

S.No. : 221

BCS 3303

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

PAPER ID : 33213

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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 :

$$ABC' + ABC + A'B'C$$

(c) Draw the logic circuit of half adder.

(d) What is a combinational circuit?

[P. T. O.]

- (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 : $2 \times 6 = 12$

- (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. $5 \times 8 = 40$

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 $F = A + B'C$ as 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.

[P. T. O.]

- (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.
