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B. E. (Third Semester) Examination, April-May 2020

(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) Convert $(1001011)_2$ to decimal.

(b) Simplify the following Boolean function by using Tabulation method :

$F = \sum(0,1,2,8,10,11,14,15)$

(c) Simplify the following using K-Map :

(i) $F(W, X, Y, Z) = \Sigma m(2, 3, 12, 13, 14, 15)$

(ii) $F(A,B,C,D) = \Pi m(1,4,5,11,12,14) \cdot d(6,7,15)$

(d) Minimize and Implement the following multiple output functions :

$$f_1 = \sum m(1,2,3,6,8,12,14,15)$$

$$f_2 = \Pi m(0,4,9,10,11,14,15)$$

Unit-II

2. (a) What is Fan-in and Fan-out.

(b) With the help of a neat diagram, explain working of a two Input TTL NAND gate.

(c) Explain CMOS Invertor with its diagram & characteristic.

(d) Explain working of two input I^2L NOR gate with its diagram.

Unit-III

3. (a) Explain Half Adder with its diagram.

(b) Design a BCD-to-XS-3 code convertor and also draw its logic diagram.

(c) Implement the Boolean function using 8 × 1 multiplexer select lines are A, B and D, as S_2, S_1 & S_0 respectively.

$$F(A,B,C,D) = \sum(0,1,3,4,8,9,15)$$

(d) Design a 3 bit odd parity generator and check the parity using 4 bit odd parity checker.

Unit-IV

4. (a) Explain sequential circuit with a block diagram.

(b) Explain with diagram a 4 bit bidirectional shift Register.

(c) Design a synchronous counter using T Flip-flop that goes through states, 0, 3, 5, 6, 0 ..... Is the counter self starting.

(d) Design a 4 bit Ring Counter using D flip-flops.

Unit-V

5. (a) Compare Moore Machine & Meelay Machine.

(b) Compare following programmble Logic Devices :
PROM and PLA and PAL

(c) Draw the state diagram and the state table for a Moore type sequence detector to detect the sequence 110.

(d) Explain various semiconductor memories in detail.