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Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 33213 Roll No. 1 2 2 [redacted]

B. Tech. Examination 2023-24

(Odd Semester)

DIGITAL LOGIC DESIGN

Time : Three Hours] *[Maximum Marks : 60*

Note :– Attempt all questions.

SECTION–A

1. Attempt all parts of the following : 8×1=8

   (a) Write 2's complement of binary number 110010.

   (b) Plot Boolean expression :

   $$AB C' + AB C + A' B' C$$

   (c) Draw the logic circuit of half adder.

   (d) What is a combinational circuit?

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(e) What is a flip flop?

(f) What is a counter?

(g) Define pulse mode.

(h) What are the hazards in asynchronous circuits?

SECTION – B

2. Attempt any two parts of the following : 2×6=12

(a) Perform following conversions :

(i) $(123.25)_{10} = (\ )_2$

(ii) $(A1B)_{16} = (\ )_8$

(iii) $(1011.11)_2 = (\ )_{10}$

(b) What are universal gates and why we call these gates as universal? Explain it with example.

(c) Converts RS flip-flop to JK flip-flop.

(d) Explain working of BCD ripple counter along with circuit diagram.

SECTION – C

Note :– Attempt all questions. Attempt any two parts from each question. 5×8=40

3. (a) Using K-map find the Boolean function and its complement for the following :

$F(A, B, C, D) = \Sigma (1, 2, 3, 4, 6, 8, 9, 10, 11, 12, 14)$

(b) Express the Boolean function $F = A + B'C$ a sum of min terms and in product of max terms.

(c) Write a brief note on Gray codes. Also discuss methods for conversion from gray to binary code and vice versa.

4. (a) Simplify the following :

(i) $A'B + A'BC' + A'BCD + A'BC'D'E$

(ii) $(P + Q + R)(P' + Q' + R')P$

(b) What is the difference between serial and parallel transfer? What types of registers are used in each case?

(c) What is code converter? Implement the code converter that converts the BCD code to Excess-3 code.

5. (a) Write the characteristic table for JK and D flip-flops.

(b) Write the excitation table of RS, D, JK and T flip-flops.

(c) Define the master-slave flip-flop and how the master-slave flip-flop resolves the race around conditions.

6. (a) Explain design procedure for combinational circuit and difference between combinational circuit and sequential circuit.

(b) Explain any three programmable logic devices.

(c) Explain briefly with the difference between the Mealy model and Moore model.

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