Quiz-2

Course Title: Digital Logic Design

Course Code: CSE223

Section: 64_K

Date: 23 Sept 2024

Time: 25 minutes **Marks: 15**

1. What are the differences between Canonical Form and Standard Form? **[2]** **CO2**

2 Write down the Canonical and the standard SOP and POS form of F(A,B,C) **[5]** **CO2**

A	B	C	X = F(A,B,C)
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	1

3. **Simplify the following Boolean expression using a 4-variable K-map with sum of minterm:** **[4]** **CO3**

$F(A,B,C,D) = \sum(0,1,2,5,7,8,10,15) + \Sigma d(3, 4, 11,13)$

i. Simplify the Boolean expression using the K-map method.
ii. Write the simplified expression in Sum of Products (SOP) form.

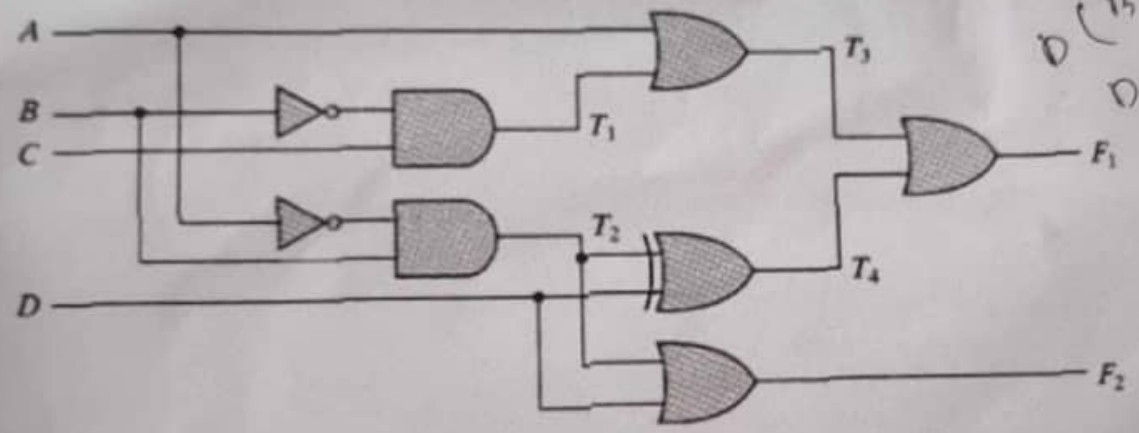
4. a) **Simplify the following Boolean expression using a 3-variable K-map with product of maxterms:** **[4]** **CO3**

$F(A,B,C) = \pi(1,2,4,6,7) + d(2,5)$

iii. Simplify the Boolean expression using the K-map method.
iv. Write the simplified expression in Product of Sum (POS) form.

1. Apply the simplification of the following Boolean function using K-map with sum of minterm:
$F(A,B,C,D) = \Sigma(0, 1, 2, 7, 8, 12,15) + \Sigma\, d(3, 4, 11,14)$

2. Demonstrate Boolean expression of the following circuit.



3. Develop a standard form the Boolean function $F(A,B,C,D)= \bar{B}D + \bar{A}D + BD$ as a sum of minterms and as a product of maxterms.

4. Construct the expression of Boolean function (F) and logic circuit from following truth table:

A	B	C	F
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0

Digital Logic Design (CSE-223) Quiz-01 Section: 64_C Date: 17-09-2024

You have countless options in life, but today you've got just three. Thank you for waking up and showing up for the quiz. Good morning, and happy quizzing!

1. Three friends, Ali, Sara, and Rafiq, decided to buy new gadgets from an electronics store. Each of them chose a different gadget, and coincidentally, the prices of their gadgets were given in different number systems: The prices given are as follows: Ali's gadget price $(101111101)_2$, Sara's gadget price $(750)_8$ and Rafiq's gadget price $(1E3)_{16}$. Now verify that who spend most.
2. Design a logic circuit for the Boolean expression **(A + B) C + DE** using basic logic gates (AND, OR, NOT). Then, re-implement the same circuit **using only NAND gates**. Show all steps and conversions for both implementations.
3. Design two logic circuits: one using the X-OR gate and the other using the X-NOR gate. Write the Boolean expressions for each gate and construct their truth tables, showing all possible input combinations and corresponding outputs.

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1.		Why number system conversion is needed? Convert $(A79E)_{16}$ to binary.	[2.5]	CO2
2		What is logic gate and what are the applications of X-OR gate	[2.5]	CO2
3.		Simplify the Boolean expression using Boolean algebra: F(A,B,C)=A'BC +AB'C'+ A'B'C'+AB'C+ ABC	[2]	CO2
4.	a)	Explain why NAND and NOR gates are considered universal gates. Demonstrate how to implement the basic logic gates (AND, OR, NOT) using only NOR gates. Provide the corresponding truth tables for each implementation.	[3]	CO3
	b)	Given the truth table below, derive the Boolean expression and implement the logic circuit using basic gates (AND, OR, NOT):	[5]	

A	B	C	X
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1