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202051213

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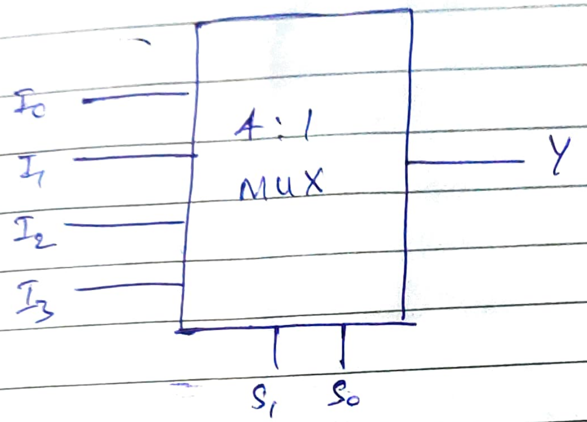
EC201 : Digital Logic Design

Remote Midsem Exam

① 202051213

a. ∵ last four digits are → 1213



∵ digits are in between 0 and 3

$I_0 = I_1 = I_2 = I_3 = 0$

∴ Truth Table

S_1	S_0	Output
0	0	$I_0 = 0$
0	1	$I_1 = 0$
1	0	$I_2 = 0$
1	1	$I_3 = 0$

∴ Output of multiplexer is always 'false'.

Or

$$Y = \bar{S_1}\bar{S_0}I_0 + \bar{S_1}S_0I_1 + S_1\bar{S_0}I_2 + S_1S_0I_3$$

$$Y = 0 + 0 + 0 + 0$$

$$\boxed{Y = 0}$$

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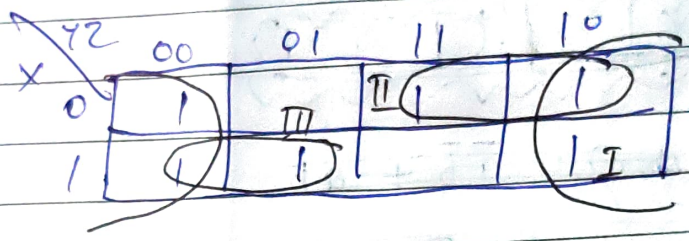
2. $f = \Sigma m(0, 2, 3, 4, 5, 6)$

Let the logical variable be X, Y, Z

$f(X, Y, Z) = \Sigma m(0, 2, 3, 4, 5, 6)$

the K-map for the function f is



possible pairings are shown by black pen

$\therefore f(X, Y, Z) = I + II + III$

$= \bar{Z} + X\bar{Y} + \bar{X}Y$

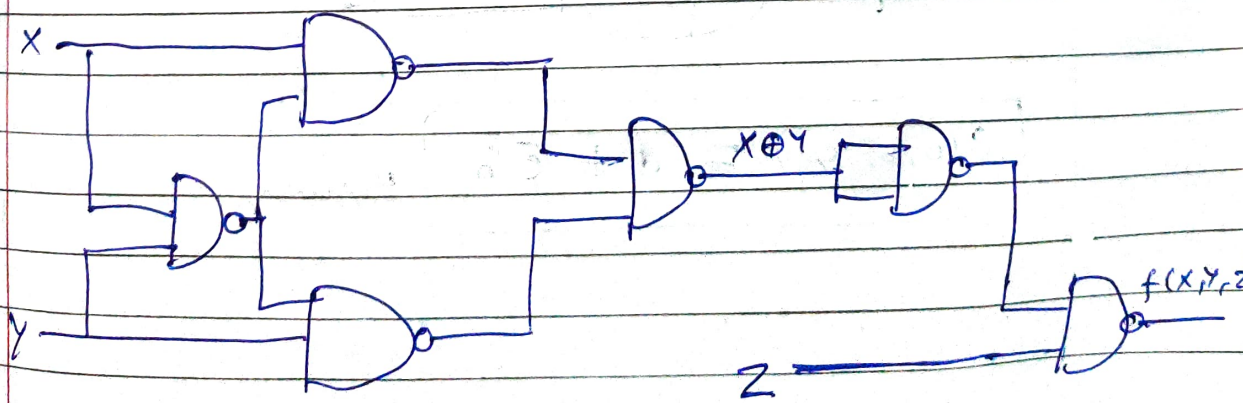
$= \bar{Z} + (X \oplus Y)$

Roll No. → 20205213

sum = 16

sum is even

realizing circuit using NAND gates



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Q.3 (1)

$f(a,b,c) = \Sigma m(0,1,6,7) + \Sigma d(3,4,5)$

K-map

a \ bc	00	01	11	10
0	1	1	x	
1	x	x	1	1

~~$f(a,b,c) = \bar{a}\bar{b} + ab$~~

$f(a,b,c) = \bar{b} + a$ — Answer

(2) $f(a,b,c,d) = \Sigma m(0,1,3,5,7,8,9,11,13,15)$

ab \ cd	00	01	11	10
00	1	1	1	
01		1	1	
11		1	1	
10	1	1	1	

$f(a,b,c,d) = d + \bar{c}\bar{b}$ — Answer

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4.

	D	C	B	A	Output
Jan (31)	0	0	0	0	1
Feb (28-29)	0	0	0	1	0
Mar (31)	0	0	1	0	1
Apr (30)	0	0	1	1	0
May (31)	0	1	0	0	1
June (30)	0	1	0	1	0
July (31)	0	1	1	0	1
August (31)	0	1	1	1	1
Sept (30)	1	0	0	0	0
Oct (31)	1	0	0	1	1
Nov (30)	1	0	1	0	0
Dec (31)	1	0	1	1	1

the K-map for the table is

DC \ BA	00	01	11	10
00	1			1 I
01	1		1 II	1
11	X	X	X	X
10		1	1 II	

Let the function be $f(D, C, B, A)$.

$$f(D, C, B, A) = \bar{D}\bar{A} + \bar{D}CB + D\bar{C}A$$

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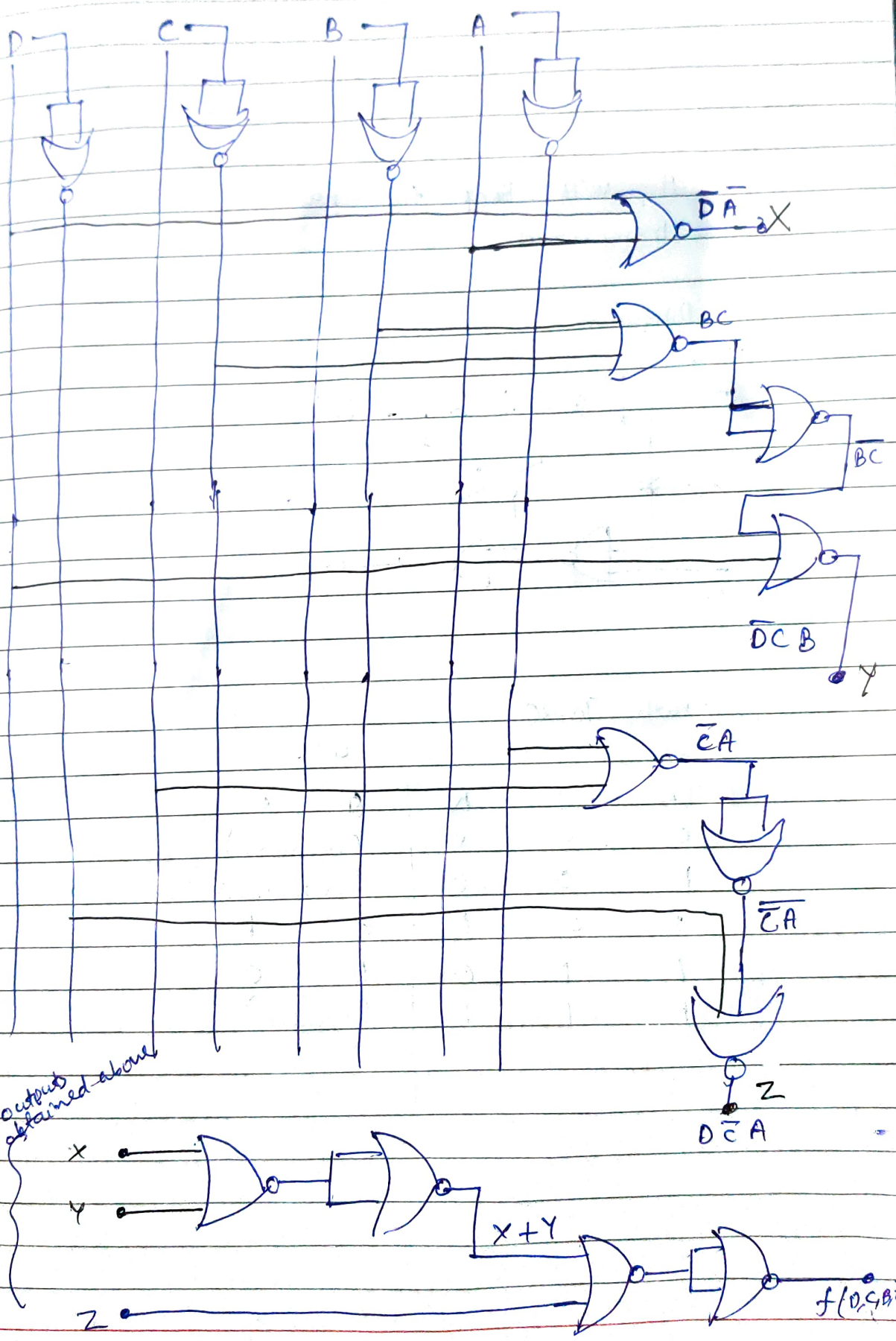

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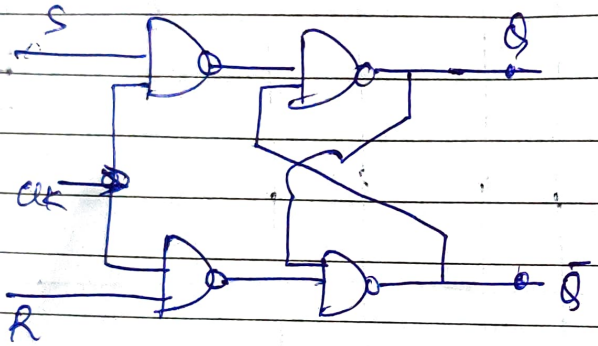
(5) Last digit is 3 → 0011

last two bits are 1 1.
If S and R are 1, 1 the, SR flip flop invalidates this state and it will keep the previous output memorized

Diagram



Truth Table

Clk	S	R	Output Q	Output Q'
0	X	X	(memory)	
1	0	0	(memory)	
1	0	1	0	1
1	1	0	1	0
1	1	1	(invalid)	