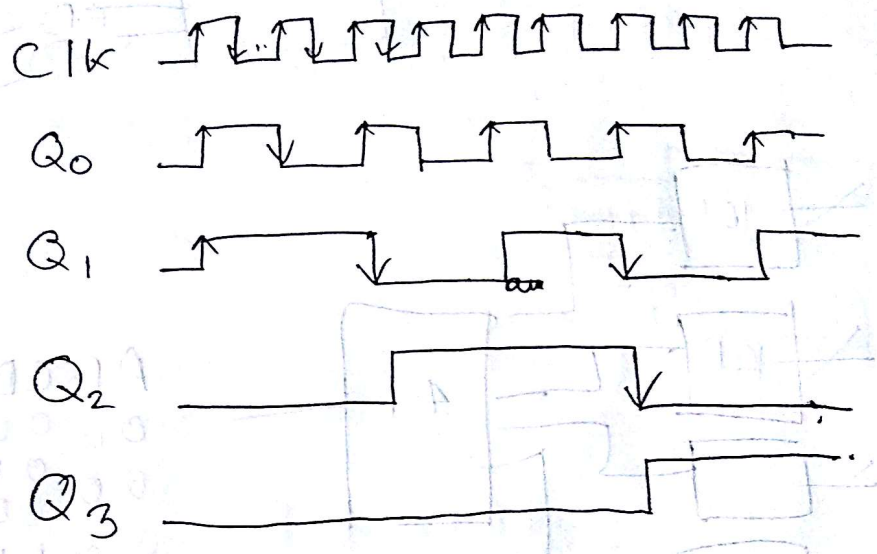
CSE 260 2015 Final (Summer)

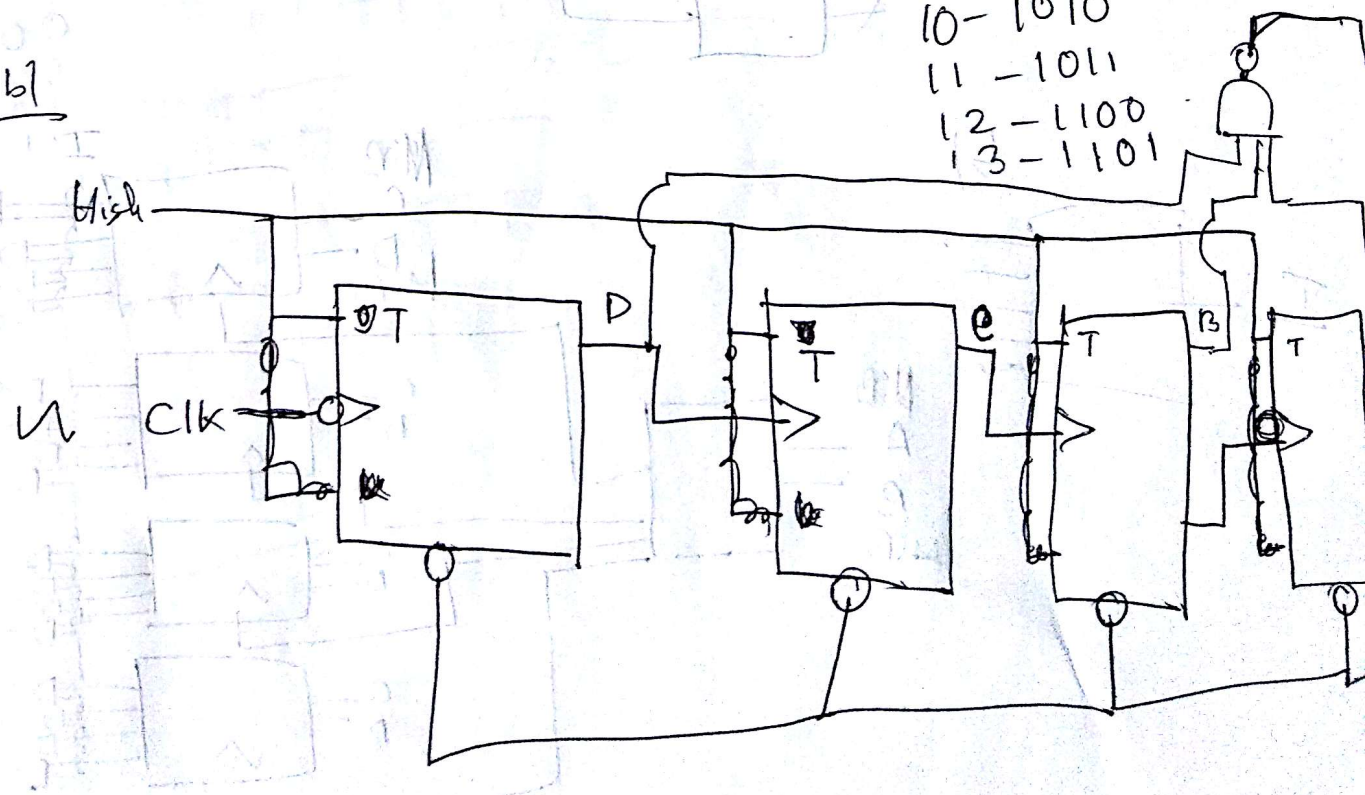
Q1

a)



b)

AB CD
10 - 1010
11 - 1011
12 - 1100
13 - 1101



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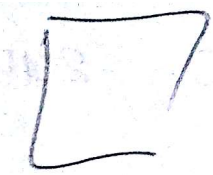
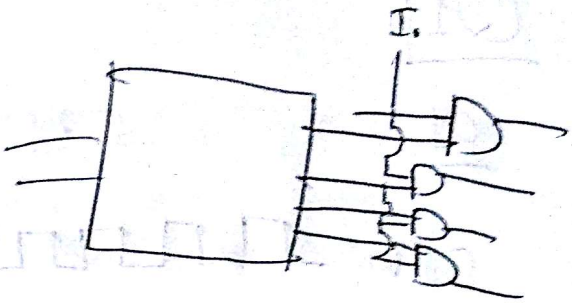
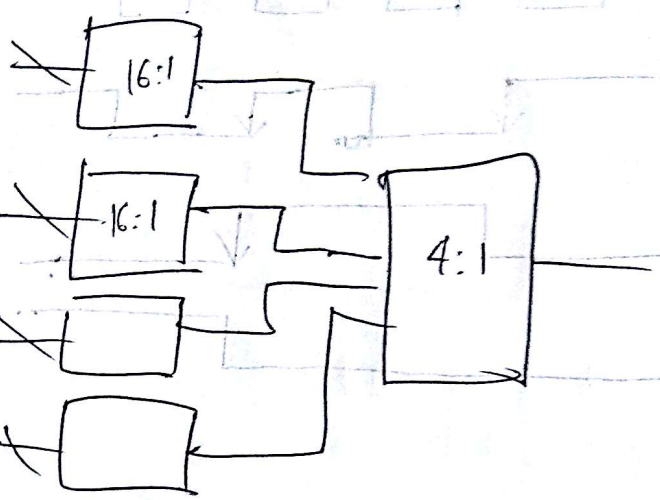
Q3

64:1



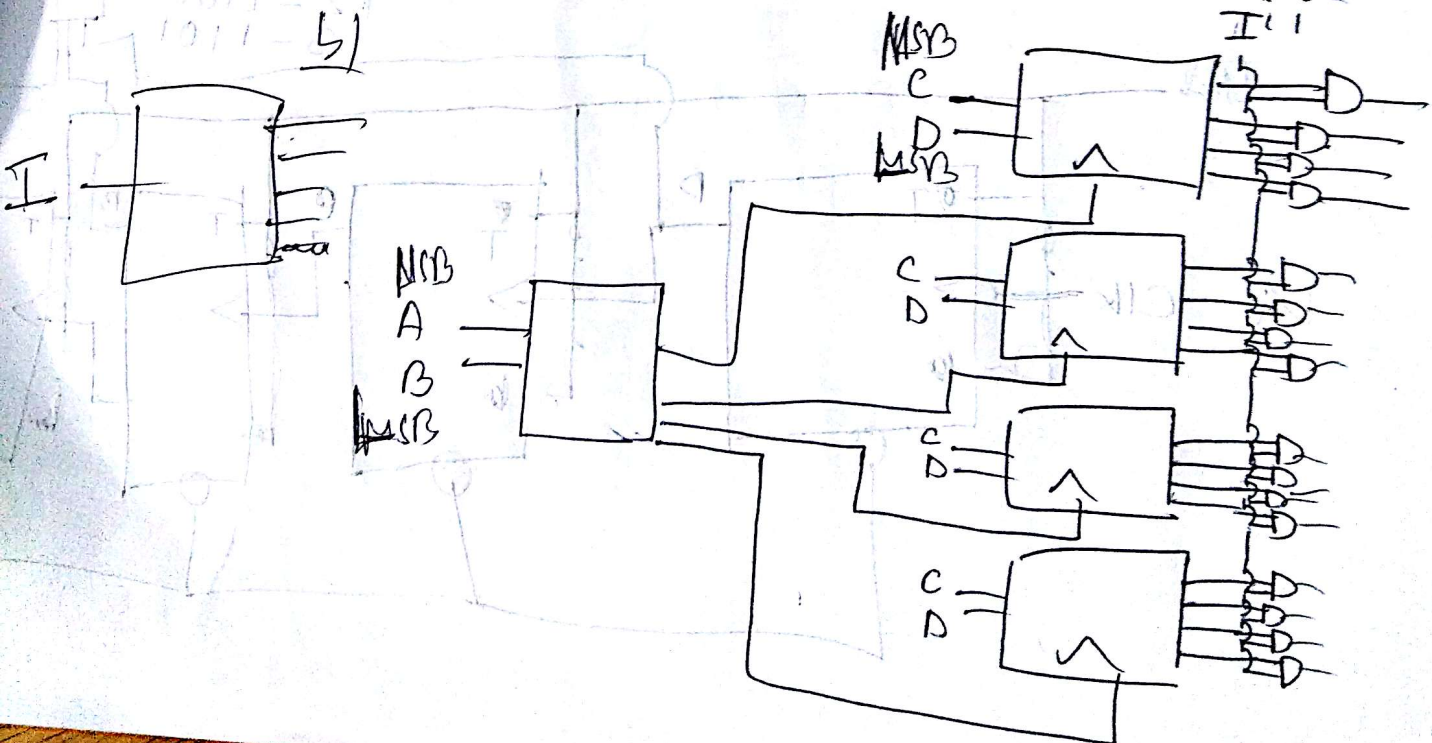


Q4



A	B	C	D
0	0	0	0
0	0	0	1
0	0	1	0
0	0	1	1
		0	0
		0	1
		1	0
		1	1

Q1



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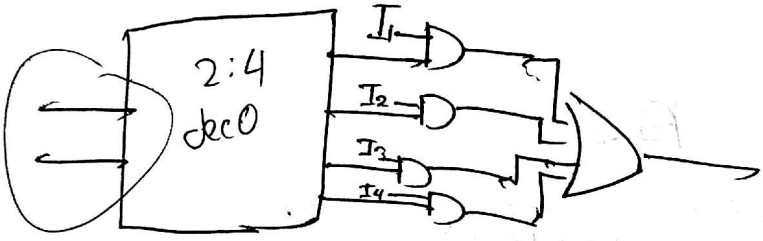

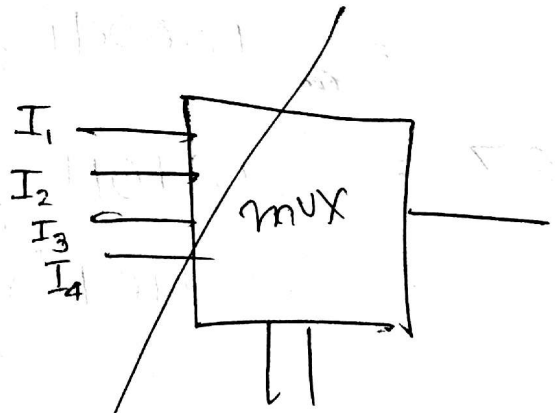

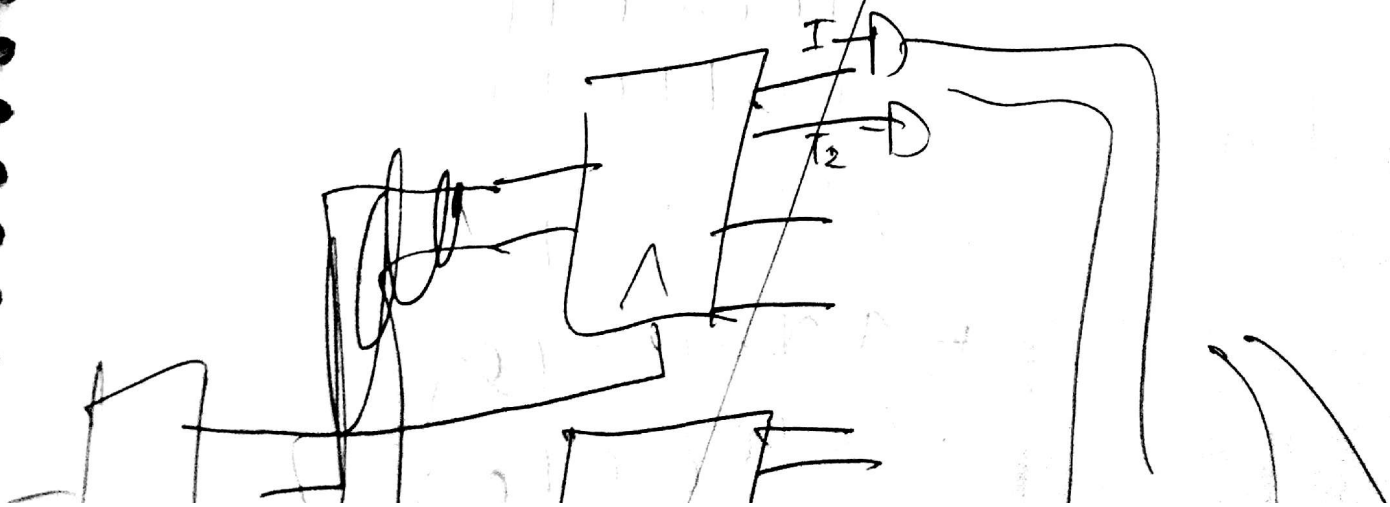

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4

1) $-61 = -(0111101)_2$

$= (1000010)_{1s}$

$= (1000011)_{2s}$

$27 = (0011011)_2$

$= (0011011)_{2s}$

$$\begin{array}{r} 1000011 \\ 0011011 \\ \hline (1011110)_{2s} \end{array}$$

$\leftarrow (0100010)_2$

$-(0100010)_2$

-34

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(iii) b

$-(27) = -(0011011)_2$

$= (1100100)_{1s}$ $(-27) = (1011011)_{sign\ mag}$

$= (1100101)_{2s}$

$-(61) = -(0111101)_2$

$= (1000010)_{1's}$

$= (1000011)_{2s}$

~~1 00101~~
~~1000~~

$$\begin{array}{r} 1\ 00101 \\ 0\ 00011 \\ \hline 1\ 0\ 01\ 10 \end{array}$$

Overflow

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Q4)

$(1\,0\,0\,1\,1\,0\,0)_{2s}$

$(0\,1\,1\,0\,1\,0\,0)_2$

c)

Unsigned	signed	sim ls	2s
76	-12	~~01100H~~ -51	-52

~~10011~~

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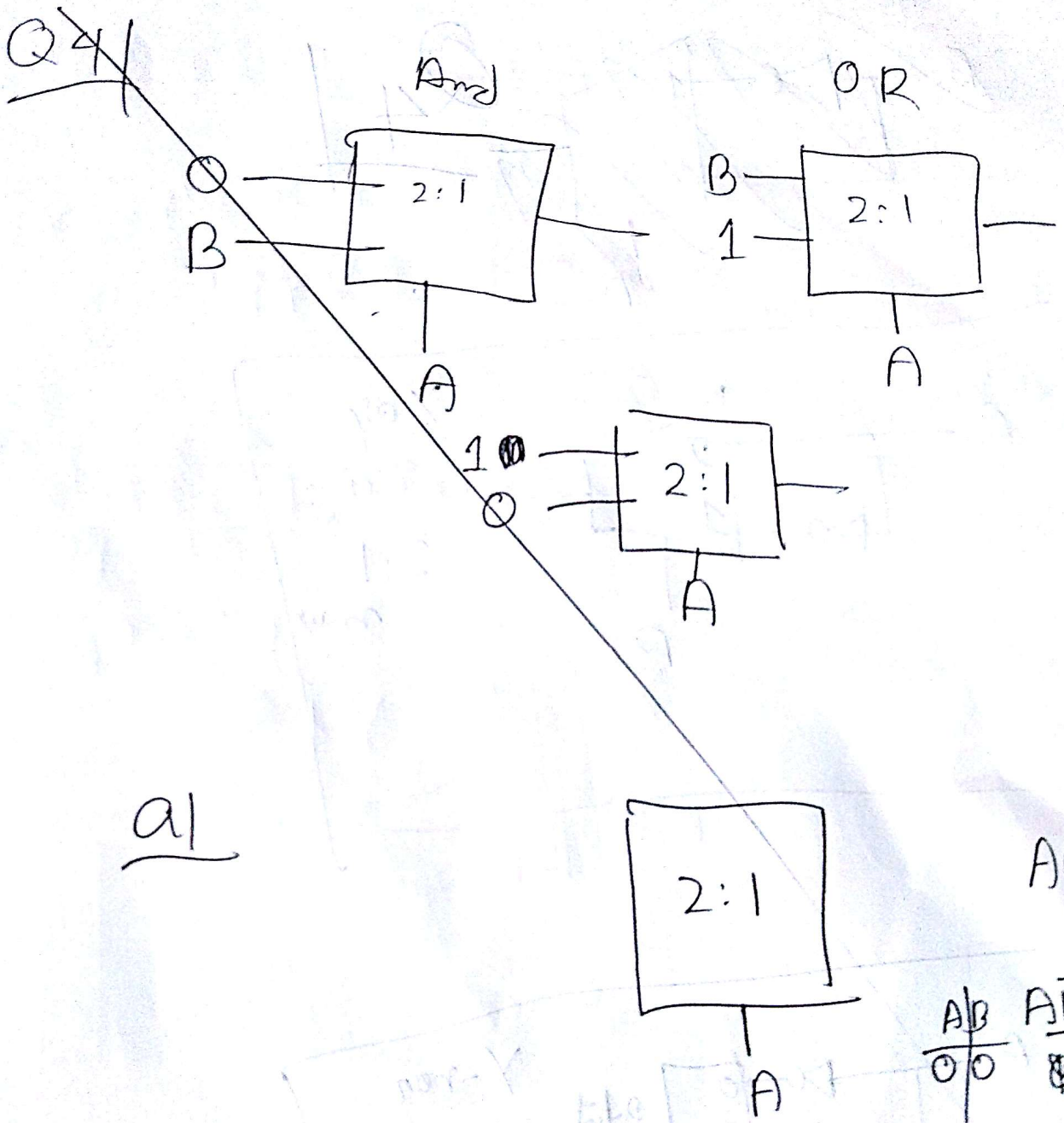
Q4



a)

A⊕B

A	B	$A\bar{B}+\bar{A}B$
0	0	0

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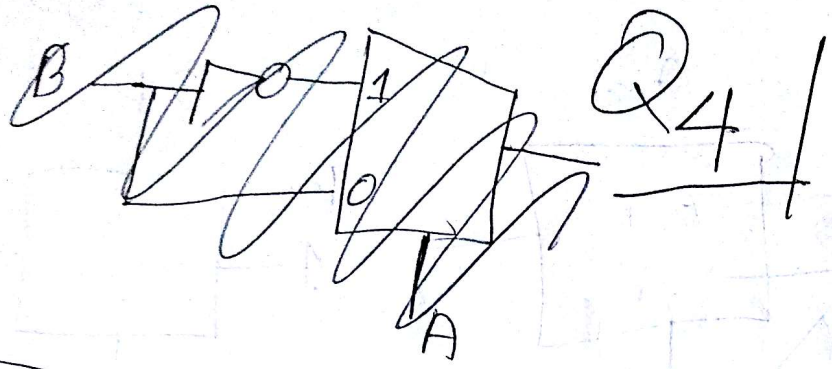
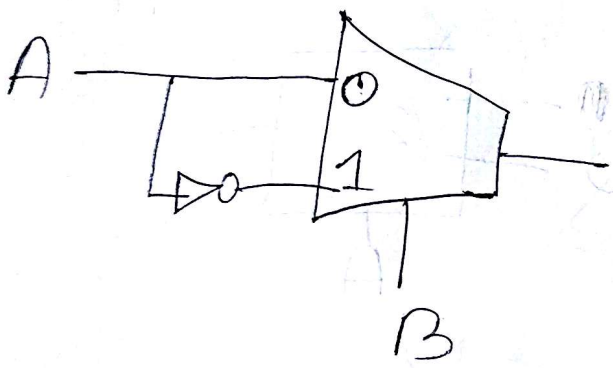
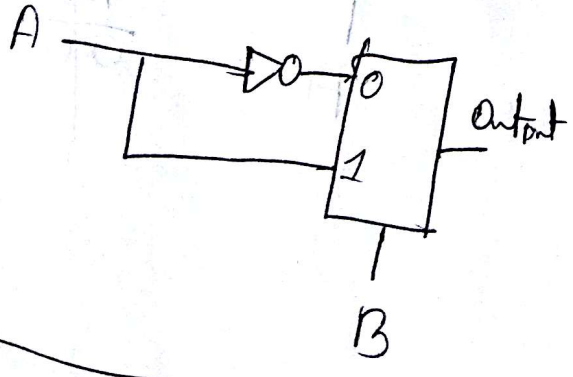


Q4 /



X-OR
Using
2:1
mux



X-nor
Using
2:1 mux

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Q4

c)

i) $XY + X'YZ' + YZ$

$= XY(Z + Z') + X'YZ' + YZ(X + X')$

$= XYZ + XYZ' + X'YZ' + ZX + X'YZ$

$= XYZ + X'YZ' + XYZ' + X'YZ$

$= XY + X'Y$

$= Y(X + X')$

$= Y$

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11)

$X'Y'+X'YZ+XZ+XYZ'$

$= X'Y'Z'+X'Y'Z+X'YZ+XZY$
$+XZY'+XYZ'$

$= X'Y'Z'+X'YZ+XY'Z+XYZ'$

$\overline{X}\overline{Y}+XY+Z$

USE K MAP Ans

$\overline{X}\,\overline{Y}+XY+Z$

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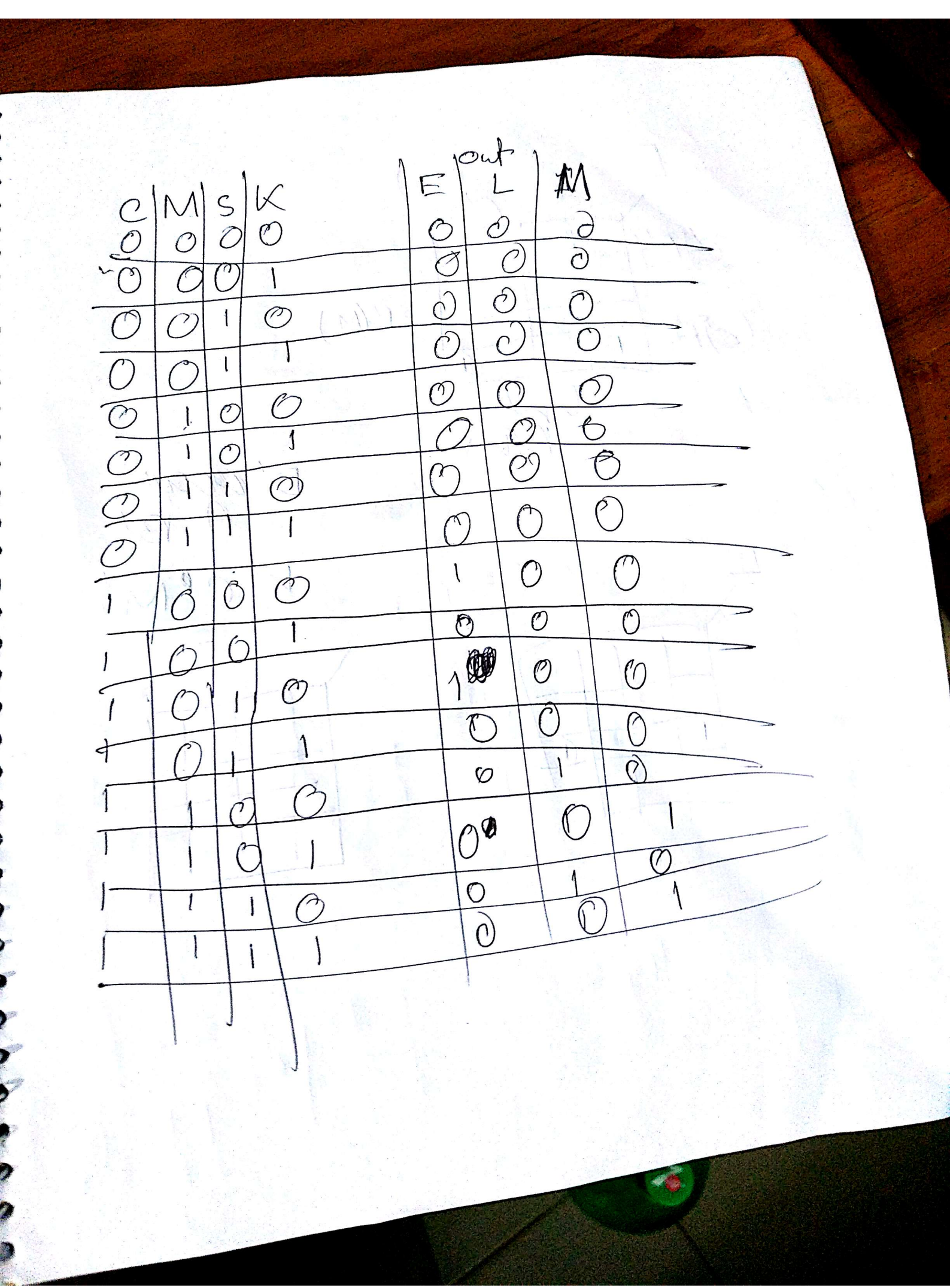

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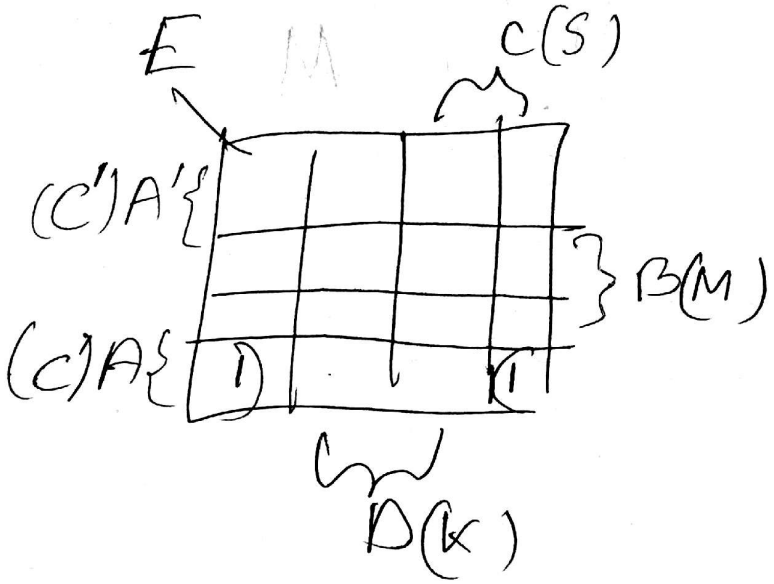
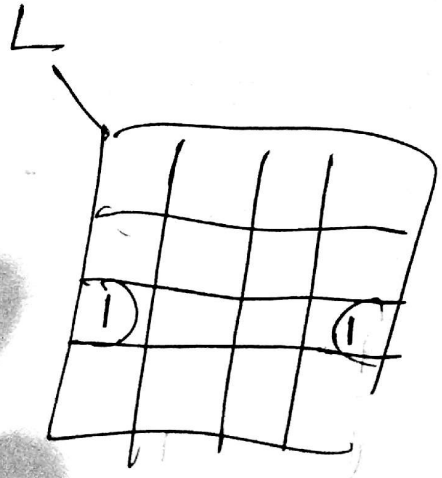
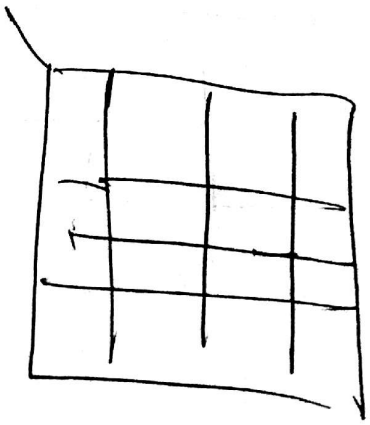


D' A' B'

K' C' M'





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Fall 2010 Mock

$-(-39) = 39$

Q2|

a) $010\,111\,011\,001\,.\,101\,110$

$(2\ 7\ 3\ 1\ .\ 5\ 6)_8$

$r^n - N$

2's: -2^{n-1} to $(2^{n-1} - 1)$

1's: $-(2^{n-1} - 1)$ to $(2^{n-1} - 1)$

$r^n - r^{-m} - N$

Scanned by CamScanner

Q3

b)

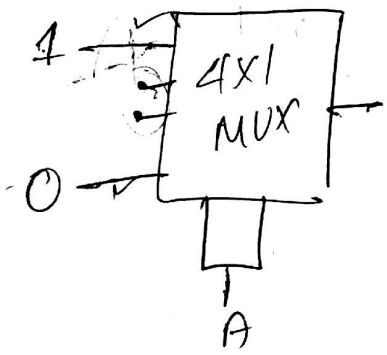
Q4)

a

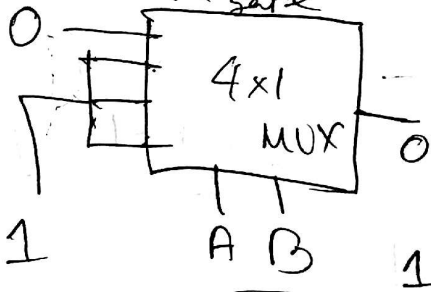
Q7)

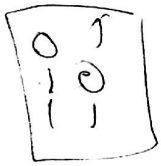
a)

Not

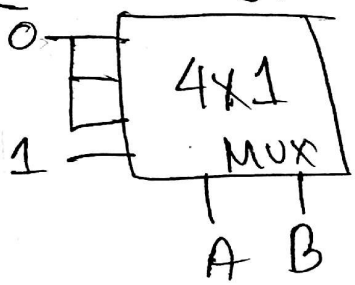


OR ~~And~~ gate

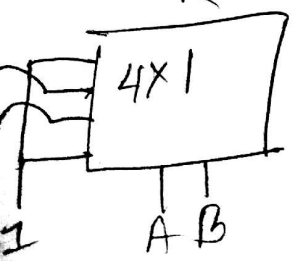




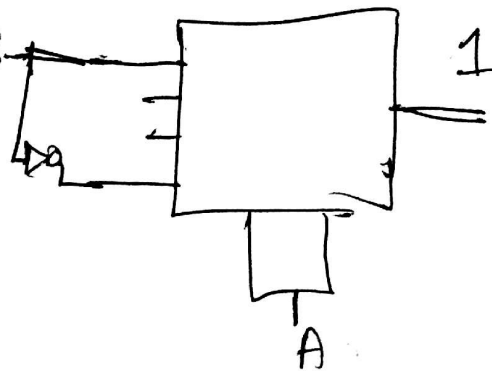
And gate



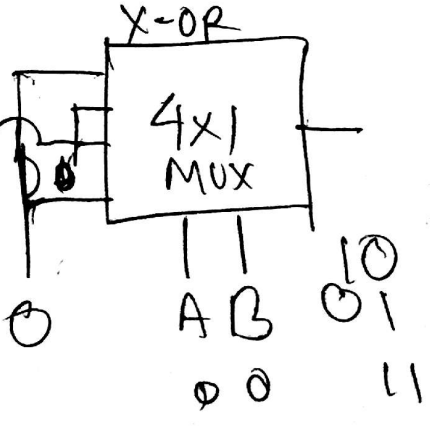
X-NOR



b) B



X-OR



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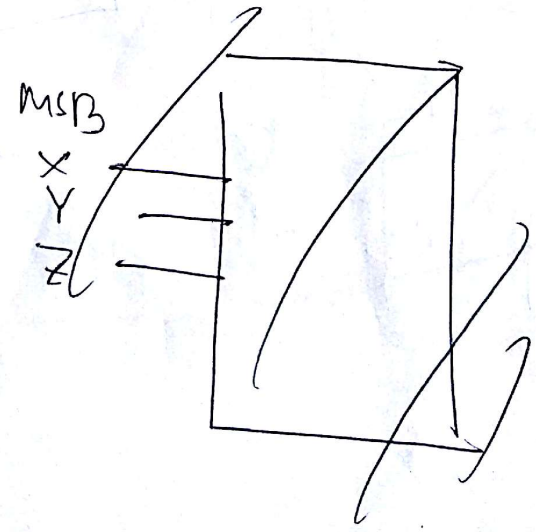
Q4)

a)

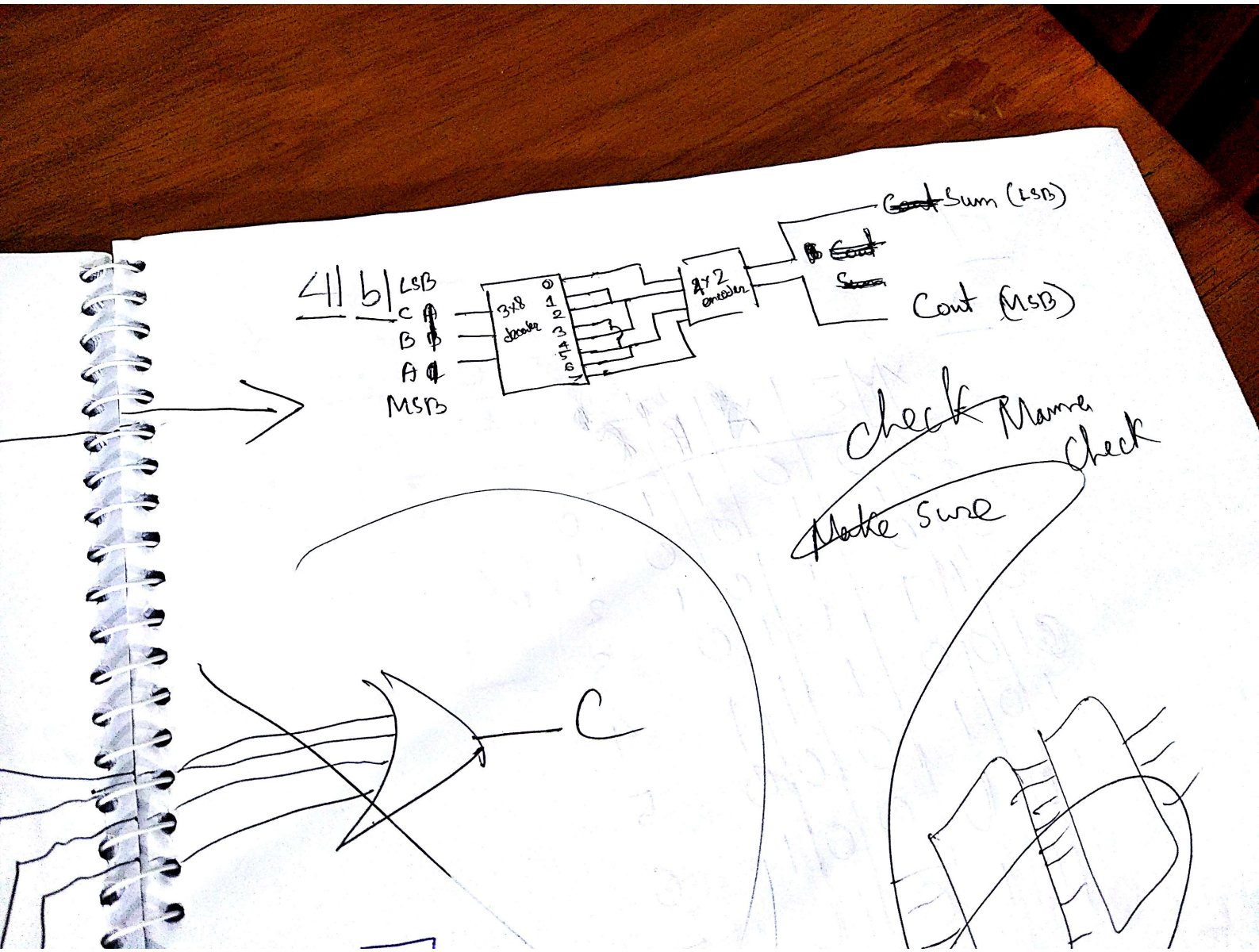
X	Y	Z	C	S	
0	0	0	0	0	0
0	0	1	0	1	1
0	1	0	0	1	2
0	1	1	1	0	3
1	0	0	0	1	4
1	0	1	1	0	5
1	1	0	1	0	6
1	1	1	1	1	7



$S = X'Y'Z + X'YZ'$
$XY'Z'$ ~~XYZ~~
~~XYZ'~~
~~XYZ~~
$+XYZ$

$C = X'YZ$
$+XY'Z$
$+XYZ'$
$+XYZ$

Scanned by CamScanner

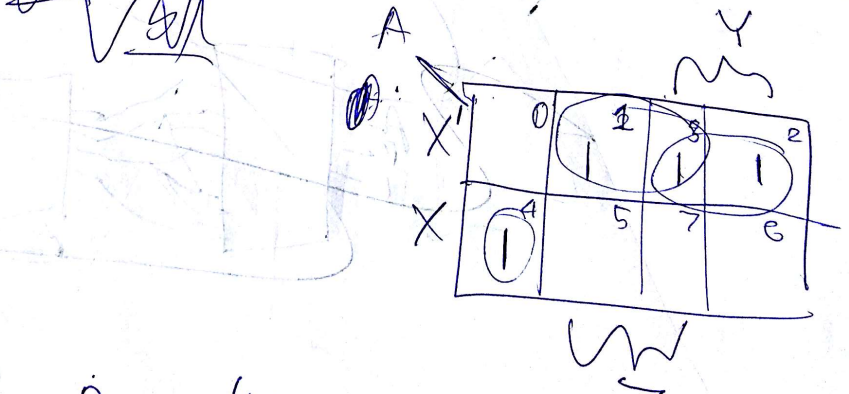


Scanned by CamScanner

5/

a)

X	Y	Z	A	B	C	
0	0	0	0	1	1	0
0	0	1	0	1	0	1
0	1	0	0	1	0	2
0	1	1	0	1	0	3
1	0	0	1	1	1	4
1	0	1	1	0	0	5
1	1	0	1	0	1	6
1	1	1	1	0	0	7



$$A = X'Y + X'Z + XZ'Y'$$

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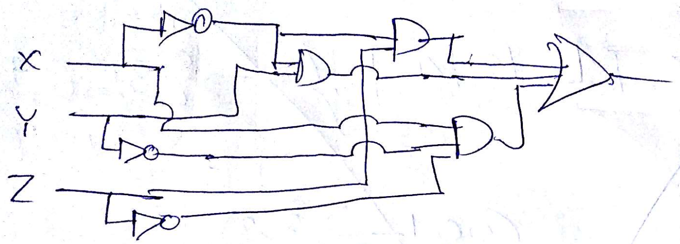

5| 6|

W	X	Y	Z	output	
0	0	0	0	0	0
0	0	0	1	0	1
0	0	1	0	0	2
0	0	1	1	~~0~~	3
0	1	0	0	0	4
0	1	0	1	~~0~~	5
0	1	1	0	~~0~~	6
0	1	1	~~0~~ 1	1	7
1	0	0	0	~~0~~	8
1	0	0	~~0~~ 1	~~0~~	9
1	0	1	0	1	10
1	0	1	~~0~~ 1	~~0~~	11
1	1	0	0	1	12
1	1	0	~~0~~ 1	1	13
1	1	1	0	1	14
1	1	1	~~0~~ 1		15

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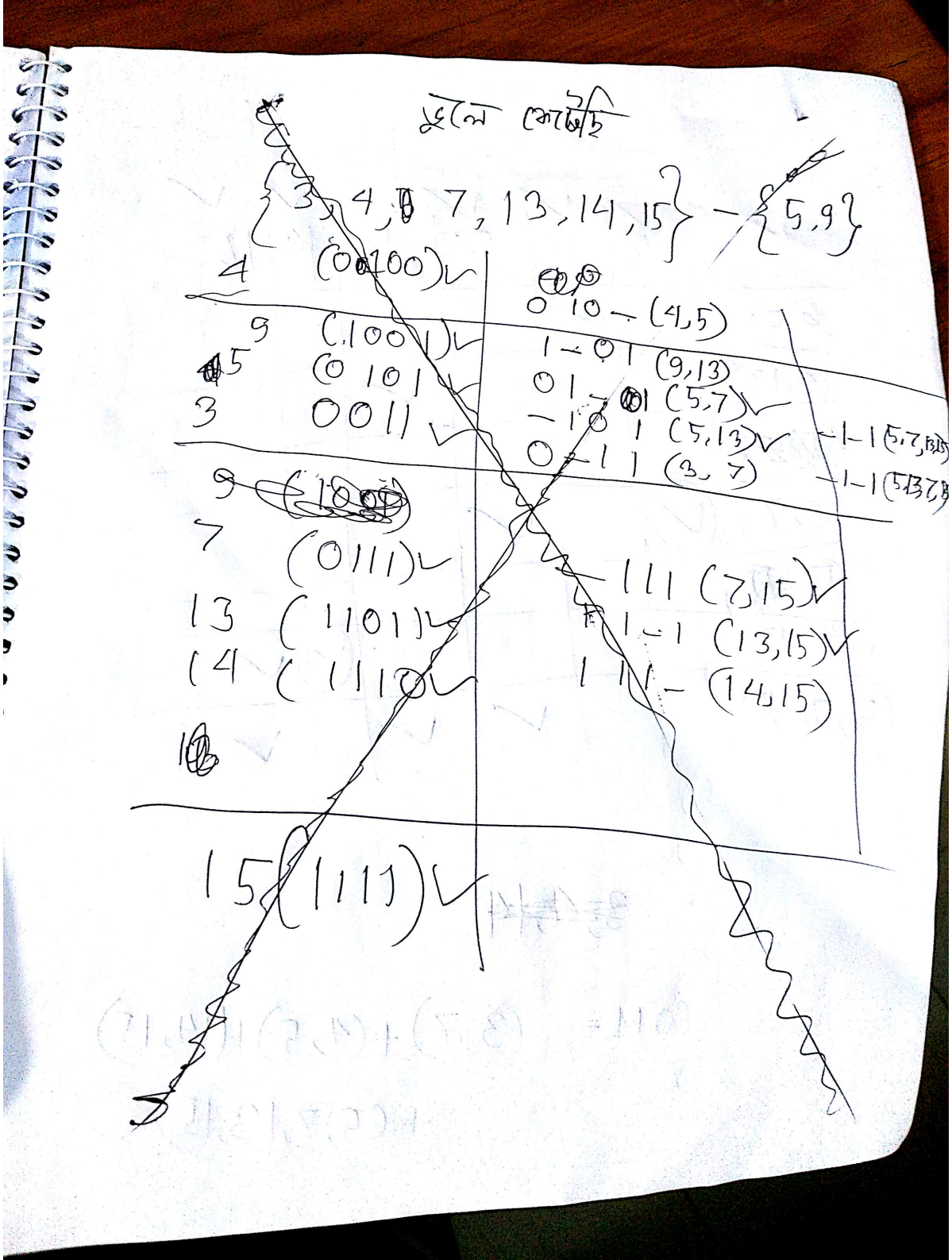

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~~3, 4, 14.~~

SO M = (3,7) + (4,5) + (14,15)
+ (5,7,13,15).

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3, 4, 7, 13, 14, 15

A B C D

SOM = $\bar{A}CD + \bar{A}B\bar{C} + ABC + BD$

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$$\{(ab\bar{c}d + ab\bar{c}\bar{d} + a\bar{b}ce)' \cdot (a\bar{b}c\bar{e} + ac\bar{e} + a\bar{c}\bar{e})'\}$$

$$= \{(ab\bar{c} + a\bar{b}ce)' + (a\bar{b}c\bar{e} + a\bar{c})'\}$$

$$= \{(\bar{a}+b+c)(\bar{a}+b+\bar{c}+\bar{e}) \cdot (a+\bar{b}+c+e)(a+c)\}'$$

$$= ab\bar{c} + a\bar{b}ce + a\bar{b}c\bar{e} + a\bar{c}$$

$$= \bar{c}a + a\bar{b}c$$

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9|

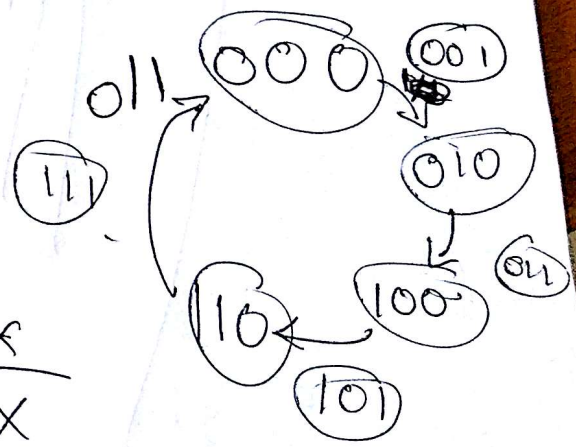
a)

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

A^+	B^+	C^+
0	1	0
x	x	x
1	0	0
x	x	x
1	1	0
x	x	x
0	0	0
x	x	x

	DA	SB	RB	JC	KC
0	0	1	0	0	x
1	x	x	x	x	x
2	1	0	1	0	x
3	x	x	x	x	x
4	1	1	0	0	x
5	x	x	x	x	x
6	0	0	1	1	x
7	x	x	x	x	x

Check!



	S	R
0 → 0	0	0 (X)
0 → 1	1	0
1 → 0	0	1
1 → 1	1	0
(X)	0	0

J	K
0	X
1	X
X	1
X	0

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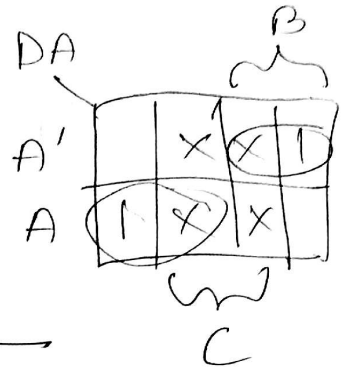


$DA = BA' + AB'$

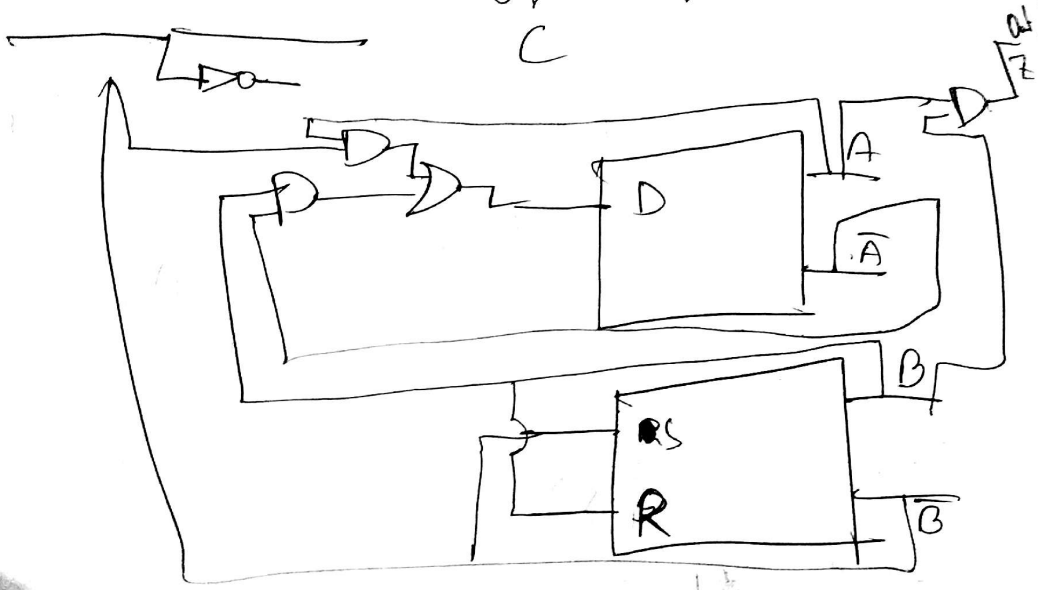
$SB = B'$

$RB = B$

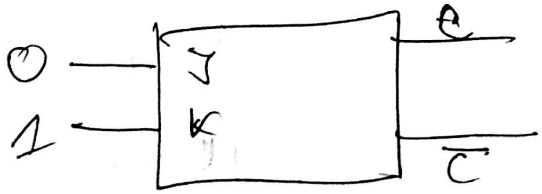
$JC = 0$

$KC = 1$

$Z = AB$



AB



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