

S.No. : 142

BCS 3303

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

PAPER ID : 33213

Roll
No.

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B. Tech. Examination 2022-23

(Odd Semester)

DIGITAL LOGIC DESIGN

Time : Three Hours]

[Maximum Marks : 60

Note :- Attempt all questions.

SECTION-A

1. Attempt all parts of the following : $8 \times 1 = 8$

(a) The solutions to the quadratic equation

$$x^2 - 11x + 22 = 0 \text{ are } x = 3 \text{ and } x = 6$$

what is the base of the number?

(b) In K-map, the large number of cells that we group will produce better result. Why?

(c) Give one application each for mutiolevere and decoder.

[P. T. O.

- (d) What is canonical form?
- (e) What is the characteristics equation of a T flip-flop?
- (f) Give the comparison between synchronous and asynchronous sequential circuits.
- (g) What is the cause for essential hazards?
- (h) What is FPGA?

SECTION – B

2. Attempt any two parts of the following : $2 \times 6 = 12$

- (a) Give that a frame with bit sequence 1101011011 is transmitted, it has been received as 1101011010. Determine the method of detecting the error using any one error detecting code.
- (b) Implement following function using suitable multiplexer :
$$F(A, B, C, D) = \Sigma (1, 3, 4, 11, 12, 13, 14, 15)$$
- (c) Design a synchronous sequential circuit which goes through the following steps :

1, 3, 5, 3, 6, 1, 3, 5

- (d) What is FSM? Compare between Mealy and Moore machine.

SECTION – C

Note :- Attempt all questions. Attempt any two parts from each question. $5 \times 8 = 40$

3. (a) Solve the following given equation :

(i) $(75)_{10} = (?)_2 = (?)_8 = (?)_{16}$

(ii) $(135)_x = (531)_x = (666)_x$

- (b) Explain Hamming code with an example. State its advantage over parity codes.

(c) $F = (A, B, C, D, E) = \sum (0, 1, 2, 3, 4, 5, 9, 10, 16, 17, 18, 19, 20, 22, 25, 26) + \sum d (7, 11, 12, 13, 15, 23, 27, 28, 29, 30)$.

Obtain minimal SoP expressing using K-map.

4. (a) Differentiate between a MUX and DEMUX.

- (b) Design a half adder logic using only NOR gate.

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- (c) Implement the function :

$$F(P, q, r, s) = \Sigma (0, 1, 2, 4, 7, 10, 11, 12)$$

using decoder.

5. (a) What are the various types of shift register? Explain each.
- (b) Explain the circuit of a SR flip-flop and explain its operation.
- (c) Construct a JK flip-flop using JK flip-flop, a 2×1 MUX and an inverter.
6. (a) Find a circuit that has no static hazards and implements the Boolean function :

$$F(A, B, C, D) = \Sigma (0, 2, 6, 7, 8, 10, 12)$$

- (b) What are the steps in the analysis and design of asynchronous sequential circuit? Explain with an example.
- (c) Solve using Quine-McCluskey method :

$$\Sigma 1, 3, 5, 7, 8, 16, 20, 25, 31$$
