EE 214 (R-22)

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

First Semester

ELECTRICAL AND ELECTRONICS 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) $(475.25)_8$ to its decimal equivalent, (ii) $(549.B4)_{16}$ to its binary equivalent.

   b) Realize the basic gates using only NAND and NOR gates.

(OR)

2. a) Simplify the following expression using Boolean algebra rules.

   $\overline{\overline{A\overline{B}+ABC+A(B+A\overline{B})}}\cdot$

   b) Design the circuit by using NAND gate F = ABC' + DE + AB'D'.

UNIT - II

3. a) Discuss a few applications of multiplexers and distinguish between a multiplexer and a decoder.

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

(OR)

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

   b) What is BCD ? Perform the addition of 8 and 9 in BCD.

UNIT - III

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

   b) What is ripple counter ? Explain 3-bit Ripple counter using JK flip flop.

P.T.O.

(OR)

6. a) Realize SR flip flop using JK flip flop.

   b) Design synchronous Mod-6 Gray code counter.

UNIT - IV

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

   b) Explain the procedure of addition using serial adder with an example.

(OR)

8. a) Explain the FSM as an Arbiter Circuit in detail.

   b) Draw an ASM chart and state diagram to describe a sequence detector that detects a sequence of 101. Design the control unit using JK flip-flop.

UNIT - V

9. a) Compare the logic families.

   b) State the important characteristics of TTL family.

(OR)

10. Write short notes on RTL and DDL logic families.