*Total No. of Questions: 6* *Total No. of Printed Pages:3*

**Enrollment No.** EN21CI304039

# Faculty of Engineering / Science

## End Sem (Odd) Examination Dec-2022

## CS3CO29 / CS3CO33 / EC3CO07 / IT3CO26 / BC3CO38

## Digital Electronics

Programme: B.Tech./ B.Sc.(CS) Branch/Specialisation: CS/EC/IT/ Computes 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.

Q.1 i. In Boolean algebra, the OR operation is performed by which properties? **1**

(a) Associative properties (b) Commutative properties

(c) Distributive properties (d) All of these

ii. Binary number 1001 is equal to octal number- **1**

(a) 13 (b) 9 (c) 10 (d) 11

iii. Decimal number 7 in Gray code is- **1**

(a) 1100 (b) 0101 (c) 0100 (d) 0111

iv. Half-adders have a major limitation in that they cannot- **1**

(a) Accept a carry bit from a present stage

(b) Accept a carry bit from a next stage

(c) Accept a carry bit from a previous stage

(d) Accept a carry bit from the following stages

v. Latches constructed with NOR and NAND gates tend to remain in the latched condition due to which configuration feature? **1**

(a) Low input voltages (b) Gate impedance

(c) Synchronous operation (d) Cross coupling

vi. In T flip flop, when T = 1, the flip-flop will be in the _____. **1**

(a) Set mode (b) Complement mode

(c) Reset mode (d) Store mode

vii. The total capacity of a memory that has 1024 addresses and can store 8 bits at each address is- **1**

(a) 2048 (b) 16384 (c) 128 (d) 8192

viii. How many address lines required for a 8K memory system? **1**

(a) 13 (b) 11 (c) 12 (d) 8

P.T.O.

ix. Which logic has higher speed among all the logic families? 1
(a) DTL (b) RTL (c) TTL (d) ECL

x. A TTL circuit acts as a current sink in the- 1
(a) High state (b) Low state (c) High impedance state (d) Ideal state

Q.2 i. Convert the decimal number 250.5 to Base 7. 2

ii. Convert the following in other canonical form: 3
(a) $F(A,B,C)= \sum(0,2,6,7)$ (b) $F(W,X,Y,Z)= \Pi(0,1,2,3,4,6,12)$

iii. Reduce the following function using K-map technique- 5
$F(A, B, C, D) = \Pi(0, 3, 4, 7, 8, 10, 12, 14) + d(2, 6)$.

OR iv. Reduce the following using tabulation method- 5
$F=m2+m3+m4+m6+m7+m9+m11+m13$.

Q.3 i. Show that a positive logic AND gate is a negative-logic OR gate and vice versa. 3

ii. Design full adder circuit on the basis of following- 7
(a) Circuit diagram (b) Truth table
(c) Characteristic equation

OR iii. Define multiplexer. Implement the Boolean function using 8:1 mux. 7
$F(A, B, C, D) = A'BD'+ACD+B'CD+A'C'D$.

Q.4 i. Define flip-flop. Write down its applications. 2

ii. Explain race around condition with neat diagram. 3

iii. Draw the circuit diagram of JK flip flop and explain its operation using truth table. 5

OR iv. Design an asynchronous MOD 10 up counter with neat diagram & truth table. 5

Q.5 i. State the classification of memories. Write down differences between RAM & ROM. 3

ii. Write notes on any two of the following: 7
(a) EPROM (b) PAL (c) SRAM

OR iii. A combinational circuit is defined by the functions. 7
$F1(a, b, c) = m(3, 5, 6, 7)$
$F2(a, b, c) = m(0, 2, 4, 7)$ implement the circuit with a PLA.

Q.6 Attempt any two:

i. Write down following specification for logic families 5

(a) Propagation delay (b) Figure of merit (c) Fan out

ii. State five characteristic of TTL logic. 5

iii. Write note on CMOS, NMOS, PMOS. 5

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