_{10}$.

   b) Perform the decimal subtraction in 8-4-2-1 BCD using 9's complement

   (i) Subtract 79 from 26. (ii) Subtract 748 from 983.

(OR)

2. a) Using K-map find minimal expression for the following function.
   $f(A,B,C,D) = \Sigma(1,3,4,6,7,9,11,13,14,15)$

   b) Simplify the following expression using Boolean algebra rules.
   $\overline{\overline{A\overline{B}+ABC+A(B+A\overline{B})}}$.

UNIT - II

3. a) Design a combinational circuit which converts BCD to Excess-3 code.

   b) Implement the following Boolean function using 8:1 multiplexer
   F(A, B, C, D) = A'BD' + ACD + A'C' D + B' CD

(OR)

4. a) What is a combinational logic circuit ? Implement a Full adder using two half adders and one OR gate.

   b) Design 4 bit Magnitude Comparator and explain in detail.

UNIT - III

5. a) Compare synchronous sequential circuits and asynchronous sequential circuits.

   b) What is difference between latch and flip flop ? Explain about clocked RS flip flop using NAND gates.

P.T.O.

(OR)

6. a) Convert a D flip flop into SR flip flop and JK flip flop.

   b) What is a register ? Discuss the applications of shift registers ?

UNIT - IV

7. a) Draw the model of Mealy circuit and explain Mealy circuit with an example.

   b) Design a non-overlapping 101 Mealy sequence detector.

(OR)

8. a) Draw the model of Moore circuit and explain Mealy circuit with example.

   b) Design a Non-Overlapping Moore Sequence Detector for the sequence 1101.

UNIT - V

9. a) Compare the logic families.

   b) Explain 2-input RTL NOR gate.

(OR)

10. a) Explain 3-input RTL NOR gate.

    b) Realize logic circuit of 2-input DTL NAND gate.