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I/IV B. Tech. DEGREE EXAMINATIONS, AUGUST - 2023

Second Semester

AM / CS / CYS / DS

DIGITAL ELECTRONICS

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

Answer All Questions

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

UNIT - I

1. a) Convert the given decimal number 234 to binary, octal, hexadecimal and BCD equivalent.

   b) Solve using K-map and implement using NAND gates only.

   $F(v,w,x,y) = \Sigma m (0,1,2,3,9,11,14,15) + d (4,5,7)$

(OR)

2. a) Design BCD to grey code system.

   b) State and prove the following Boolean laws

   (i) Commutative.

   (ii) Associative.

   (iii) Distributive.

UNIT - II

3. a) Explain the Quine-Mc Cluskey method of minimizing the Boolean functions. Also mention its limitation.

   b) Determine the prime-implicants, essential prime implicants and simplified expression for the following function.

   $F (w,x,y,z) = \Sigma (1,3,4,5,9,10,11) + \Sigma d (6,8)$.

(OR)

4. a) List the steps involved in simplification of K-Map.

   b) Simplify the Boolean function using Five Variable K-Map.

   $F = \Sigma m (0, 1, 2, 4, 7, 8, 12, 14, 15, 16, 17, 18, 20, 24, 28, 30, 31)$.

P.T.O.

UNIT - III

5. a) Design & implement Full adder using Decoder.

   b) Represent the following Boolean function with an 8 : 1 multiplexer.

   F (A, B, C, D) = A' BD' + ACD + B'CD + A'C'D.

(OR)

6. a) Design a 4 bit parallel adder using full adders.

   b) Design Magnitude comparator.

UNIT - IV

7. a) What is the need for Master Slave JK FF and explain its operation with neat diagrams.

   b) Explain the steps involved in analysis of the clocked sequential circuits.

(OR)

8. a) Convert SR flip flop into JK Flip-Flop. Draw and explain its logic diagram.

   b) Design and implement a 2 bit Up-Down Counter using JK FF's.

UNIT - V

9. a) Draw and explain a 4-bit Serial in Serial out (SISO) Shift Register.

   b) Illustrate the PAL for the following Boolean functions.

   (i) $A(w,x,y,z) = \Sigma m\,(0,2,6,7,8,9,12,13)$.

   (ii) $B(w,x,y,z) = \Sigma m\,(0,2,6,7,8,9,12,13,14)$.

(OR)

10. a) What is a synchronous counter ? Design a 3-bit synchronous up/down counter.

    b) Classify various types of RAMs. Explain.