

C 6071

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Name.....

Reg. No.....

**FOURTH SEMESTER B.TECH. (ENGINEERING) DEGREE
EXAMINATION, JUNE 2010**

EC 04 403—DIGITAL ELECTRONICS

(2004 Admissions)

Time : Three Hours

Maximum : 100 Marks



Answer all questions.

Part A

- I. (a) Explain floating point representation.
- (b) Find the min-terms of the following Boolean expression $Y = A\bar{B} + \bar{A}B + AC$.
- (c) Explain what is meant by fan-in and fan-out.
- (d) Explain the function of S-R flip flop with truth table.
- (e) Explain the concept of Moore models.
- (f) What is excitation table ? Give excitation table for S-R flip flop and J-K flip flop.
- (g) Compare synchronous and asynchronous sequential circuits.
- (h) Explain the significance of Hazards.

(8 × 5 = 40 marks)

Part B

- II. (a) Simplify the following Boolean function of Queen-Mclusky method :—

$$F(A, B, C, D, E, F) = \sum m(6, 9, 13, 18, 19, 25, 27, 29, 41, 45, 57, 61).$$

Or

- (b) (i) Design a full adder and realize using only NAND logic. (10 marks)
- (ii) Write short note on ASCII code. (5 marks)

- III. (a) Draw the circuit of a TTL NAND gate and explain its operation.

Or

- (b) (i) Draw the circuit of Master-Slave JK flip-flop and explain its operation with truth table. (9 marks)
- (ii) Draw the circuit of ring counter and explain. (6 marks)

Turn over

IV. (a) Design a counter with the following binary sequence 0, 4, 2, 1, 6 and repeat use J.K. flip flop.

Or

(b) Derive the state diagram for an FSM that has an input W and an output Z. The machine has to generate Z = 1 when the previous four values of W were 1001 or 1111 ; other wise, Z = 0. Overlapping input patterns are allowed.

V. (a) Explain the method to eliminate static hazard in an asynchronous circuit with an example.

Or

(b) Design an asynchronous circuit that has two inputs x_1 and x_2 and one single output Z. The circuit is required to give an output whenever the input sequence 00, 10, 11 and 01 are received but only in that order.

[4 × 15 = 60 marks]

- (b) Find the min-terms of the following Boolean expression $Y = \bar{A}\bar{B} + \bar{A}B + AC$.
- (c) Explain what is meant by fan-in and fan-out.
- (d) Explain the function of S-R flip flop with truth table.
- (e) Explain the concept of Moore models.
- (f) What is excitation table? Give excitation table for S-R flip flop and J-K flip flop.
- (g) Compare synchronous and asynchronous sequential circuits.
- (h) Explain the significance of Hazards.

(8 × 5 = 40 marks)

Part B

II. (a) Simplify the following Boolean function of Quen-Mcclusky method —

$F(A, B, C, D, E, F) = \sum m(0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31)$

Or

- (b) (i) Design a full adder and realize using only NAND logic. (10 marks)
- (ii) Write short note on ASCII code. (5 marks)

III. (a) Draw the circuit of a TTL NAND gate and explain its operation.

Or

- (b) (i) Draw the circuit of Master-Slave JK flip-flop and explain its operation with truth table. (9 marks)
- (ii) Draw the circuit of ring counter and explain. (6 marks)