PAPER ID-421211

Roll No:

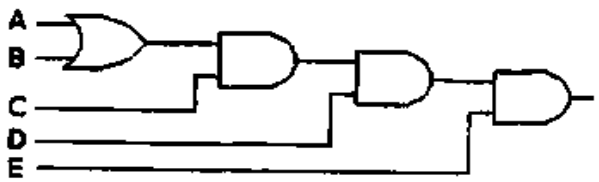
MCA(Integrated)
(SEM II) THEORY EXAMINATION 2021-22
DIGITAL ELECTRONICS

Time: 3 Hours *Total Marks: 70*

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2*7 = 14**

a.	convert a) (0110) BCD to Excess-3. b) convert (10011010) XS-3 to BCD.
b.	Define the difference between canonical form and standard form.
c.	Define the following terms by giving suitable example (a) POS (b) SOP.
d.	Draw three variable K-map format.
e.	Derive the Boolean expression for the logic circuit shown below: 
f.	Differentiate between sequential circuit and combinational circuit.
g.	Define modulus of a counter? Write down the number of flip flops required for mod-5 counter?

SECTION B

2. Attempt any *three* of the following: **7*3 = 21**

a.	Convert the following: i) $(5C7)_{16} = (?)_{10}$ ii) ii) $(2598)_{10} = (?)_{16}$ iii) iii) $(10110)_2 = (?)_{10} = (?)_{16}$
b.	Explain the Basic theorems and Properties of Boolean algebra in detail.
c.	Simplify the Boolean function by means of Tabulation method: $F(A, B, C, D) = \sum m(9,12,13,15) + \sum d(1,4,5,7,8,11,14)$
d.	Define Decimal Adder with truth table and logic diagram.
e.	Discuss the features of ripple counter in detail and design a 3-bit Ripple counter using a JK flip-flop along with its truth table.

SECTION C

3. Attempt any *one* part of the following: **7*1 = 7**

a.	Define digital computer. Draw the functional parts of a digital computer and explain its block.
b.	If X= 1010100 and Y=1000011, Compute X-Y and Y - X using 1's complement and 2's complement.

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4. Attempt any *one* part of the following: 7*1 = 7

a.	Realize the Boolean expression Z=ABC' + AD + CD' using NAND gates only.
b.	For the Boolean function F = xy'z + x'y'z + w'xy + wx'y + wxy a. Obtain the truth table of F. b. Draw the logic diagram, using the original Boolean expression. c. Use Boolean algebra to simplify the function to a minimum number of literals.

5. Attempt any *one* part of the following: 7*1 = 7

a.	Minimise the following function in SOP minimal form using K-Maps: F(A, B, C, D) = m(1, 2, 6, 7, 8, 13, 14, 15) + d(0, 3, 5, 12)
b.	Reduce the expression f = ∑ m (0,1,2,3,5,7,8,9,10,12,13) using K-maps and implement the real minimal expression using NAND logic.

6. Attempt any *one* part of the following: 7*1 = 7

a.	Differentiate between full adder and half adder. Implement a full adder with two half adders and an OR gate.
b.	Realize the following function F(A, B,C,D) = ∑m(1,3,4,10,11,12,13) using a) 4 X 1 MUX b) 8 X 1 MUX

7. Attempt any *one* part of the following: 7*1 = 7

a.	Describe the working of Master-Slave JK Flip-Flop with Truth Table and Logic diagram.
b.	Discuss the different types of shift registers with their block diagram.

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