Total No. of Questions: 6 *Total No. of Printed Pages:2*

Enrollment No.....

Faculty of Engineering / Science
End Sem Examination Dec-2023
CS3CO33 / EC3CO07 / IT3CO26 / BC3CO38
Digital Electronics

Programme: B.Tech. / B.Sc. Branch/Specialisation: CSE All / EC / IT / Computer Science

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. A+A=A defined by- **1**
(a) Null law (b) Idempotent law (c) Identity law (d) None of these

ii. Canonical form is a unique way of representing- **1**
(a) SOP (b) POS
(c) Minterm (d) Boolean Expressions

iii. In two input XNOR, one input is A & another is always ground then output is: **1**
(a) 0 (b) 1 (c) A (d) A'

iv. Which gate is used as comparator? **1**
(a) NAND (b) NOR (c) XNOR (d) XOR

v. The basic latch consists of _____. **1**
(a) Two inverters (b) Two comparators
(c) Two amplifiers (d) Two adders

vi. What is an ambiguous condition in a NAND based S'-R' latch? **1**
(a) S'=0, R'=1 (b) S'=1, R'=0
(c) S'=1, R'=1 (d) S'=0, R'=0

vii. ROM internal structure consist of- **1**
(a) NAND and XOR arrays (b) NOR and NAND arrays
(c) Decoder and OR (d) OR and AND arrays

viii. The full form of PLA is _____. **1**
(a) Programmable Large Array (b) Programmable Logic Array
(c) Program Logic array (d) Printed Logical array

ix. Which type of ROM has to be programmed by the manufacturer? **1**
(a) EEPROM (b) EPROM (c) PROM (d) Mask Rom

x. Which ROM can be erased by an electrical signal? **1**
(a) ROM (b) Mask ROM (c) EPROM (d) EEPROM

Q.2 i. Determine the value of base x if $(211)_x = (152)_8$. **2**

ii. Express the Boolean function F=XY+X'Z in product of maxterm. **3**

iii. Express the following function as the minimal sum of products using a K-map. **5**
$F(a,b,c,d)=\sum(0,2,4,5,6,11,13,15)+\sum d(8,10,14)$

OR iv. Reduce the following using tabulation method. **5**
$F(A,B,C,D)=\sum(3,4,5,7,9,13,14,15)$

Q.3 i. Implement the Boolean functions using basic logic gates- **2**
(a) ABC'+(A'+B')C (b) ABC

ii. Define encoder & decoder. **3**

iii. Explain a full subtractor with logic diagram, truth table & Boolean equation. **5**

OR iv. Implement the Boolean function using 8:1 mux. **5**
F (A, B, C, D) =A'BD'+ACD+B'CD+A'C'D.

Q.4 i. Convert SR FF to JK FF using suitable diagram. **3**

ii. Define shift registers. Describe any two shift register with example. **7**

OR iii. Design a circuit for 3-bit synchronous up counter using T flip-flop. **7**

Q.5 i. Write types of memories. Which memory is called volatile? Why? **4**

ii. Compare the PROM, EPROM and EEPROM. **6**

OR iii. Explain dynamic RAM. **6**

Q.6 Attempt any two:

i. Explain the two inputs TTL NAND gate using neat circuit diagram. **5**

ii. Write a short note on DTL & RTL. **5**

iii. Write a short note on CMOS family. **5**

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