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# 333356(33)

## B. E. (Third Semester) Examination, April-May 2021

**(New Scheme)**

**(IT Branch)**

## DIGITAL ELECTRONICS and LOGIC DESIGN

***Time Allowed : Three hours***

***Maximum Marks : 80***

***Minimum Pass Marks : 28***

***Note :*** *Part (a) from each question is compulsory carrying 2 marks. Attempt any* ***two*** *parts from (b), (c) and (d) of each question carrying 7 marks each.*

### Unit-I

**1.** (a) Compare BCD with Binary. 2

(b) Write down the steps to minimize Boolean expression and also discuss different theorem involve in it. 7

(c) Minimize the following boolean function using K Map : 3½+3½

(i) $F_1(A,B,C,D,E) = \Sigma m(0,2,5,7,9,11,13,15,16,18,21,23,25,27,29,31)$

(ii) $F_2(A,B,C,D) = \pi m(1,5,6,12,13,14) + d(2,4)$

(d) Solve following Boolean function using Quine-Mc Cluskeys method : 7

$F(A,B,C,D) = \Sigma m(1,3,4,5,9,10,11) + d(6,8)$

## Unit-II

**2.** (a) Write the answer of following in one word : 2

(i) Which logic family has the highest fan in, fan out and lowest power dissipation?

(ii) Which logic family is the fastest among all logic families and what is its propogation delay time?

(b) Design CMOS NOR gate and NAND gate logic and write the advantages and disadvantages of CMOS logic family. 7

(c) What is ECL logic? Why it is not so popular? Give advantages and disadvantage of it. 7





(d) Explain 2 $i/p$ TTL circuit in detail. 7

## Unit-III

**3.** (a) Drawa full adder circuit using two Half Adder circuit. 7

(b) Convert BCD to seven segment decoder. 7

(c) Design an even and odd parity bit generator using logic gates, if data is of 4 bits. 7

(d) (i) Implement the circuit for the given function using 4×1 MUX

$F(A,B,C) = \Sigma m(1,3,5,6)$ 3½

(ii) Design 16 : 1 MUX using 4 : 1 MUX. 3½

## Unit-IV

**4.** (a) Write excitation and characteristics table of JK flip-flop. 2

(b) Construct a mod-5 synchronous binary up-down counter using T-flip-flop. 7

(c) Design a counter with the following sequence 0, 3, 5, 6, and repeat. 7

(d) Implement :

(i) 4 bit Ripple counter using D flip-flop. 3½

(ii) 4 bit ring counter. 3½

## Unit-V

5. (a) Explain the function of programmable Array logic. 2

(b) Give the classification of semiconductor memory. Explain them briefly why semiconductor memories are better than other. 7

(c) Implement the following boolean function using PLA : 7

$$A(x, y, z) = \Sigma m(1, 2, 4, 6)$$

$$B(x, y, z) = \Sigma m(0, 1, 6, 7)$$

$$C(x, y, z) = \Sigma m(2, 6)$$

$$D(x, y, z) = \Sigma m(1, 3, 5, 7)$$

(d) How to convert a Melay machine into Moore machine? Explain with suitable example. 7