Sistemas Digitales I

Estudiante: Almeida Meneses Luis
Matrícula: 25A0555
Paralelo: 4
Fecha: 24/11/2025

30/30

Pregunta 1)

tabla de verdad)

A	B	X_2	X_1	X_0	R_2	R_1	R_0
0	0	0	0	0	Ø	Ø	Ø
0	0	0	0	1	Ø	Ø	Ø
0	0	0	1	0	Ø	Ø	Ø
0	0	0	1	1	Ø	Ø	Ø
0	0	1	0	0	Ø	Ø	Ø
0	0	1	0	1	Ø	Ø	Ø
0	0	1	1	0	Ø	Ø	Ø
0	0	1	1	1	Ø	Ø	Ø
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	0
0	1	0	1	0	0	0	0
0	1	0	1	1	0	0	0
0	1	1	0	0	0	0	0
0	1	1	0	1	0	0	0
0	1	1	1	0	0	0	0
0	1	1	1	1	0	0	0
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0
1	0	0	1	0	0	0	0
1	0	0	1	1	0	0	0
1	0	1	0	0	0	0	1
1	0	1	0	1	0	1	0
1	0	1	1	0	1	0	0
1	0	1	1	1	1	0	0
1	1	0	0	0	Ø	Ø	Ø
1	1	0	0	1	Ø	Ø	Ø
1	1	0	1	0	Ø	Ø	Ø
1	1	0	1	1	Ø	Ø	Ø
1	1	1	0	0	Ø	Ø	Ø
1	1	1	0	1	Ø	Ø	Ø
1	1	1	1	0	Ø	Ø	Ø
1	1	1	1	1	Ø	Ø	Ø

+2 pts

R_1 :

$B x_2$ / $x_1 x_0$	00	01	11	10
00	Ø	Ø	X	0
01	Ø	Ø	0	0
11	Ø	Ø	0	1
10	Ø	Ø	0	1

$R = 0$

$B x_2$ / $x_1 x_0$	00	01	11	10
00	0	0	Ø	Ø
01	0	0	Ø	Ø
11	Ø	1	Ø	Ø
10	0	1	Ø	Ø

$R =$

$R_1 = \bar{B} x_2 x_1 + B \bar{x}_2 x_1$

R_0 :

$B x_2$ / $x_1 x_0$	00	01	11	10
00	Ø	Ø	0	0
01	Ø	Ø	0	1
11	Ø	Ø	0	1
10	Ø	Ø	0	0

$R = 0$

$B x_2$ / $x_1 x_0$	00	01	11	10
00	0	0	Ø	Ø
01	0	1	Ø	Ø
11	0	1	Ø	Ø
10	0	0	Ø	Ø

$R = 1$

$R_{10} = B x_2 x_0 + B \bar{x}_2 x_0$

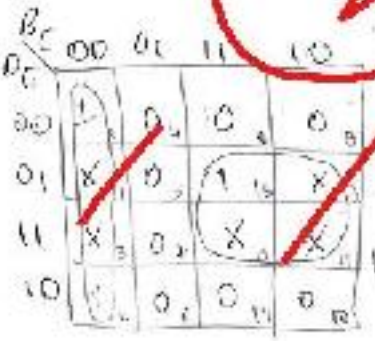
Pregunta 2

- Obtenga la expresión más reducida usando un mapa de Karnaugh. Nota: Don't care está representado por "X".

25/25

A	B	C	D	E	S_1	S_2
0	0	0	0	0	1	0
0	0	0	0	1	x	0
0	0	0	1	0	1	0
0	0	0	1	1	x	0
0	0	1	0	0	0	0
0	0	1	0	1	0	0
0	0	1	1	0	0	0
0	0	1	1	1	0	0
0	1	0	0	0	0	0
0	1	0	0	1	x	x
0	1	0	1	0	0	0
0	1	0	1	1	x	x
0	1	1	0	0	0	0
0	1	1	0	1	x	x
0	1	1	1	0	1	1
0	1	1	1	1	0	0
1	0	0	0	0	1	0
1	0	0	0	1	x	0
1	0	0	1	0	x	0
1	0	0	1	1	x	0
1	0	1	0	0	0	x
1	0	1	0	1	0	1
1	0	1	1	0	0	x
1	0	1	1	1	0	1
1	1	0	0	0	0	0
1	1	0	0	1	1	0
1	1	0	1	0	0	1
1	1	0	1	1	1	0
1	1	1	0	0	0	0
1	1	1	0	1	1	0
1	1	1	1	0	0	1
1	1	1	1	1	x	0

Para S_1



+4P

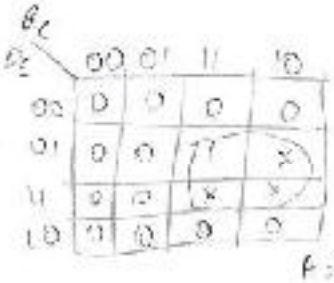
Cuando A = 0

$S_1 = \bar{B}\bar{C} + B\bar{E}$

+6P

+5P

Para S_2



F = 0

F = 1

$S_2 = \bar{A}BE + A\bar{B}C + A\bar{D}D\bar{E}$

(b) Para S_1 => Puertas NAND

$S_1 = B\bar{C} + B\bar{E}$ → $\overline{B\bar{C}}$; $\overline{B\bar{E}}$ (Falta negación no dibuja)

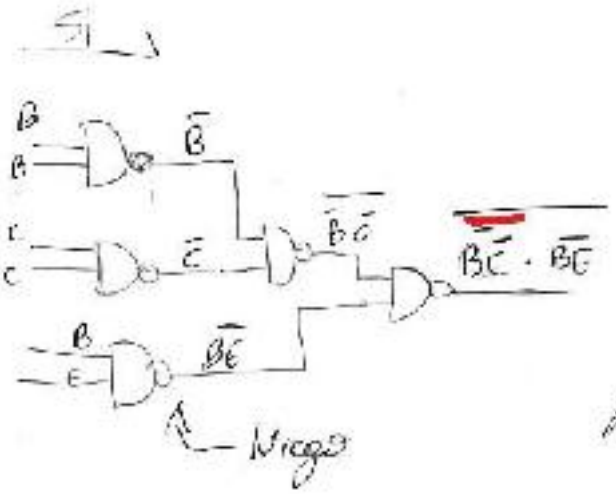
$S_1 = \overline{B\bar{C}} \cdot \overline{B\bar{E}}$

Recordemos

$\bar{x} + \bar{y} = \overline{x \cdot y}$

$\bar{x} \cdot \bar{y} = \overline{x + y}$

$x \cdot 1 = x$



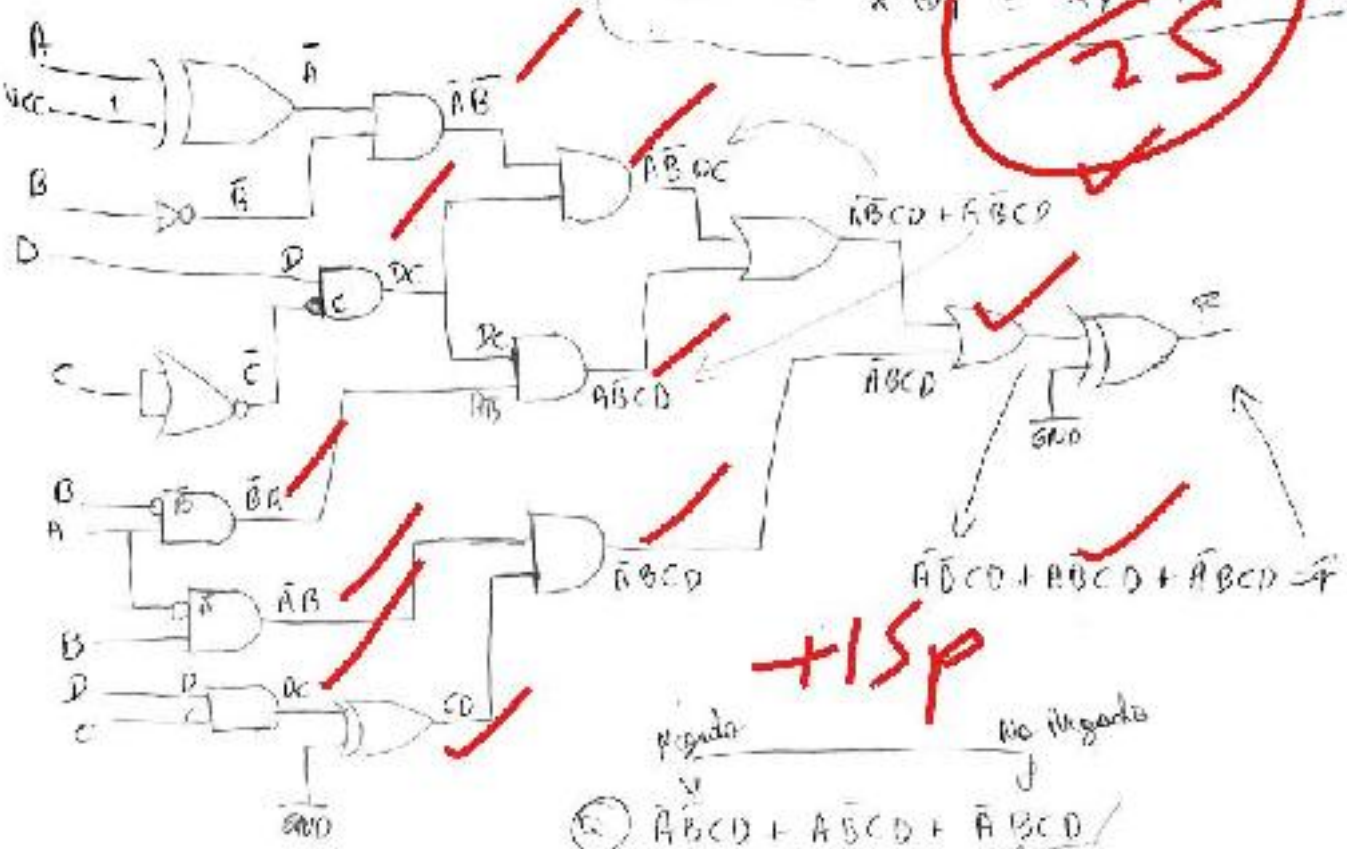
+10p

Problema 3

XOR => $x \oplus y = \bar{x}y + x\bar{y}$

XNOR => $\overline{x \oplus y} = xy + \bar{x}\bar{y}$

22/25



Negada | No negada

$\bar{A}BCD + A\bar{B}CD + \bar{A}\bar{B}CD$

Podríamos factorizar expresión

$\bar{A}CD(\bar{B}+B) + A\bar{B}CD$

solución:

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

Podríamos factorizar "CD"

$CD(\bar{A}+A\bar{B})$ +7p

$CD(\bar{A}+\bar{B})$

la pregunta pide MK.

Nombre: Asimbaya Huichuchua Edison Geovanny

30/30

Examen

1) Tema 1

A	B	X_2	X_1	X_0	R_2	R_1	R_0
0	0	0	0	0	∅	∅	∅
0	0	0	0	1	∅	∅	∅
0	0	0	1	0	∅	∅	∅
0	0	0	1	1	∅	∅	∅
0	0	1	0	0	0	0	0
0	0	1	0	1	0	0	0
0	0	1	1	0	0	0	0
0	0	1	1	1	0	0	0
0	1	0	0	0	∅	∅	∅
0	1	0	0	1	∅	∅	∅
0	1	0	1	0	∅	∅	∅
0	1	0	1	1	∅	∅	∅
0	1	1	0	0	0	0	0
0	1	1	0	1	0	0	0
0	1	1	1	0	0	0	0
0	1	1	1	1	0	0	0
1	0	0	0	0	∅	∅	∅
1	0	0	0	1	∅	∅	∅
1	0	0	1	0	∅	∅	∅
1	0	0	1	1	∅	∅	∅
1	0	1	0	0	0	0	0
1	0	1	0	1	0	0	0
1	0	1	1	0	0	0	0
1	0	1	1	1	0	0	0
1	1	0	0	0	∅	∅	∅
1	1	0	0	1	∅	∅	∅
1	1	0	1	0	∅	∅	∅
1	1	0	1	1	∅	∅	∅
1	1	1	0	0	0	0	0
1	1	1	0	1	0	0	0
1	1	1	1	0	0	0	0
1	1	1	1	1	0	0	0

+2 p

R_2

A = 0

X_1X_0 \ BX_2	00	01	11	10
00	∅	∅	0	0
01	∅	∅	0	0
11	∅	∅	0	0
10	∅	∅	0	0

A = 1

X_1X_0 \ BX_2	00	01	11	10
00	0	1	∅	∅
01	0	1	∅	∅
11	0	1	∅	∅
10	0	1	∅	∅

$R_2 = \bar{B}X_2$

A = 0

X_1X_0 \ BX_2	00	01	11	10
00	∅	∅	0	0
01	∅	∅	0	0
11	∅	∅	0	1
10	∅	∅	0	1

A = 1

X_1X_0 \ BX_2	00	01	11	10
00	0	0	∅	∅
01	0	0	∅	∅
11	∅	1	∅	∅
10	0	1	∅	∅

$R_1 = \bar{B}X_1\bar{X}_0 + BX_2\bar{X}_1$

+1 p

R_1

A=0

$B x_2$ / $x_1 x_0$	00	01	11	10
00	∅	∅	0	0
01	0	∅	0	1
11	0	∅	0	1
10	0	0	0	0

A=1

$B x_2$ / $x_1 x_0$	00	01	11	10
00	0	0	∅	∅
01	0	1	∅	∅
11	0	1	∅	∅
10	0	0	0	0

$$R0 = \bar{B} x_1 x_0 + B \bar{x_2} x_0$$

Tema 2

S_1

A=0

DE \ BC	00	01	11	10
00	1	0	0	0
01	X	0	1	X
11	X	0	X	X
10	1	0	0	0

A=1

DE \ BC	00	01	11	10
00	1	0	0	0
01	1	0	1	1
11	X	0	X	1
10	X	0	0	0

25/25 + 4p

+ 6p

S_2

A=0

DE \ BC	00	01	11	10
00	0	0	0	0
01	0	0	1	X
11	0	0	X	X
10	0	0	0	0

A=1

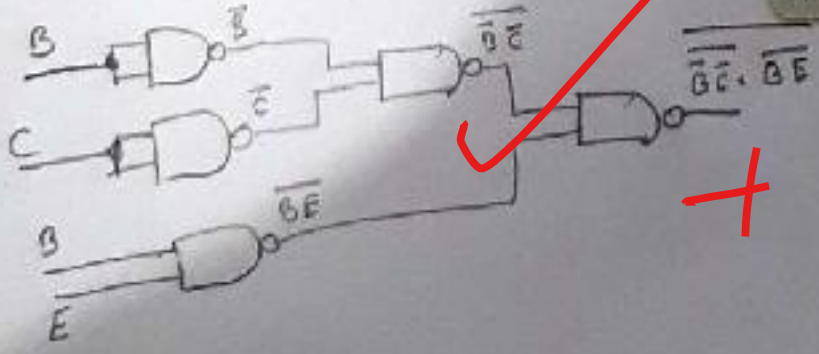
DE \ BC	00	01	11	10
00	0	X	0	0
01	0	1	0	0
11	0	1	0	0
10	0	X	1	1

+5p

$S_1 = \bar{B}\bar{C} + BE$

$S_2 = \bar{A}BE + A\bar{B}C + ABD\bar{E}$

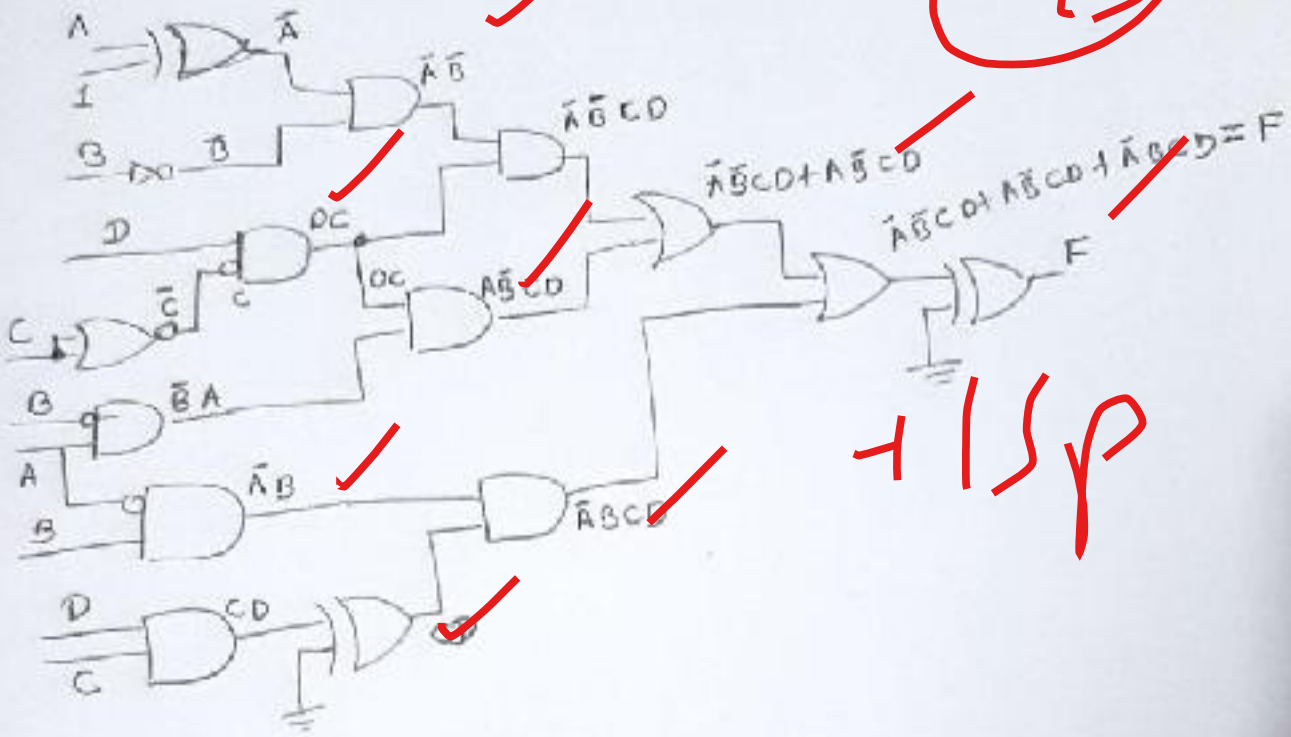
$S_1 = \overline{\bar{B}\bar{C}} \cdot \overline{BE} = \overline{\bar{B}\bar{C}} \cdot \overline{BE}$



+10p

Tema 3

18/25



+15p

a) $\bar{A}\bar{B}CD + A\bar{B}CD + \bar{A}BCD$

b) $\bar{A}CD(\bar{B}+B) + A\bar{B}CD$ (1)

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

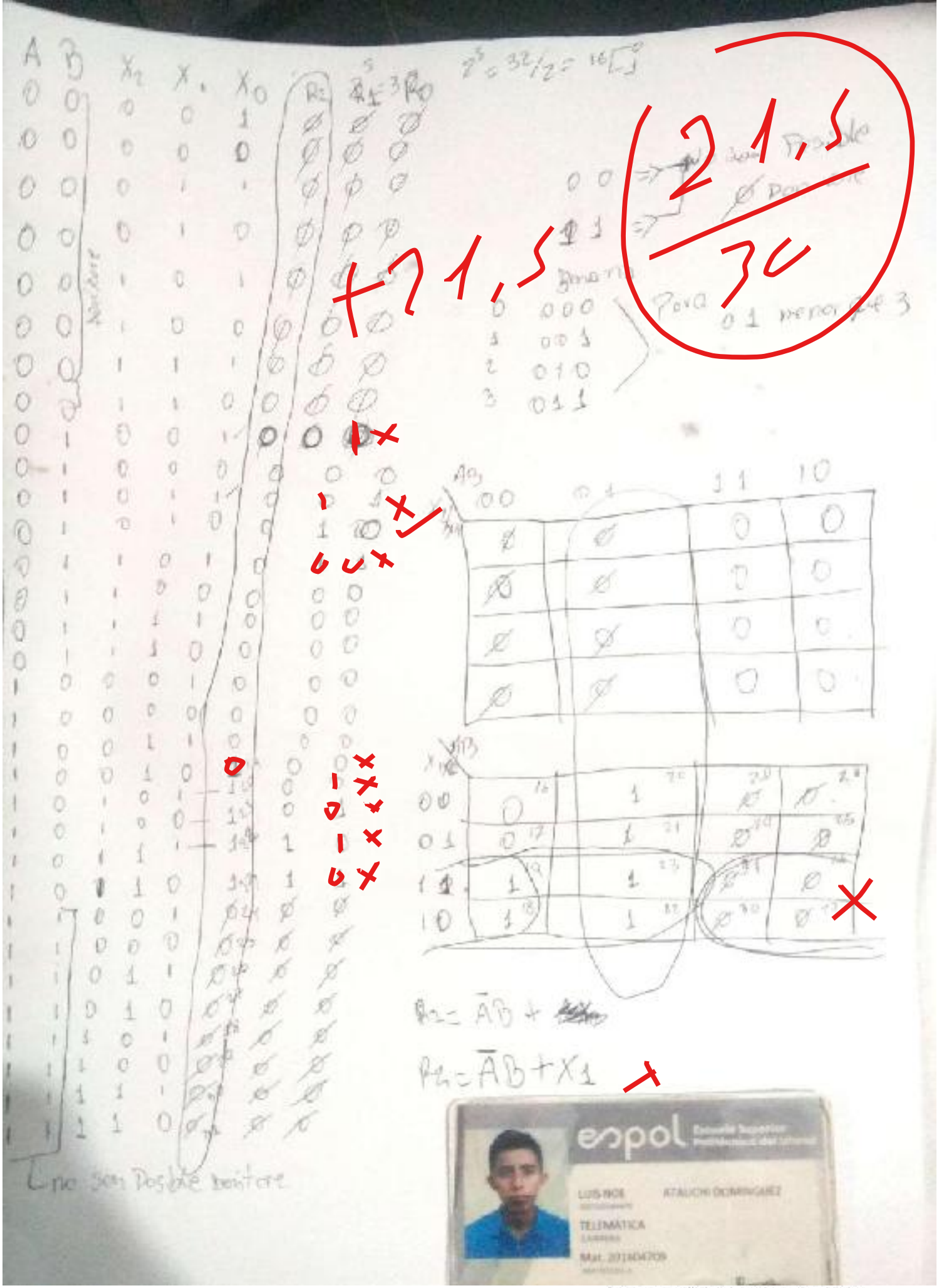
$CD(\bar{A} + A\bar{B})$

+3p

$CD(\bar{A}+\bar{B})$ → Tercera Sin Novedad

la pregunta plde

usar MN

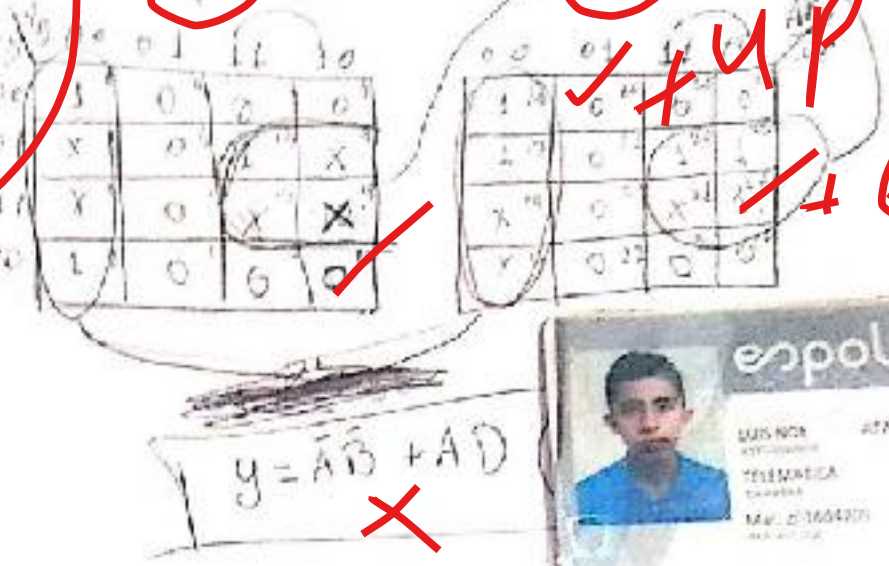

A B X2 X1 X0 R2 R1 R0
21,5
30
+7 1,5
espol
TELEMÁTICA
Mat. 201404709
Escaneado con CamScanner

10/15

Que es 0 y que uno

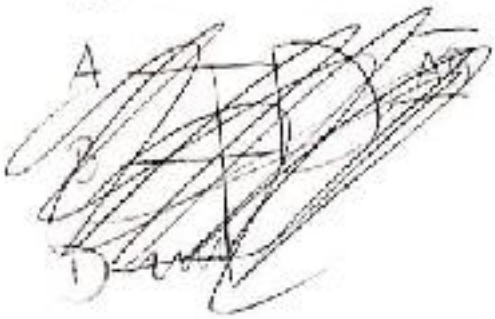
+4P

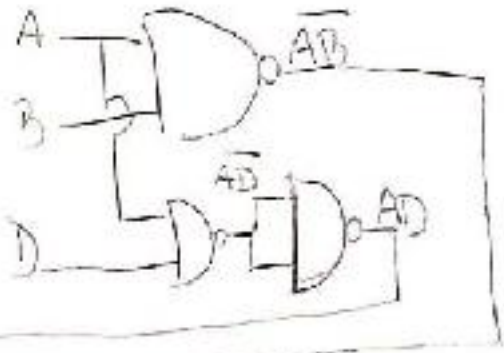
+6P



$y = \bar{A}\bar{B} + AD$

Puertas NAND





$S = \overline{\bar{A}\bar{B} + AD}$

$(A \mid \mid \bar{A}D)$

$\bar{A}D + AD$

=

$A\bar{B} + AD$

Pregunta 3

16/25

Datos:

Vcc = 1

GND = 0

$A \cdot \bar{B}$

$\bar{A}\bar{B}$

$(\bar{A}\cdot\bar{B}DC) + (DC\,A\cdot\bar{B})$

$(\bar{A}\cdot\bar{B}DC) + (DC\,A\cdot\bar{B}) + DC\bar{A}B = E$

$DC \oplus 0 = \bar{D}C0 + D\bar{C}1$

$\bar{A}B$

$DC\bar{A}B$

$\bar{A}BCD$

$E \oplus 0 = \bar{E}0 + E1$

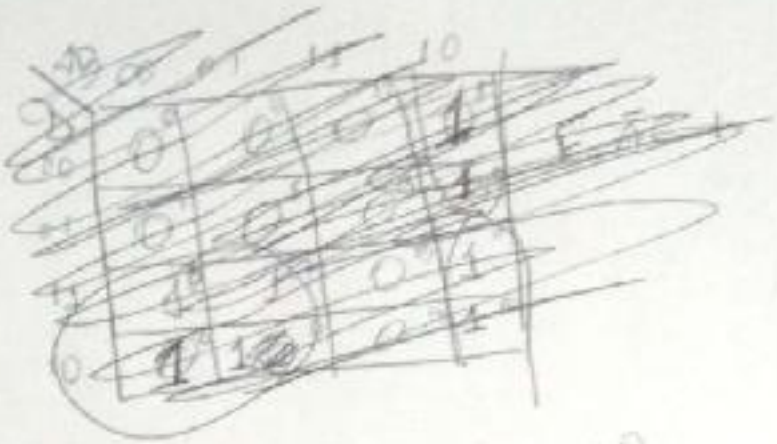
$F = E = \bar{A}\bar{B}D\bar{C} + A\bar{B}\bar{C}D + \bar{D}\bar{A}BCD$

+10 p

Tabla $F = \bar{A}\bar{B}D\bar{C} + A\bar{B}\bar{C}D + \bar{A}BCD$

Bacha con haber usado "d" como palabra

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



+6p

$S = \bar{B}\bar{C}D + \bar{A}BCD$

Nombre: David S Auqui M.
EXAMEN

PROBLEMA #1

A	B	X_2	X_1	X_0	R_2	F_1	R_0
0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	1
0	0	0	1	0	0	0	0
0	0	0	1	1	0	0	1
0	0	1	0	0	0	0	0
0	0	1	0	1	0	0	1
0	0	1	1	0	0	0	0
0	0	1	1	1	0	0	1
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	1
0	1	0	1	0	0	0	0
0	1	0	1	1	0	0	1
0	1	1	0	0	0	0	0
0	1	1	0	1	0	0	1
0	1	1	1	0	0	0	0
0	1	1	1	1	0	0	1
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	1
1	0	0	1	0	0	0	0
1	0	0	1	1	0	0	1
1	0	1	0	0	0	0	0
1	0	1	0	1	0	0	1
1	0	1	1	0	0	0	0
1	0	1	1	1	0	0	1
1	1	0	0	0	0	0	0
1	1	0	0	1	0	0	1
1	1	0	1	0	0	0	0
1	1	0	1	1	0	0	1
1	1	1	0	0	0	0	0
1	1	1	0	1	0	0	1
1	1	1	1	0	0	0	0
1	1	1	1	1	0	0	1

20/20

$\rightarrow X_2 \bar{X}_1 \bar{X}_0$
$\rightarrow X_2 \bar{X}_1 X_0$
$\rightarrow X_2 X_1 \bar{X}_0$
$\rightarrow X_2 X_1 X_0$

+10p

$R_2 = X_2 \bar{X}_1 \bar{X}_0 + X_2 \bar{X}_1 X_0 + X_2 X_1 \bar{X}_0 + X_2 X_1 X_0$

$= X_2 \cdot (\bar{X}_1 \bar{X}_0 + \bar{X}_1 X_0 + X_1 \bar{X}_0 + X_1 X_0)$

$= X_2 \cdot (\bar{X}_1 X_0 + X_1 \bar{X}_0 + 1) = X_2 \cdot (\bar{X}_1 X_0 + X_1 \bar{X}_0)$

$R_2 = X_2 \cdot (X_1 \oplus X_0)$

$\bar{X}_1 \bar{X}_0 + X_1 X_0 = X_1 \odot X_0$

$\bar{X}_1 + X_1 = 1$

David S Auqui Mora

PROBLEMA #2

$\frac{25}{25}$

+4p

+6p

+5p

+10p

A	B	C	D	F1	F2	F3	F4	F5	F6	F1	F2	F3	G1	G2	G3	H1	I1	F
0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0
0	0	0	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0
0	0	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0
0	0	1	1	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0
0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0
0	1	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0
0	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
0	1	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0
1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0
1	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0
1	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0
1	0	1	1	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
1	1	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
1	1	1	1	0	0	0	1	1	1	0	1	1	0	0	0	0	0	0

CD / AB	00	10	01	11
00	0 (1)	0 (3)	0 (2)	1 (4)
10	0 (9)	0 (11)	0 (10)	1 (12)
01	0 (5)	0 (7)	0 (6)	1 (8)
11	0 (13)	0 (15)	0 (14)	0 (16)

$F = \bar{A}\bar{B}CD + \bar{A}BCD + A\bar{B}CD$

$= CD[\bar{A}\bar{B} + \bar{A}B + A\bar{B}]$

$= CD[\bar{A}(\bar{B} + B') + A\bar{B}]$

$= CD[\bar{A}(1) + A\bar{B}]$

$= CD[\bar{A} + A\bar{B}]$

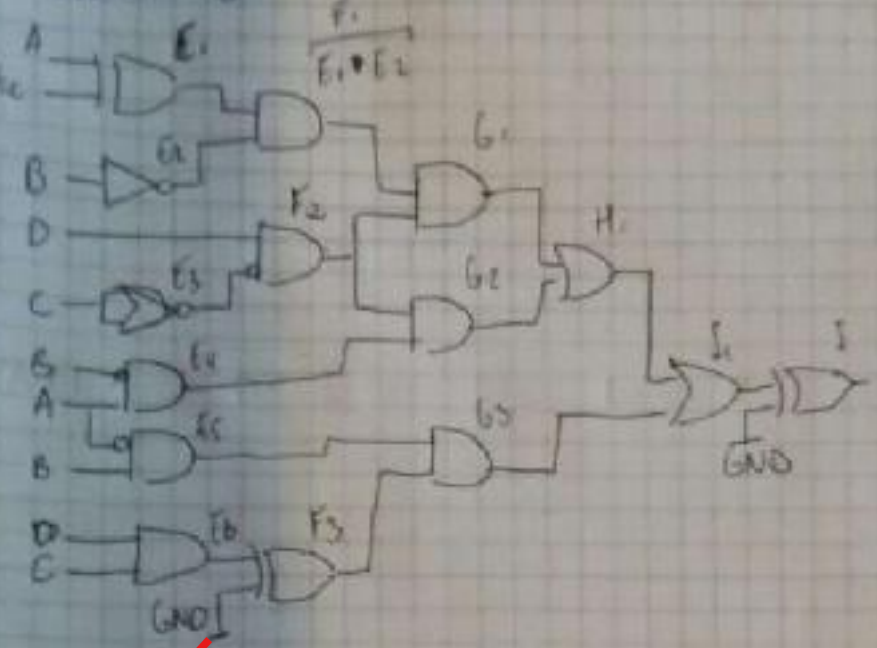
$= CD[\bar{A} + \bar{B}]$

$F = CD(\overline{A \cdot B})$ //

+10p

David S. Angulo Otero

PROBLEMA #3



$E_1 = A \oplus 1$ $\quad F_1 = G_1 \cdot E_2$ $\quad G_1 = F_1 \cdot F_2$ $\quad H_1 = G_1 + G_2$

$E_2 = B$ $\quad F_2 = D \cdot \bar{E_3}$ $\quad G_2 = F_2 \cdot E_4$

$E_3 = C$ $\quad F_3 = E_6 \oplus 0$ $\quad G_3 = E_5 \cdot F_3$ $\quad I_1 = H_1 + G_3 \rightarrow J_1 = I_1 \oplus 0$

$E_4 = \bar{B} \cdot A$

$E_5 = \bar{A} \cdot B$

$E_6 = D \cdot C$

$\rightarrow I_1 \oplus 0$

$\rightarrow (H_1 + G_3) \oplus 0 \Rightarrow [(G_1 + G_2) + G_3] \oplus 0 \Rightarrow [F_1F_2 + F_2E_4 + E_5F_3] \oplus 0$

$\Rightarrow [E_1F_2D\bar{E_3} + D\bar{E_3}E_4 + E_5(E_6 \oplus 0)] \oplus 0$

$[(A \oplus 1)(\bar{B}) \cdot D \cdot \bar{C} + D \cdot \bar{C} \cdot (\bar{B} \cdot A) + (\bar{A} \cdot B)(D \cdot C \oplus 0)] \oplus 0 = F$ @

+10p

tema 1-

Entradas

Salidas

	A	B	X1	X2	X3	R2	R1	R0
0	0	0	0	0	0	0	0	0
1	0	0	0	0	1	0	0	1
2	0	0	0	1	0	0	1	0
3	0	0	0	1	1	0	1	1
4	0	0	1	0	0	1	0	0
5	0	0	1	0	1	1	0	1
6	0	0	1	1	0	1	1	0
7	0	0	1	1	1	1	1	1
8	0	1	0	0	0	0	0	1
9	0	1	0	0	1	0	1	0
10	0	1	0	1	0	0	1	1
11	0	1	0	1	1	1	0	0
12	0	1	1	0	0	1	0	1
13	0	1	1	0	1	1	1	0
14	0	1	1	1	0	1	1	1
15	0	1	1	1	1	0	0	0
16	1	0	0	0	0	0	0	1
17	1	0	0	0	1	0	1	0
18	1	0	0	1	0	0	1	1
19	1	0	0	1	1	1	0	0
20	1	0	1	0	0	1	0	1
21	1	0	1	0	1	1	1	0
22	1	0	1	1	0	1	1	1
23	1	0	1	1	1	0	0	0
24	1	1	0	0	0	0	0	1
25	1	1	0	0	1	0	1	0
26	1	1	0	1	0	0	1	1
27	1	1	0	1	1	1	0	0
28	1	1	1	0	0	1	0	1
29	1	1	1	0	1	1	1	0
30	1	1	1	1	0	1	1	1
31	1	1	1	1	1	0	0	0

30/30

flop

Variable R_2

$$A\bar{B}X_2\bar{X}_1\bar{X}_0 + A\bar{B}X_2\bar{X}_1X_0 + A\bar{B}X_2X_1\bar{X}_0 + A\bar{B}X_2X_1X_0$$

$$A\bar{B}X_2[\bar{X}_1\bar{X}_0 + \bar{X}_1X_0 + X_1\bar{X}_0 + X_1X_0]$$

$$A\bar{B}X_2[\bar{X}_1[\bar{X}_0 + X_0] + X_1[\bar{X}_0 + X_0]]$$

$$A\bar{B}X_2[\bar{X}_1 + X_1]$$

2.- $\boxed{A\bar{B}X_2}$

+1pt

Tema 7:

DE \ ABC	000	001	011	010	110	111	101	100
00	1	0	0	0	0	0	0	0
01	X	0	1	X	1	1	0	1
11	X	0	X	X	1	X	0	X
10	1	0	0	0	0	0	0	X

25/25

+4p

+6p

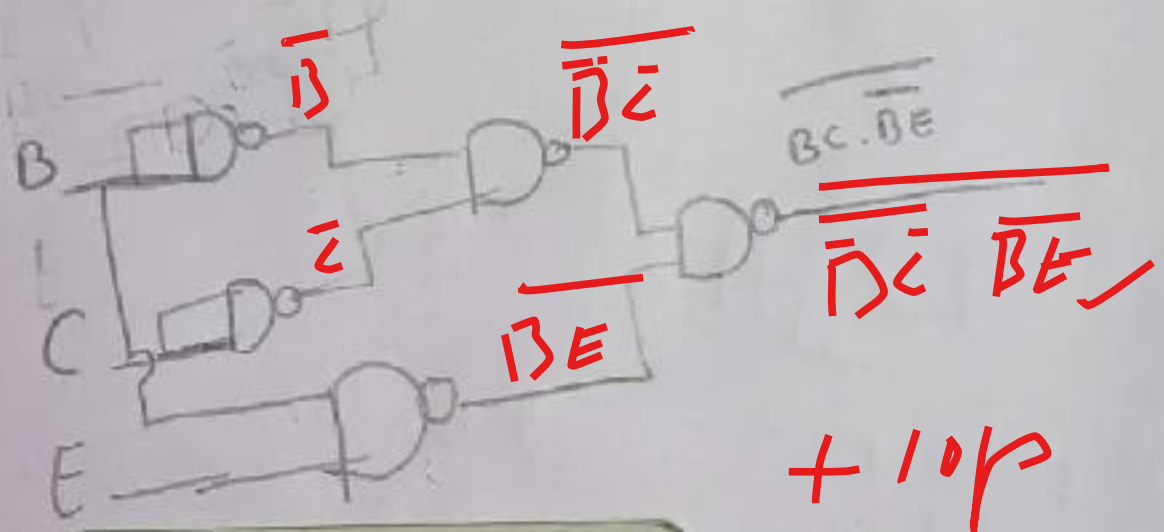
$\bar{B}\bar{C} + BE$ +1p

NAND = $\overline{A \cdot B}$

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

$\overline{\bar{B}\bar{C} + \bar{B}E}$

S1 $\overline{BC} \cdot \overline{BE} = \bar{B}\bar{C} + \bar{B}E$



+10p

tema 3

1. A EXOR 1
   $A \oplus 1$
   $\bar{A}\,1 + A\,\bar{0} = \bar{A}$ ✓
2. $\bar{B}$ ✓
3. $\bar{C}$ ✓
4. 4 AND D
   CD ✓
5. $\bar{B}$ AND A
   $\bar{B}.A$ ✓
6. $\bar{A}$ AND B
   $\bar{A}.B$ ✓
7. D AND C
   D.C ✓

(8) 1 AND 2

$\bar{A} \cdot \bar{B}$

(9) 8 AND 3

$\bar{A}\bar{B} \cdot CD$

(10) 3 AND 5

$CD\bar{B}A = A\bar{B}CD$

(11) 7 EXOR 0

$DC \oplus 0 = \bar{D}C0 + D\bar{C}1 = DC$

(12) 6 AND 11

$\bar{A}0 \cdot DC = \bar{A}BCD$

(13) 9 OR 10

$\bar{A}BCD + A\bar{B}CD$

(14) 13 OR 12

$\bar{A}\bar{B}CD + A\bar{B}CD + \bar{A}BCD$

(15) 14 EXOR 0

$[\bar{A}\bar{B}CD + A\bar{B}CD + \bar{A}BCD] \oplus 0 = \bar{A}\bar{B}CD + A\bar{B}CD + \bar{A}BCD$

+15p

AB / CD	00	01	11	10
00	0	0	0	0
01	0	0	0	1
11	1	1	0	0
10	0	0	0	0

✓

$\bar{A}\bar{B}CD + A\bar{B}CD + \bar{A}B\bar{C}D$

✓

b) $\bar{A}CD + \bar{B}CD = CD(\bar{A}+\bar{B})$

+10 p

Andrés Campaña

A	B	X_2	X_1	X_0	R_2	R_1	R_0
0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	1
0	0	0	1	0	0	1	0
0	0	0	1	1	0	1	1
0	0	1	0	0	1	0	0
0	0	1	0	1	1	0	1
0	0	1	1	0	1	1	0
0	0	1	1	1	1	1	1
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	1
0	1	0	1	0	0	1	0
0	1	0	1	1	0	1	1
0	1	1	0	0	1	0	0
0	1	1	0	1	1	0	1
0	1	1	1	0	1	1	0
0	1	1	1	1	1	1	1
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	1
1	0	0	1	0	0	1	0
1	0	0	1	1	0	1	1
1	0	1	0	0	1	0	0
1	0	1	0	1	1	0	1
1	0	1	1	0	1	1	0
1	0	1	1	1	1	1	1
1	1	0	0	0	0	0	0
1	1	0	0	1	0	0	1
1	1	0	1	0	0	1	0
1	1	0	1	1	0	1	1
1	1	1	0	0	1	0	0
1	1	1	0	1	1	0	1
1	1	1	1	0	1	1	0
1	1	1	1	1	1	1	1

23/30

+23P

Mapa

X_1X_2 \ ABX_c	000	001	011	010	110	111	101	100
00	X	X	0	0	X	X	0	0
01	X	X	0	0	X	X	0	0
11	X	X	0	1	X	X	0	1
10	X	X	0	1	X	X	0	1

$R_2 = \bar{B}\bar{X}_c X_1 + B\bar{X}_c X_2$

$R_2 = \bar{X}_c \cdot X_1 \left(\frac{5}{13}\right)$

$R_2 = \bar{X}_c \cdot X_1$

X

-> De aquí solo esta tabla si en la página anterior $R_2 = 0,1$

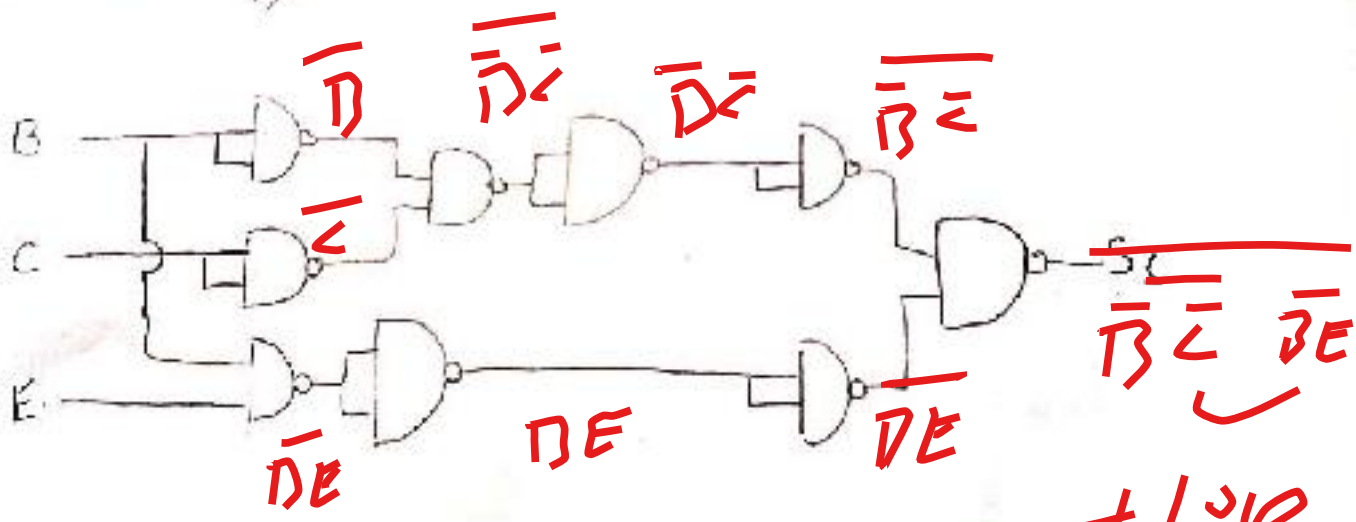
(2)

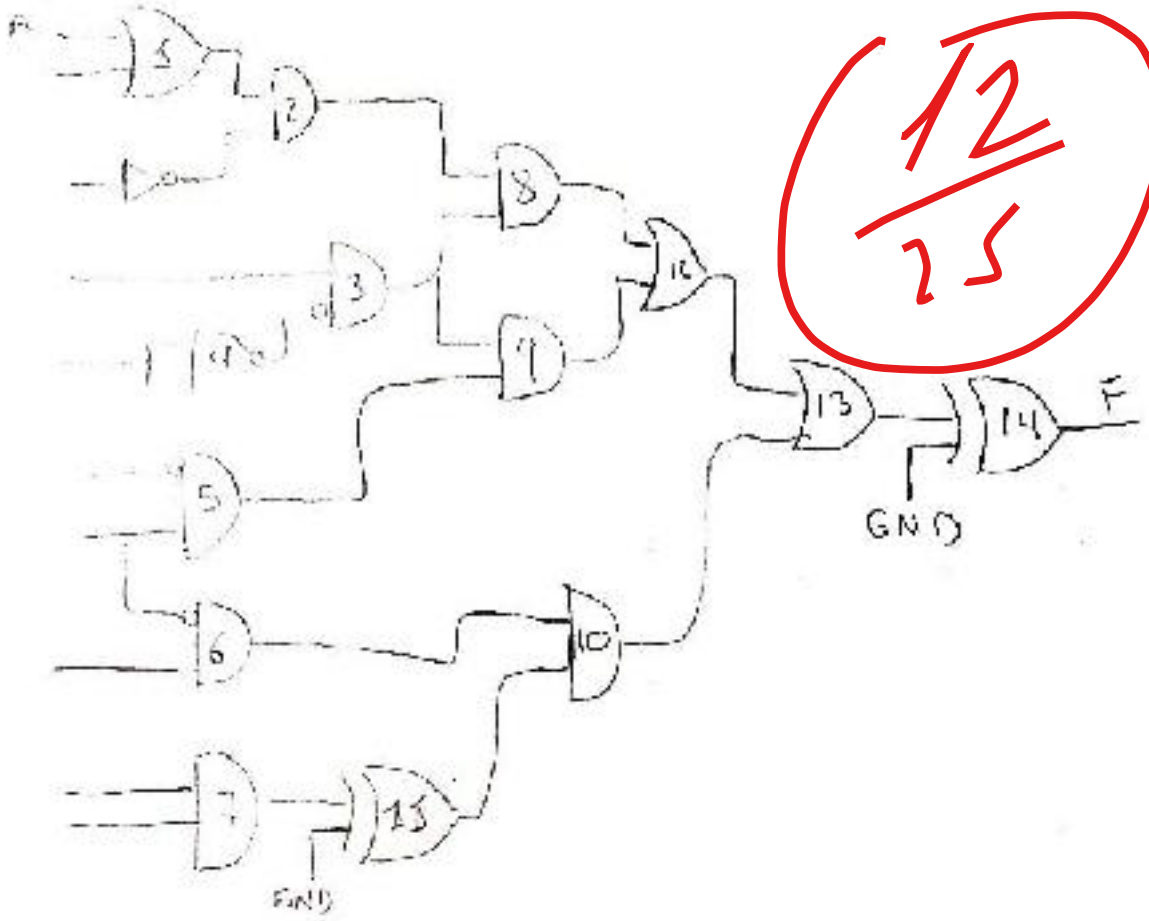
DE \ ABC	000	001	011	010	110	111	101	100
00	1	0	0	0	0	0	0	1
01	x	0	1	x	1	1	0	1
11	x	0	x	x	1	x	0	x
10	1	0	0	0	0	0	0	x

$S1 = \bar{A}\bar{B}\bar{C} + A\bar{B}\bar{C} + \bar{E}B$

$\bar{B}\cdot\bar{C}(\bar{A}+A) + \bar{E}B$

$S1 = \bar{B}\cdot\bar{C} + \bar{E}B$ ✓




5
12
8
3
11
9
13
14
F
GND
6
10
7
15
GND

12/25


ESPOL
Nombres y Apellidos
CAMPAÑA MONTENEGRO
ANDRES ALAZIMH
Carrera
MECATRONICO
FIMCP

(3)

$1 = A\overset{C}{\cancel{0}} + \bar{A}\,1$

$1 = \bar{A}$

$2 = \bar{A}\,B$

$3 = D \cdot \overline{C+C}$

$4 = \overline{C+C}$

$5 = \bar{B}\,A$

$6 = \bar{A}\,B$

$7 = CD$

$8 = \bar{A}\bar{B} \cdot D \cdot \overline{C+C}$

$9 = D \cdot \overline{C+C} \cdot \bar{B}\,A$

$10 = \bar{A}\,B \cdot CD$

$11 = CD \cdot 1 + \overline{C}\overset{B}{\cancel{D}} \cdot 0$

$= CD$

$12 = \{\bar{A}\bar{B}\,D\,\overline{C+C}\} + \{D \cdot \overline{C+C} \cdot \bar{B}\,A\}$

$13 = \bar{A}\bar{B}\,D\,\overline{C+C} + D\,\overline{C+C}\,\bar{B}\,A + \underline{\quad\quad}$

$13 = 12 + 10$

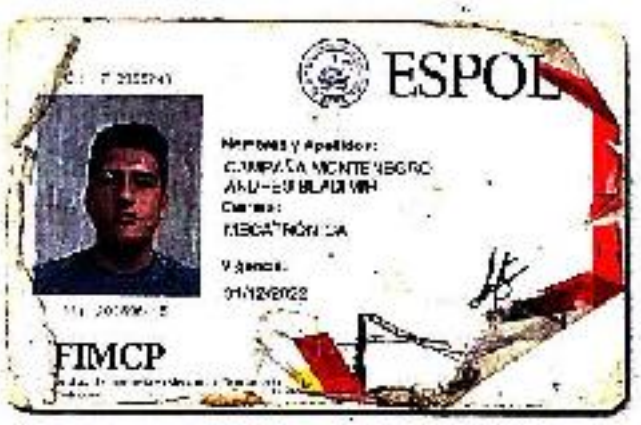
$14 = \{\bar{A}\bar{B}\,D\,\overline{C+C}\} + \{D\,\overline{C+C}\,\bar{B}\,A\} \cdot 1 + [\bar{A}\,\bar{B}\,D\,\overline{C+C} + D\,\overline{C+C}\,\bar{B}\,A \cdot 0]$

$F = 14 = \bar{A}\bar{B}\,D\,\overline{C+C} + D\,\overline{C+C}\,\bar{B}\,A + \underline{10}$

+10p

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

+2p



AB / CD	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	1	1	1	1
10	0	0	0	0

$F = C \cdot D$ x

3L2 + 1L2 = 10 — 011 = 3

Tema 1

Tabla Verdad

A	B	X_2	X_1	X_0	R_2	R_1	R_0
0	0	0	0	0	x	x	x
0	0	0	0	1	x	x	x
0	0	0	1	0	x	x	x
0	0	0	1	1	x	x	x
0	0	1	0	0	x	x	x
0	0	1	0	1	x	x	x
0	0	1	1	0	x	x	x
0	0	1	1	1	x	x	x
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	1
0	1	0	1	0	0	1	0
0	1	0	1	1	0	1	1
0	1	1	0	0	0	0	0
0	1	1	0	1	0	0	0
0	1	1	1	0	0	0	0
0	1	1	1	1	0	0	0
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0
1	0	0	1	0	0	0	0
1	0	0	1	1	0	0	0
1	0	1	0	0	1	0	0
1	0	1	0	1	1	0	1
1	0	1	1	0	1	1	0
1	0	1	1	1	1	1	1
1	1	0	0	0	x	x	x
1	1	0	0	1	x	x	x
1	1	0	1	0	x	x	x
1	1	0	1	1	x	x	x
1	1	1	0	0	x	x	x
1	1	1	0	1	x	x	x
1	1	1	1	0	x	x	x
1	1	1	1	1	x	x	x

R_2

$X_2X_1X_0$	AB 00	01	11	10
000	x	0	x	0
001	x	0	x	0
011	x	0	x	0
010	x	0	x	0
110	x	0	x	1
111	x	0	x	1
101	x	0	x	1
100	x	0	x	1

$R_2 = \bar{B}X_2$

$2^3 = 8$

$2^4 =$

+2 pts

+1 pt

30/30

Examen 1P

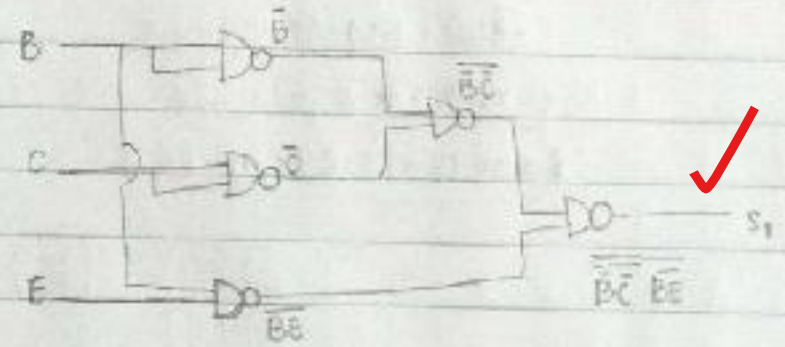
Tema 2.

(a)

DE \ ABC	000	001	011	010	110	111	101	100
00	1	0	0	0	0	0	0	x
01	x	0	1	x	1	1	0	1
11	x	0	x	x	1	x	0	x
10	1	0	0	0	0	0	0	x

$S_1 = \bar{B}\bar{C} + B\bar{E} \rightarrow \overline{\bar{B}\bar{C} + B\bar{E}} = \overline{\bar{B}\bar{C}}\ \overline{B\bar{E}}$

(b)



Tema 3

$A \oplus B = A(\bar{1}) + B(0) = \bar{A}$

$\bar{B}$ → $A\bar{B}$

D, $\bar{C} \rightarrow C$ → DC → $A\bar{B} \cdot DC$

$\bar{B}$, A → $\bar{B}A$ → $DC \cdot \bar{B}A$

$A\bar{B} \cdot DC + DC \cdot \bar{B}A$

$\bar{A}$, B → $\bar{A}B$ → $\bar{A}B \cdot DC$

D, C → DC → $D\bar{C}(0) + D(1)$

$\bar{A}\bar{B} \cdot DC + DC \cdot \bar{B}A + \bar{A}B \cdot DC$

$\bar{Z}(0) + Z(0) = S$

$\bar{Z}(0) = Z(0)$

$S = A\bar{B} \cdot DC + DC \cdot \bar{B}A + \bar{A}B \cdot DC$

$1 \oplus 0 = 0 \quad 0 \oplus 1 = 0$

$0 \oplus 0 = 1 \quad 0 \oplus 0 = 0$

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

S / CD \ AB	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	1	1	0	1
10	0	0	0	0

$S = \bar{A}CD + A\bar{B}CD$

23/25

+15p

+8p

Problema 1

A	B	X_2	X_1	X_0	R_2	R_1	R_0
0	0	0	0	0	ϕ	ϕ	ϕ
0	0	0	0	1	ϕ	ϕ	ϕ
0	0	0	1	0	ϕ	ϕ	ϕ
0	0	0	1	1	ϕ	ϕ	ϕ
0	0	1	0	0	ϕ	ϕ	ϕ
0	0	1	0	1	ϕ	ϕ	ϕ
0	0	1	1	0	ϕ	ϕ	ϕ
0	0	1	1	1	ϕ	ϕ	ϕ
0	1	0	0	0	0	0	0
0	1	0	0	1	0	1	0
0	1	0	1	0	1	0	0
0	1	0	1	1	1	0	0
0	1	1	0	0	0	0	0
0	1	1	0	1	0	0	0
0	1	1	1	0	0	0	0
0	1	1	1	1	0	0	0
1	0	0	0	0	1	0	0
1	0	0	0	1	1	0	1
1	0	0	1	0	1	1	0
1	0	0	1	1	1	1	1
1	0	1	0	0	ϕ	ϕ	ϕ
1	0	1	0	1	ϕ	ϕ	ϕ
1	0	1	1	0	ϕ	ϕ	ϕ
1	0	1	1	1	ϕ	ϕ	ϕ
1	1	0	0	0	ϕ	ϕ	ϕ
1	1	0	0	1	ϕ	ϕ	ϕ
1	1	0	1	0	ϕ	ϕ	ϕ
1	1	0	1	1	ϕ	ϕ	ϕ
1	1	1	0	0	ϕ	ϕ	ϕ
1	1	1	0	1	ϕ	ϕ	ϕ
1	1	1	1	0	ϕ	ϕ	ϕ
1	1	1	1	1	ϕ	ϕ	ϕ

25/30

+20p

A=0

X_1X_0 \ BX_2	00	01	11	10
00	ϕ	ϕ	0	0
01	ϕ	ϕ	0	0
11	ϕ	ϕ	0	0
10	ϕ	ϕ	0	0

Op.1

A=1

X_1X_0 \ BX_2	00	01	11	10
00	0	1	ϕ	ϕ
01	0	1	ϕ	ϕ
11	0	1	ϕ	ϕ
10	0	1	ϕ	ϕ

Op.2

$R_2 = A\bar{B}X_2$

+5p

Ejercicio 2

15/25

A = 0

BC \ DE	00	01	11	10
00	(1	X	X	1)
01	0	0	0	0
11	0	1	X	0
10	0	X	X	0

+4p ✓

A = 1

BC \ DE	00	01	11	10
00	(1	1	X	X)
01	0	0	0	0
11	0	1	X	0
10	0	1	1	0

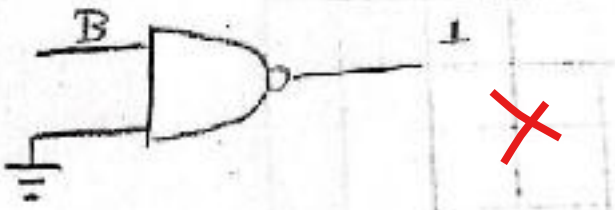
+6p ✓

$S1 = \bar{B}\bar{C} + EB$ ✓ +5p

$S1 = (\overline{\bar{B}\bar{C}EB})$

$S1 = (\overline{\bar{B}B\bar{C}E})$?

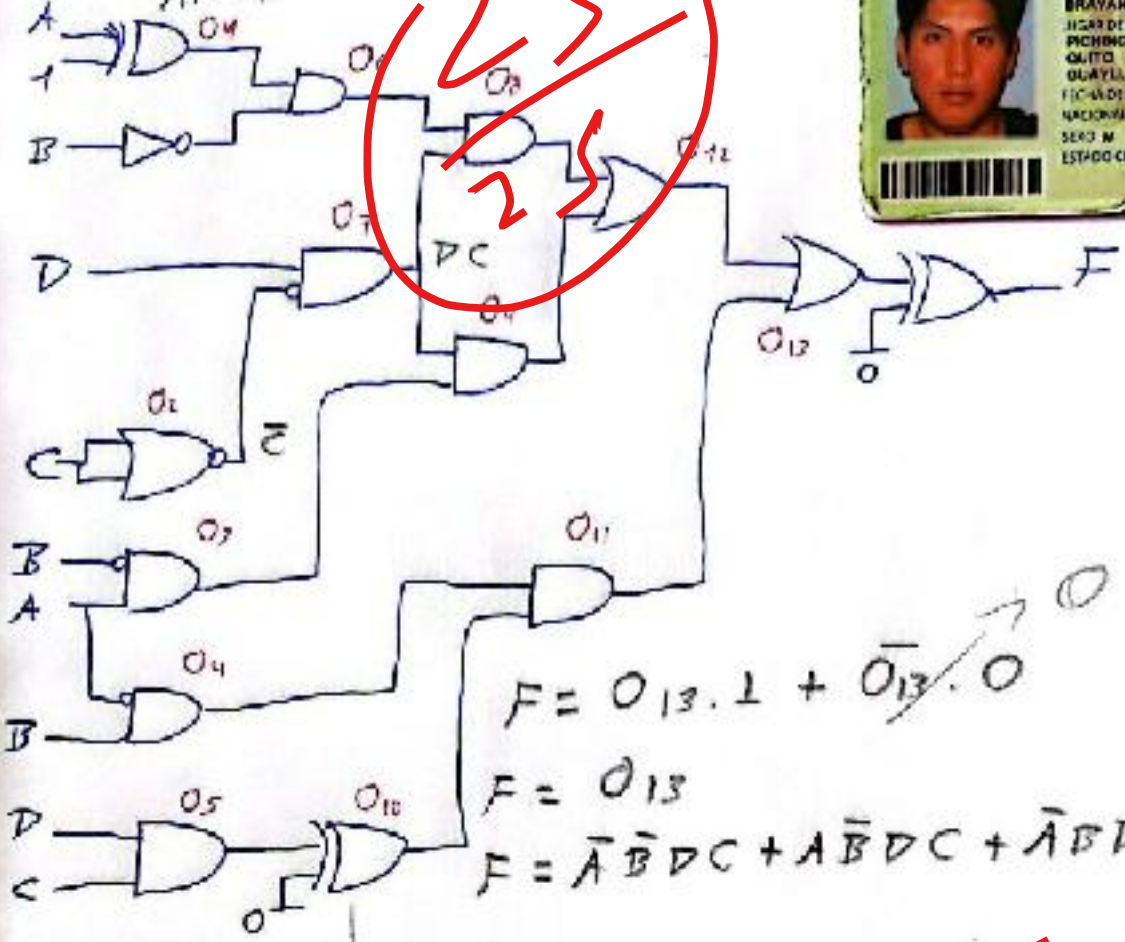
$S1 = 1$



X

Problema 3

$A.0 + \bar{A}$



$F = O_{13}.1 + \bar{O}_{13}.0$ → 0

$F = O_{13}$

$F = \bar{A}\bar{B}DC + A\bar{B}DC + \bar{A}BDC$

$O_1 = \bar{A}$

$O_2 = \bar{C}$

$O_3 = A.\bar{B}$

$O_4 = \bar{A}B$

$O_5 = DC$

$O_6 = \bar{A}\bar{B}$

$O_7 = DC$

$O_8 = O_6 O_7 = \bar{A}\bar{B}DC$

$O_9 = O_7 O_3 = DCA\bar{B}$

$O_{10} = O_5.1 + \bar{O}_5.0 = O_5 = DC$

$O_{11} = O_4 O_{10} = \bar{A}BDC$

$O_{12} = O_8 + O_9 = \bar{A}\bar{B}DC + A\bar{B}DC$

$O_{13} = O_{12} + O_{11} = \bar{A}\bar{B}DC + A\bar{B}DC + \bar{A}BDC$

Problema 3

Parte 2

A	B	C	D	
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	1 $\bar{A}\bar{B}DC$
0	1	0	0	0
0	1	0	1	0
0	1	1	0	0
0	1	1	1	1 $\bar{A}BDC$
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	1 $A\bar{B}DC$
1	1	0	0	0
1	1	0	1	0
1	1	1	0	0
1	1	1	1	0

$F = \bar{A}\bar{B}DC + A\bar{B}DC + \bar{A}BDC$

AB \ CD	00	01	11	10
00	0	0	1	0
01	0	0	1	0
11	0	0	0	0
10	0	0	1	0

→ Cmp = 2

$F = CD\bar{A} + CDA\bar{B}$

+8P

Pregunta 1

20/20

+2 vp ✓

A	B	Y_2	Y_1	Y_0	E_2	E_1	E_0
0	0	0	0	0	1	0	0
0	0	0	0	1	0	1	0
0	0	0	1	0	0	0	1
0	0	0	1	1	0	0	0
0	0	1	0	0	0	0	0
0	0	1	0	1	0	0	0
0	0	1	1	0	0	0	0
0	0	1	1	1	0	0	0
0	1	0	0	0	1	0	0
0	1	0	0	1	0	1	0
0	1	0	1	0	0	0	1
0	1	0	1	1	0	0	0
0	1	1	0	0	0	0	0
0	1	1	0	1	0	0	0
0	1	1	1	0	0	0	0
0	1	1	1	1	0	0	0
1	0	0	0	0	1	0	0
1	0	0	0	1	0	1	0
1	0	0	1	0	0	0	1
1	0	0	1	1	0	0	0
1	0	1	0	0	0	0	0
1	0	1	0	1	0	0	0
1	0	1	1	0	0	0	0
1	0	1	1	1	0	0	0
1	1	0	0	0	1	0	0
1	1	0	0	1	0	1	0
1	1	0	1	0	0	0	1
1	1	0	1	1	0	0	0
1	1	1	0	0	0	0	0
1	1	1	0	1	0	0	0
1	1	1	1	0	0	0	0
1	1	1	1	1	0	0	0

$A_0 = \bar{A}$

Y_2Y_1 \ BY_0	00	01	11	10
00	ϕ	ϕ	0	0
01	ϕ	ϕ	0	0
11	ϕ	ϕ	0	0
10	ϕ	ϕ	0	0

$E_2 = \bar{B}\bar{A}$

$E_1 = Y_1 = A$

Y_2Y_1 \ BY_0	00	01	11	10
00	0	1	ϕ	ϕ
01	0	1	ϕ	ϕ
11	0	1	ϕ	ϕ
10	0	1	ϕ	ϕ

$E_2 = (Y_2 + B)A$

$E_2 = \bar{B}A + Y_2A + BA$

$E_2 = Y_2A + (\overline{A \oplus B})$ //

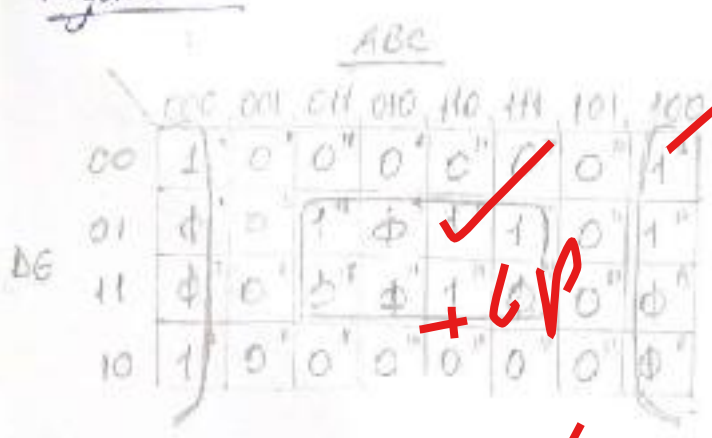
Aquí es Más ϕ = 0 menos igual

Mejor 1 grupo

Este grupo es el único que necesito

×

Pregunta 2



+4p

+6p

$\frac{25}{25}$

=> Mapa de Karnaugh

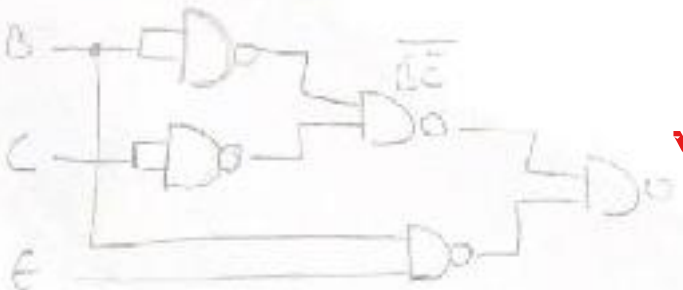
1) $\sum m(0,1,2,3,16,17,18,19)$

2) $\sum m(13,9,25,29,15,11,23,31)$

$S = \bar{B}\bar{C} + B\bar{E}$

+5p

b)



+10p

1) $\bar{B}\bar{C}$

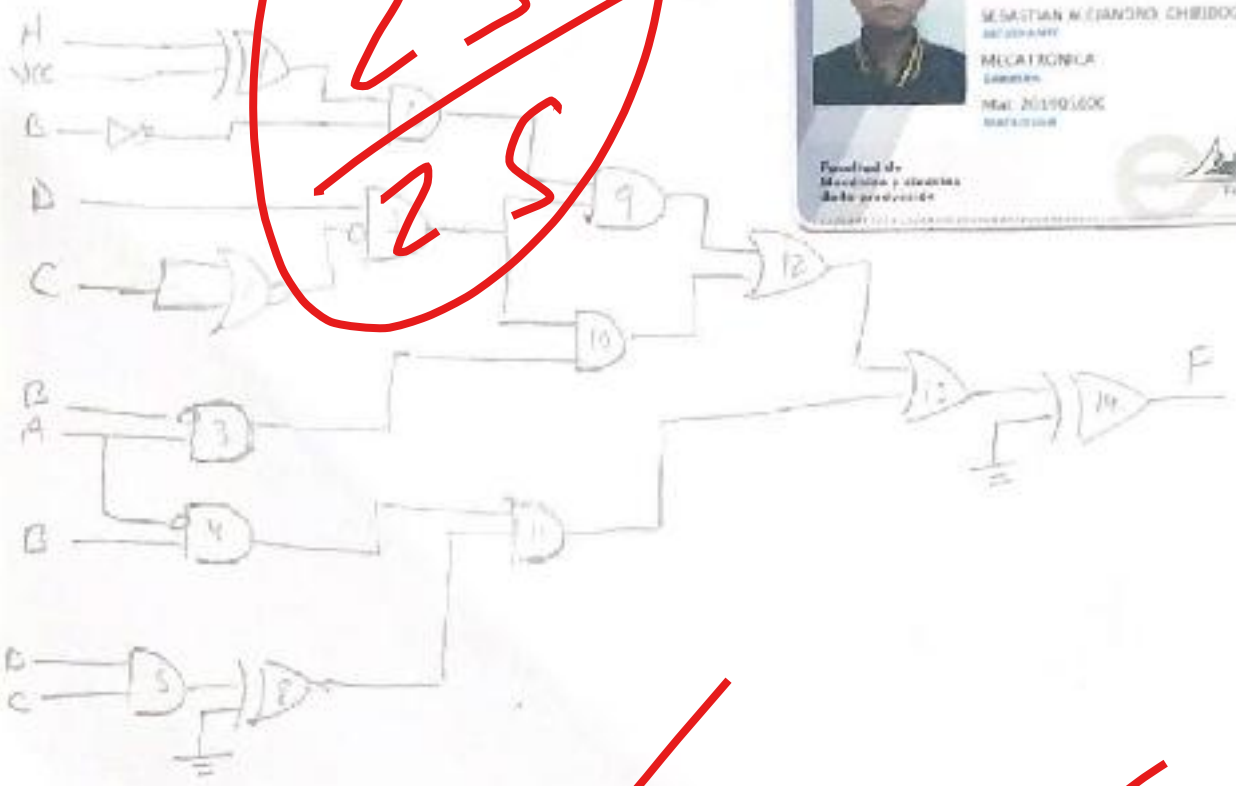
2) $B\bar{E}$

3) $\overline{(\bar{B}\bar{C})(B\bar{E})}$ => $(\bar{\bar{B}}\bar{\bar{C}}) + (\bar{B}\bar{\bar{E}})$

$(B\bar{C}) + (\bar{B}E)$ //

Pregunta 3

25/25



1) XOR(A, Vcc) = $\bar{A}1 + A0 = \bar{A}$

2) NOR(C, C) = $\overline{C+C}$

3) AND($\bar{C}$, A) = $\bar{C}A$

4) AND($\bar{A}$, B) = $\bar{A}B$

5) AND(D, C) = DC

6) AND(①, $\bar{B}$) = $\bar{A}\bar{B}$

7) AND(D, ②) = $D(\overline{C+C})$

8) XOR(⑤, 0) = $\bar{D}C0 + DC1 = DC$

9) AND(⑥, ⑤) = $(\bar{A}\bar{B})(D(\overline{C+C}))$

10) AND(⑦, ③) = $(D(\overline{C+C}))(\bar{B}A)$

11) AND(⑧, ④) = $\bar{A}BDC$

12) OR(⑨, ⑩) = $[(\bar{A}\bar{B})(D(\overline{C+C}))] + [(D(\overline{C+C}))(\bar{B}A)]$

13) OR(⑫, ⑪) = $[(\bar{A}\bar{B})(D(\overline{C+C}))] + [(D(\overline{C+C}))(\bar{B}A)] + (\bar{A}BDC)$

14) XOR(⑬, 0) = $([(\bar{A}\bar{B})(D(\overline{C+C}))] + [(D(\overline{C+C}))(\bar{B}A)] + (\bar{A}BDC))0$

a) $S = [(\bar{A}\bar{B}(D(\bar{C}+\bar{C})) + (D(\bar{C}+\bar{C})(\bar{B}A)] + \bar{A}BDC$ // adj

00 01 11 10

b) Mínimos con tabla de Karnaugh

CD \ AB	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	1	1	0	1
10	0	0	0	0

$= \bar{A}BDC = 0111$ ✓3

$= \bar{A}\bar{B}(D(\bar{C}+C)) = 0001$ ✓1 } 6 soluciones repetidas

$= A\bar{B}(D(\bar{C}+C)) = 1011$ ✓1

1) $\Sigma M(3,7)$

2) $\Sigma M(3,11)$

$S = \bar{A}CD + \bar{B}CD$ ✓

+1sp

+1sp

8/10

Examen Parcial

1)

A	B	X_2	X_1	X_0	R_2	R_1	R_0	
0	0	0	0	0	Combinación no es posible			$X=0$
0	1	0	0	1	0 0 1			$X=1$
1	0	0	1	0	0 0 0			$X=2$
1	1	0	1	1	Combinación no es posible			$X=3$
0	0	1	0	0	Combinación no es posible			$X=4$
0	1	1	0	1	0 0 0			$X=5$
1	0	1	1	0	0 0 0			$X=6$
1	1	1	1	1	Combinación no es posible			$X=7$

$\Rightarrow X_2X_1X_0$;

A	B	X_2	X_1	X_0	R_2	R_1	R_0
0	0	0	0	0	X	X	X
0	1	0	0	1	0	0	1
1	0	0	1	0	0	0	0
1	1	0	1	1	X	X	X
0	0	1	0	0	X	X	X
0	1	1	0	1	0	0	0
1	0	1	1	0	1	1	0
1	1	1	1	1	X	X	X

ΣH_1 = Suma de minitérminos.

$R_2 = A\bar{B}X_2X_1\bar{X}_0$ ✓

$R_1 = R_2$

$R_0 = AB\bar{X}_2X_1X_0$

Tabla de verdad debe tener todas las posibles combinaciones de las entradas

$2^n = 2^5 = 32$ filas

$n = 5$

Pregunta 2.

A	B	C	D	E	S_1	S_2
0	0	0	0	0	1	0
0	0	0	0	1	X	0
0	0	0	1	0	1	0
0	0	0	1	1	X	0
0	0	1	0	0	0	0
0	0	1	0	1	0	0
0	0	1	1	0	0	0
0	0	1	1	1	0	0
0	1	0	0	0	0	0
0	1	0	0	1	X	X
0	1	0	1	0	0	0
0	1	0	1	1	X	X
0	1	1	0	0	0	0
0	1	1	0	1	1	1
0	1	1	1	0	0	0
0	1	1	1	1	X	X
1	0	0	0	0	1	0
1	0	0	0	1	1	0
1	0	0	1	0	X	0
1	0	0	1	1	X	0
1	0	1	0	0	0	X
1	0	1	0	1	0	1
1	0	1	1	0	0	X
1	0	1	1	1	0	1
1	1	0	0	0	0	0
1	1	0	0	1	1	0
1	1	0	1	0	0	1
1	1	0	1	1	0	1
1	1	1	0	0	0	0
1	1	1	0	1	0	0
1	1	1	1	0	0	1
1	1	1	1	1	X	0

25

$S_1 = \bar{B}\bar{C} + BE$

+6p

A = 0

BC \ DE	00	01	11	10
00	1	0	0	0
01	X	0	1	X
11	X	0	X	X
10	1	0	0	0

A = 1

BC \ DE	00	01	11	10
00	1	0	0	0
01	1	0	1	1
11	X	0	X	X
10	X	0	0	0

+sp

+4p

$S_2 = \bar{A}BE + A\bar{B}C + AB\bar{D}\bar{E}$

A = 0

BC \ DE	00	01	11	10
00	0	0	0	0
01	0	0	1	X
11	0	0	X	X
10	0	0	0	0

A = 1

BC \ DE	00	01	11	10
00	0	X	0	0
01	0	1	0	0
11	0	1	0	0
10	0	X	1	1

3) Usando puerta NAND

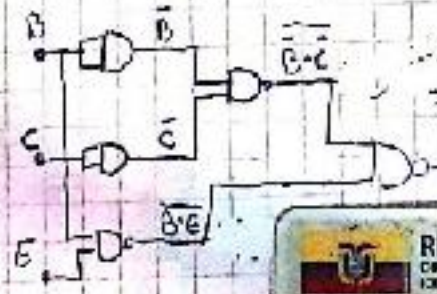
+10p

NAND

$F = \overline{A \cdot B} = \bar{A} + \bar{B}$

$F = \bar{A}$

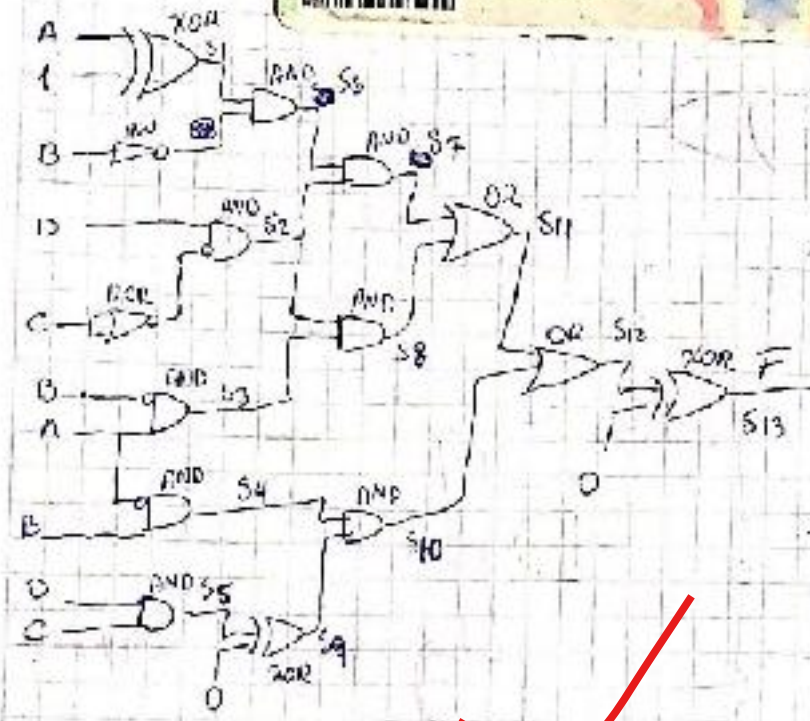
$F = A + B$



$\bar{B}\cdot\bar{C} + \bar{B}\cdot E + B\cdot\bar{C} + B\cdot E$

$= \bar{B}\cdot\bar{C} + B\cdot E$

Problema 3:



$S_1 = A$
$S_2 = D \cdot (\overline{C \cdot C})$
$S_3 = \bar{B} \cdot C$
$S_4 = A \cdot B$
$S_5 = S_3 \cdot C$
$S_6 = S_1 \cdot \bar{C}$
$S_7 = S_6 + S_2$
$S_8 = S_2 + S_3$
$S_9 = S_5 \oplus 0$
$S_{10} = S_4 \cdot S_9$
$S_{11} = S_7 + S_8$
$S_{12} = S_{11} + S_{10}$
$S_{13} = F = S_{12} \oplus 0$

23/25

$S_1 = A \oplus 1 = A \cdot \bar{1} + \bar{A} \cdot 1 = A \cdot 0 + \bar{A} = \bar{A}$

$S_2 = D \cdot (\overline{C \cdot C}) = D \cdot C$

$S_3 = \bar{B} \cdot D$

$S_4 = \bar{A} \cdot C$

$S_5 = C \cdot D$

$S_6 = \bar{A} \cdot \bar{B}$

$S_7 = \bar{A} \cdot \bar{B} \cdot D \cdot C$

$S_8 = (D \cdot C)(B \cdot A)$

$S_9 = (C \cdot D) \oplus 0 = (CD)1 + \bar{C}\bar{D} \cdot 0 = CD$

$S_{10} = \bar{A} \cdot B \cdot CD$

$S_{11} = (\bar{A}\bar{B}CD) + (A\bar{B}CD)$

$S_{12} = [(\bar{A}\bar{B}CD) + (A\bar{B}CD)] + [ABCD]$

$S_{13} = F = S_{12} \oplus 0 = S_{12} \cdot 1 + \bar{S}_{12} \cdot 0$

a) Función resultante, no reducida

$F = S_{12} = [\bar{A}\bar{B}CD + A\bar{B}CD + ABCD]$ +15p

b) Forma como Mapa de Karnaugh.

CD \ AB	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	1	1	0	1
10	0	0	0	0

$S_{12} = \bar{A}\bar{B}CD + A\bar{B}CD + \bar{A}BCD$

$S_{12} = \bar{A}(\bar{B}CD + B\bar{C}D) + A\bar{B}CD$

$= \bar{A}CD(\bar{B} \oplus B) + A\bar{B}CD$

$S_{12} = \bar{A}CD + A\bar{B}CD$ +8p

D

Ejercicio 2

Examen 2 p.

NOTA

28/20

Pregunta 1

1) Tabla de verdad

A	B	X_2	X_1	X_0	R_2	R_1	R_0

3) Expresión lógica reducida

mapa R_2

AB \ $X_2 X_1 X_0$	000	001	011	010	110	111	101	100
00	X^0	X^1	X^{12}	X^8	X^{24}	X^{28}	X^{29}	X^{25}
01	O^1	O^5	O^{13}	O^9	O^{25}	O^{29}	O^{31}	O^{27}
11	X^3	X^7	X^{15}	X^{11}	X^{27}	X^{31}	X^{23}	X^{19}
10	2	6	14	10	26	30	22	18
	0	0	0	0	1	1	1	1

Si $\phi = 1$

$R_{min} = A\bar{B}X_2$ //

+ & P

Problema 2

a) Reducir S1 y su implementación mediante Mapa S1

BE \ ABC	000	001	011	010	110	111	101	100
00	1	0	0	0	0	0	0	1
01	ϕ	0	1	ϕ	1	1	0	1
11	ϕ	0	ϕ	ϕ	1	ϕ	0	ϕ
10	1	0	0	0	0	0	0	ϕ

+4p 1y/2s

+5p

$S1 = \bar{A}\bar{B}\bar{C} + BE + A\bar{B}\bar{C}$

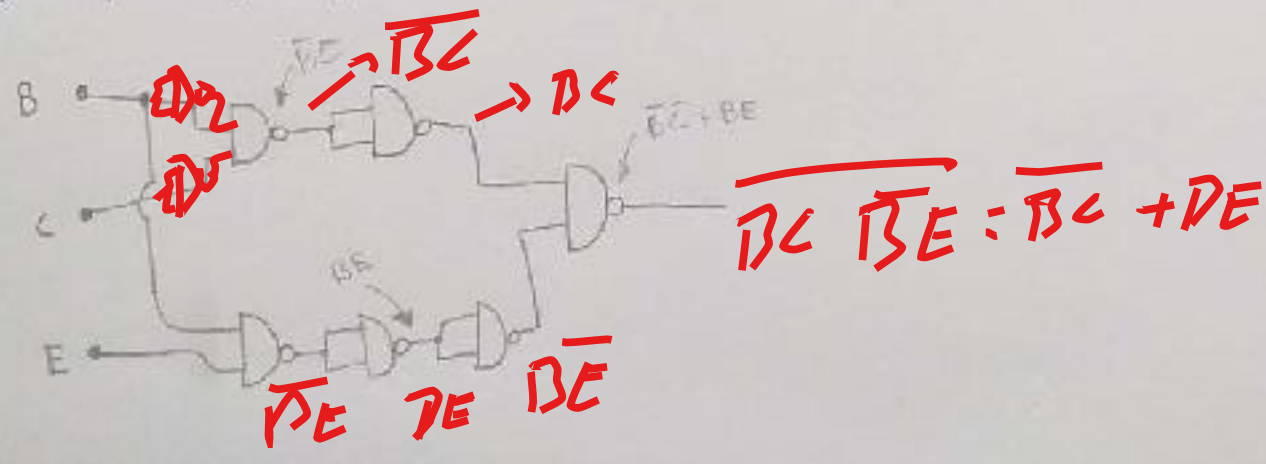
$S1 = \bar{B}\bar{C}(\bar{A}+A) + BE$

$S1 = \bar{B}\bar{C} + BE$ //

Puedes reducir Más porque hay 4 grupos de 8

+5p

b) Implementa reducida con Gerstin NAND S1 min



Problema 3.

a) Encontrar la función lógica resultante F (no reducida)

1) ~~DA + A1~~

2) $(DA + \bar{A}1)\bar{B} \rightarrow \bar{A}\bar{B}DL$

3) DL

4) $\bar{D}A$

5) $\bar{A}B$

6) $\bar{D}L \rightarrow DL1 + 0\bar{D}L$

$\rightarrow \bar{A}\bar{B}DL + DL\bar{B}A$

$\rightarrow \bar{A}\bar{B}DL + A\bar{B}DL + \bar{A}BDL \rightarrow (\bar{A}\bar{B}DL + A\bar{B}DL + \bar{A}BDL)1$

$F = \overline{(\bar{A}\bar{B}DL + A\bar{B}DL + \bar{A}BDL)} +$

$F = \bar{A}\bar{B}DL + A\bar{B}DL + \bar{A}BDL$

25/25

+1 sp

b) Minimice la función lógica con mapa de Karnaugh

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

Mapa de F

AB / CD	00	01	11	10
00	0 0	0 4	0 12	0 8
01	0 1	0 5	0 13	0 9
11	(1) 3	1 7	0 15	(1) 11
10	0 2	0 6	0 14	0 10

$F_{min} = \bar{A}CD + \bar{B}CD$

$F_{min} = CD(\bar{A} + \bar{B})$ //

+1 sp

Pregunta 1) → todo esto en lógica positiva

A.H. y B.H. son señales entre unidas (cambian ambas a la vez)

X2, X1, X0 : entrada por el generador de números (000 a 111 / 7 dec.)

R2, R1, R0 : Señales de Salidas.

A B
0 0 } no es posible d.c.
1 1

1 0 } ahí ¿qué valor de las entradas X2X1X0 mayor y menor a un valor decimal
0 1 }

ej:
10 → mayor que 8 decimal (100, 101, 110, 111)
01 → menor o igual que 8 decimal (000, 001, 010, 011)

Sino serían 000

a	b	X2	X1	X0	R2	R1	R0
0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0
0	0	0	1	0	0	0	0
0	0	0	1	1	0	0	0
0	0	1	0	0	0	0	0
0	0	1	0	1	0	0	0
0	0	1	1	0	0	0	0
0	0	1	1	1	0	0	0
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	0
0	1	0	1	0	0	0	0
0	1	0	1	1	0	0	0
0	1	1	0	0	0	0	0
0	1	1	0	1	0	0	0
0	1	1	1	0	0	0	0
0	1	1	1	1	0	0	0
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0
1	0	0	1	0	0	0	0
1	0	0	1	1	0	0	0
1	0	1	0	0	0	0	0
1	0	1	0	1	0	0	0
1	0	1	1	0	0	0	0
1	0	1	1	1	0	0	0
1	1	0	0	0	0	0	0
1	1	0	0	1	0	0	0
1	1	0	1	0	0	0	0
1	1	0	1	1	0	0	0
1	1	1	0	0	0	0	0
1	1	1	0	1	0	0	0
1	1	1	1	0	0	0	0
1	1	1	1	1	0	0	0

1) Tabla de verdad.

2) Expresión reducida para R_2

A	B	X_2	X_1	X_0	R_2
1	0	1	0	0	1
1	0	1	0	1	1
1	0	1	1	0	1
1	0	1	1	1	1

$$A\bar{B}X_2\bar{X}_1\bar{X}_0 + A\bar{B}X_2\bar{X}_1X_0 + A\bar{B}X_2X_1\bar{X}_0 + A\bar{B}X_2X_1X_0$$

$$A\bar{B}(X_2\bar{X}_1\bar{X}_0 + X_2\bar{X}_1X_0 + X_2X_1\bar{X}_0 + X_2X_1X_0)$$

$$A\bar{B}X_2(\bar{X}_1\bar{X}_0 + \bar{X}_1X_0 + X_1\bar{X}_0 + X_1X_0)$$

$$A\bar{B}X_2(\bar{X}_1\bar{X}_0 + \bar{X}_1X_0 + X_1\bar{X}_0 + X_1X_0)$$

$$A\bar{B}X_2[\bar{X}_1(\bar{X}_0 + X_0) + X_1(\bar{X}_0 + X_0)]$$

$$A\bar{B}X_2[\bar{X}_1(1) + X_1(1)]$$

$$A\bar{B}X_2(\bar{X}_1 + X_1)$$

$$A\bar{B}X_2(1) = A\bar{B}X_2$$ RH

+ 10p

Pregunta 2)

dada la tabla reducida (usando karnaugh)

S_1	S_0	T_A	T_B	T_C	T_D	T_E
0	0	1	0	0	0	0
0	1	x	0	0	0	0
1	0	1	0	0	0	0
1	1	x	0	0	0	0

1) mapas de Karnaugh S_1

de \ abc	000	001	011	010	110	111	101	100
00	1	0	0	0	0	0	0	1
01	0	0	1	1	1	1	0	1
11	0	0	0	0	1	0	0	0
10	1	0	0	0	0	0	0	1

+ S_1

1) agrupación

+ 4p

x

→ Se formaron 3 grupos

2 Grupos de 8

$\bar{A}\bar{B}\bar{C} + B\bar{E} + A\bar{B}\bar{C}$

$\bar{A}\bar{B}\bar{C} + A\bar{B}\bar{C} + B\bar{E}$

$(\bar{A}+A)\bar{B}\bar{C} + B\bar{E}$

(1) $\bar{B}\bar{C} + B\bar{E}$ + 4p.

~~$B\bar{E} + B\bar{E}$~~ 3) reducción

$\neq$?

$\bar{B}(\bar{C}+\bar{E})$

B

C

E

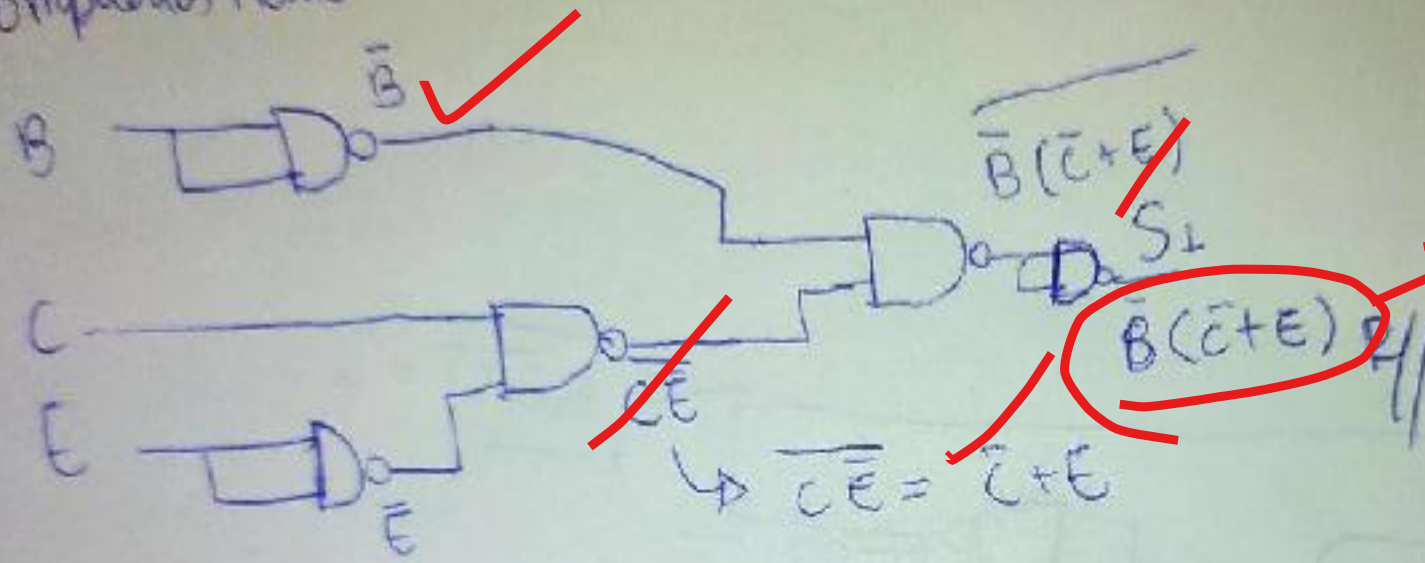
$\overline{B(\bar{C}+\bar{E})} = B$

$(\bar{C}+\bar{E})$

$\overline{C\bar{E}} = (\bar{C}+\bar{E})$

13/25

Computer round

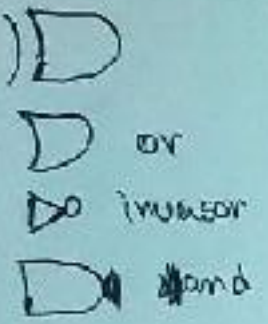


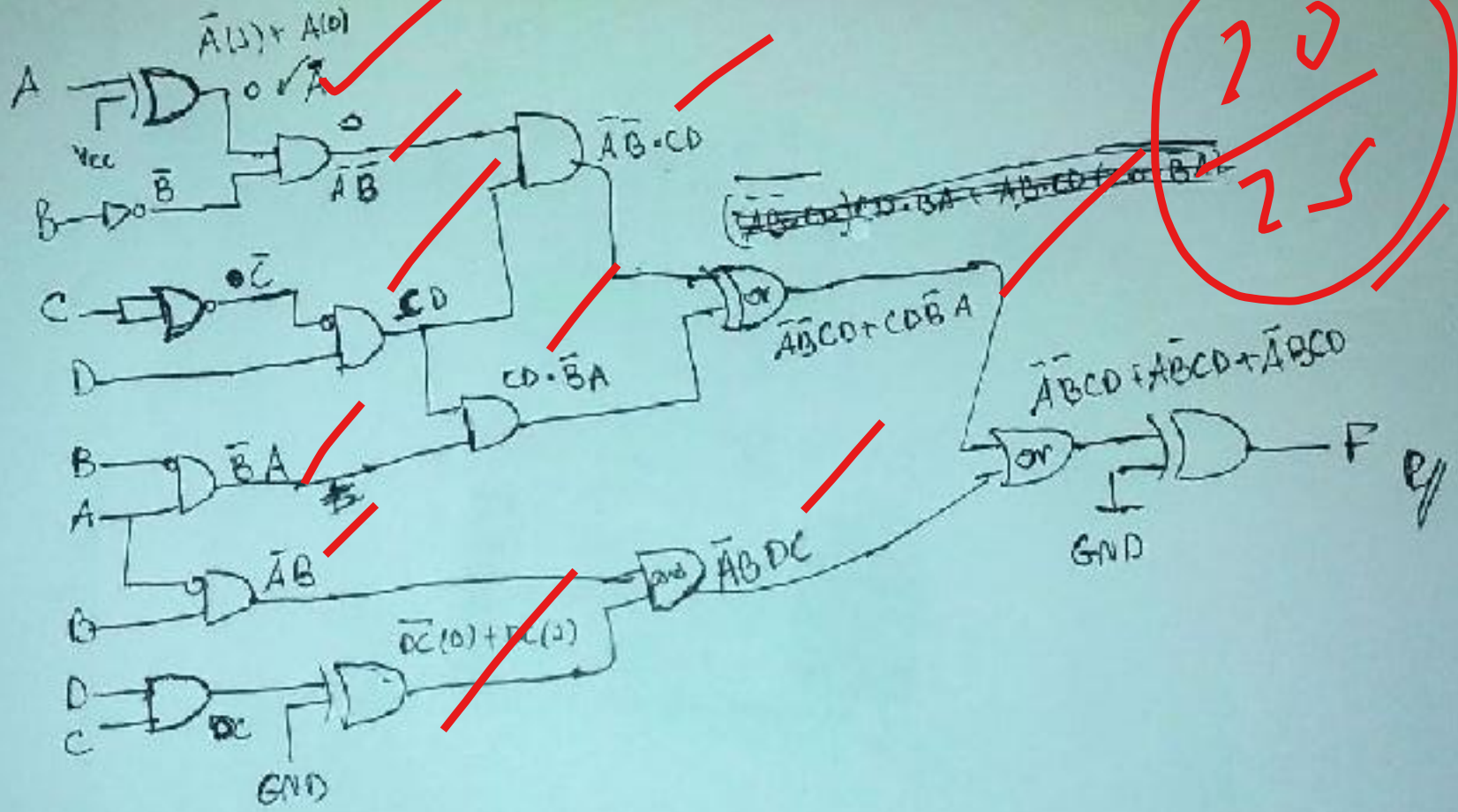
Nos da la expresión buscada

$\bar{B}\bar{C} + BE$

Qué tengo

Vcc = 1
GND = 0
Lógica positiva

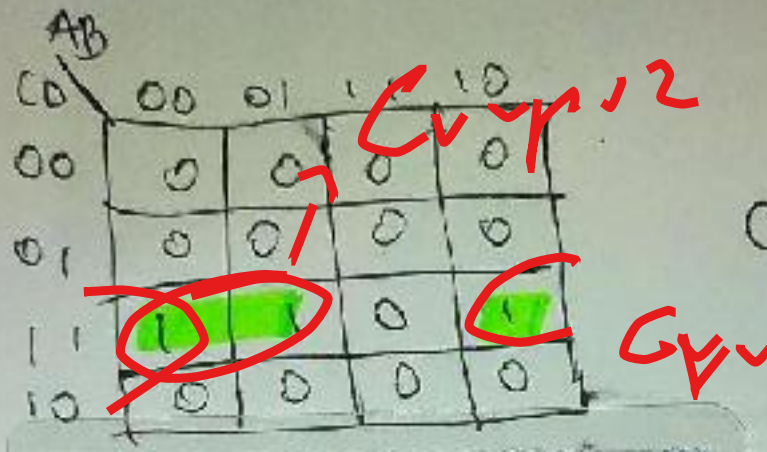




$$F = \overline{[\bar{A}\bar{B}CD + A\bar{B}CD + \bar{A}BCD](0) + (\bar{A}\bar{B}CD + A\bar{B}CD + \bar{A}BCD)(1)}$$

$$F = (\bar{A}\bar{B}CD + A\bar{B}CD + \bar{A}BCD)$$

+1 sp


AB
CD
00
01
11
10
CD(ĀB)
F= Cuyo1 + Cuyo2
+ Sp


CERTIFICADO DE VOTACIÓN 11 ABRIL 2021
GUAYAS
GUAYAQUIL
TAROUI
JUNTA No. 9226 MASCULINO
LARA PAZMIÑO
ANDRÉS

10/10

Pregunta 1: Tabla de verdad

A	B	Y_2	X_1	X_0	R_1	R_2	R_0
0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0
0	0	0	1	0	0	0	0
0	0	0	1	1	0	0	0
0	0	1	0	0	0	0	0
0	0	1	0	1	0	0	0
0	0	1	1	0	0	0	0
0	0	1	1	1	0	0	0
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	0
0	1	0	1	0	0	0	0
0	1	0	1	1	0	0	0
0	1	1	0	0	0	0	0
0	1	1	0	1	0	0	0
0	1	1	1	0	0	0	0
0	1	1	1	1	0	0	0
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0
1	0	0	1	0	0	0	0
1	0	0	1	1	0	0	0
1	0	1	0	0	1	0	0
1	0	1	0	1	1	0	1
1	0	1	1	0	1	1	0
1	0	1	1	1	1	1	1
1	1	0	0	0	0	0	0
1	1	0	0	1	0	0	0
1	1	0	1	0	0	0	0
1	1	0	1	1	0	0	0
1	1	1	0	0	0	0	0
1	1	1	0	1	0	0	0
1	1	1	1	0	0	0	0
1	1	1	1	1	0	0	0

+ 10p

Total

Caso 1 :) $A = 1 ; B = 1 ; X_2 = 1 ; X_1 = 0 ; X_0 = 0$

b) Reducir de Expresión [Mintermos y álgebra de Boole] $A\bar{B}X_2\bar{X}_1\bar{X}_0$

$R_2 = \bar{A}B\bar{X}_2X_1\bar{X}_0 + \bar{A}B\bar{X}_2X_1X_0 + A\bar{B}X_2X_1\bar{X}_0 + A\bar{B}X_2X_1X_0$

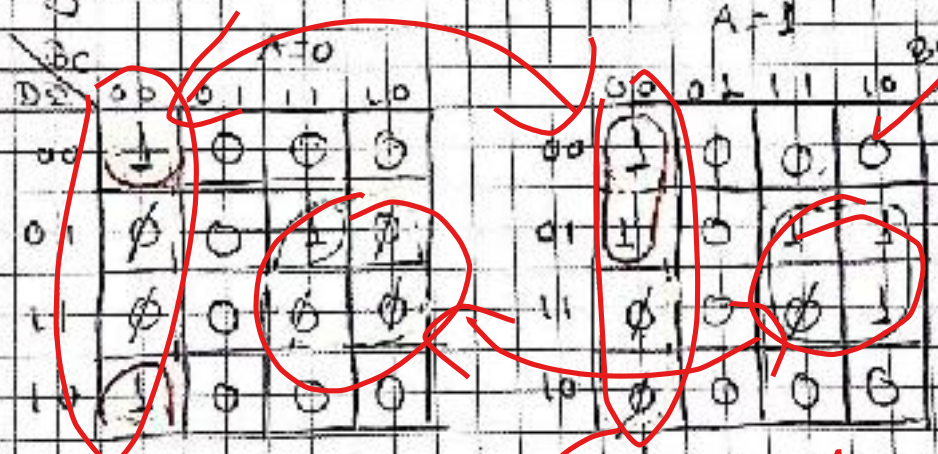
$R_2 = X_1(\bar{A}B\bar{X}_2\bar{X}_0 + \bar{A}B\bar{X}_2X_0 + A\bar{B}X_2X_0 + A\bar{B}X_2X_0)$

$R_2 = X_1[\bar{A}B(\bar{X}_2\bar{X}_0 + \bar{X}_2X_0) + A\bar{B}(X_2\bar{X}_0 + X_2X_0)]$

$R_2 = X_1[\bar{A}B(\bar{X}_2(\bar{X}_0 + X_0)) + A\bar{B}(X_2(\bar{X}_0 + X_0))]$

$R_2 = X_1[\bar{A}B\bar{X}_2 + A\bar{B}X_2]$ // X

Pregunta 2.



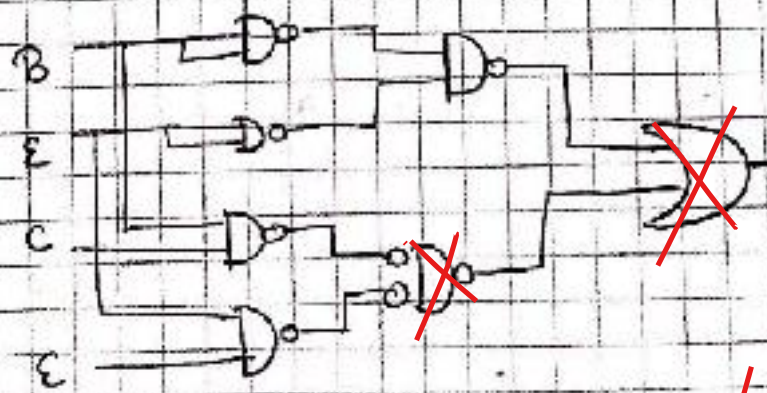
$S_1 = \bar{B}C\bar{E} + BC\bar{D}E + B\bar{C}\bar{D} + \bar{B}E$

$S_1 = BE + BC\bar{D}E + \bar{B}C\bar{D} + \bar{B}\bar{C}E$

$S_1 = BE(1 + C\bar{D}) + \bar{B}C(\bar{D} + \bar{E})$ | $\bar{D} + \bar{E} = \overline{DE}$

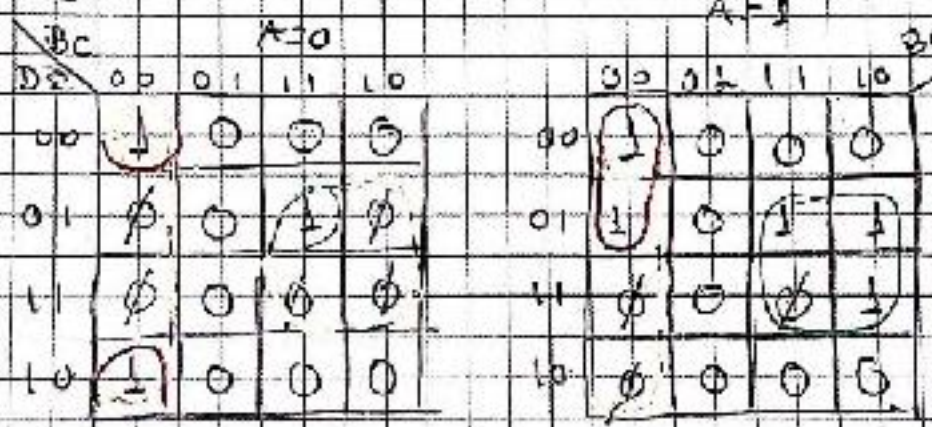
$S_1 = BE(1) + \bar{B}C(\bar{D} + \bar{E})$

$S_1 = BE + \bar{B}C(\bar{D} + C)$



Escaneado con CamScanner

Pregunta 2



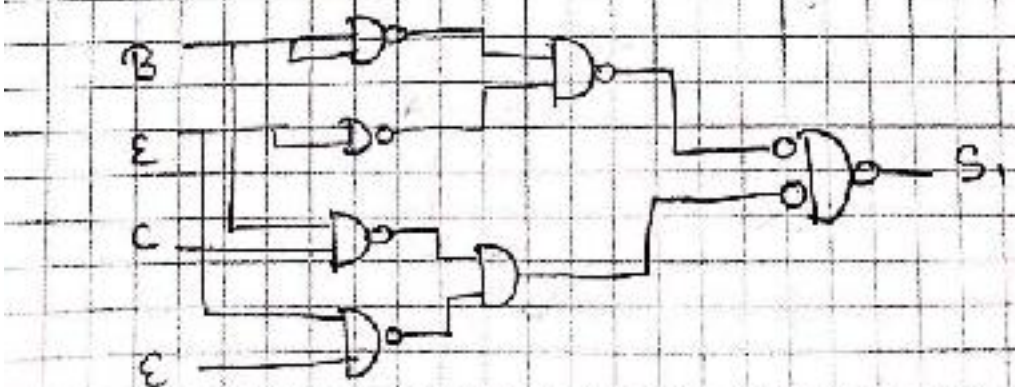
$$S_1 = \overline{BC}\,\overline{E} + BC\overline{D}\overline{E} + B\overline{C}\,\overline{D} + B\overline{E}$$

$$S_1 = B\overline{E} + BC\overline{D}\overline{E} + \overline{B}C\overline{D} + \overline{B}\overline{C}\,\overline{E}$$

$$S_1 = B\overline{E}\,(1 + C\overline{D}) + \overline{B}C(\overline{D} + \overline{E}) \qquad \overline{D} + \overline{E} = \overline{DE}$$

$$S_1 = B\overline{E}(1) + \overline{B}C(\overline{D} + \overline{E})$$

$$S_1 = B\overline{E} + \overline{B}C(\overline{D} + \overline{E})$$



$\bar{A}(1) + A(0) = \bar{A}$

$\bar{A}\bar{B}$

$\bar{A}\bar{B}(DC)$

$(DC)(\bar{B}A)$

$\bar{A}BCD + A\bar{B}CD = X$

$X + \bar{A}BDC = Y$

$F = Y$

$Y(0) + Y(1) = Y$

$B(\bar{A})$

$A(\bar{B})$

$DC(\bar{A}\bar{B})$

$DC(0) + DC(1) = DC$

$\therefore F = \bar{A}CD + \bar{A}BCD + \bar{A}B\bar{C}D$

$F = \bar{A}BCD + \bar{A}B\bar{C}D$

$F = \bar{A}CD$

CD \ AB	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	1	1	0	0
10	0	0	0	0

$\bar{A}\bar{B} \neq \bar{A}\bar{B}$

+12p

+5p

SISTEMAS DIGITALES

TABLA DE VERDAD

JAMO MALAV

A	B	X_2	X_1	X_0	R_2	R_1	R_0
0	0	0	0	0	∅	∅	∅
0	0	0	0	1	∅	∅	∅
0	0	0	1	0	∅	∅	∅
0	0	0	1	1	∅	∅	∅
0	0	1	0	0	∅	∅	∅
0	0	1	0	1	∅	∅	∅
0	0	1	1	0	∅	∅	∅
0	0	1	1	1	∅	∅	∅
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	1
0	1	0	1	0	0	1	0
0	1	0	1	1	0	1	1
0	1	1	0	0	0	0	0
0	1	1	0	1	0	0	0
0	1	1	1	0	0	0	0
0	1	1	1	1	0	0	0
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0
1	0	0	1	0	0	0	0
1	0	0	1	1	0	0	0
1	0	1	0	0	1	0	0
1	0	1	0	1	1	0	1
1	0	1	1	0	1	1	0
1	0	1	1	1	1	1	1
1	1	0	0	0	∅	∅	∅
1	1	0	0	1	∅	∅	∅
1	1	0	1	0	∅	∅	∅
1	1	0	1	1	∅	∅	∅
1	1	1	0	0	∅	∅	∅
1	1	1	0	1	∅	∅	∅
1	1	1	1	0	∅	∅	∅
1	1	1	1	1	∅	∅	∅

30/10

+2 up

JAMES MALAVÉ TOMALÁ

R_2

$X_2 = 0\ 1$

AB \ $X_2X_1X_0$	000	001	011	010	110	111	101	100
00	∅	∅	∅	∅	∅	∅	∅	∅
01	0	0	0	0	0	0	0	0
11	∅	∅	∅	∅	∅	∅	∅	∅
10	∅	∅	∅	∅	1	1	1	1

$R_2 = \square\ \square X_1 \Rightarrow$ [illegible] $R_1 = AX_2$ ✓

קמוט

R_1

$X_1 = 0$ $X_1 = 1$

AB \ $X_1X_2X_3$	000	001	011	010	110	111	101	100
00	∅	∅	∅	∅	∅	∅	∅	∅
01	0	0	1	1	0	0	0	0
11	∅	∅	∅	∅	∅	∅	∅	∅
10	0	0	0	0	1	1	0	0

$R_2 = B\bar{X}_1X_2 + AX_1X_2$

$R_0 =$

$X_1X_2X_3$ \ AB	000	001						
00								
01								
11								
10								

EXAMEN SISTEMAS DIGITALES

PROBLEMA 2

25/25 +4p +6p +5p

S_1

ABC \ DE	000	001	011	010	110	111	101	100
	A=0				A=1			
00	1	0	0	0	0	0	0	1
01	Ø	0	1	Ø	1	1	0	Ø
11	Ø	0	Ø	Ø	Ø	Ø	0	Ø
10	Ø	0	0	0	0	0	0	Ø

$$S_1 = EB + \bar{B}\bar{C}$$

S_2

ABC \ DE	000	001	011	010	110	111	101	100
	A=0				A=1			
00	0	0	0	0	0	0	Ø	0
01	0	0	1	Ø	0	0	1	0
11	0	0	Ø	Ø	0	0	1	0
10	0	0	0	0	1	1	Ø	0

$S_2 = \bar{A}BE + AB\bar{E} + A\bar{B}$

$S_2 = \bar{A}BE + A(B\bar{E}$

$S_2 = \bar{A}BE + A(B\bar{E}$

$S_2 =$

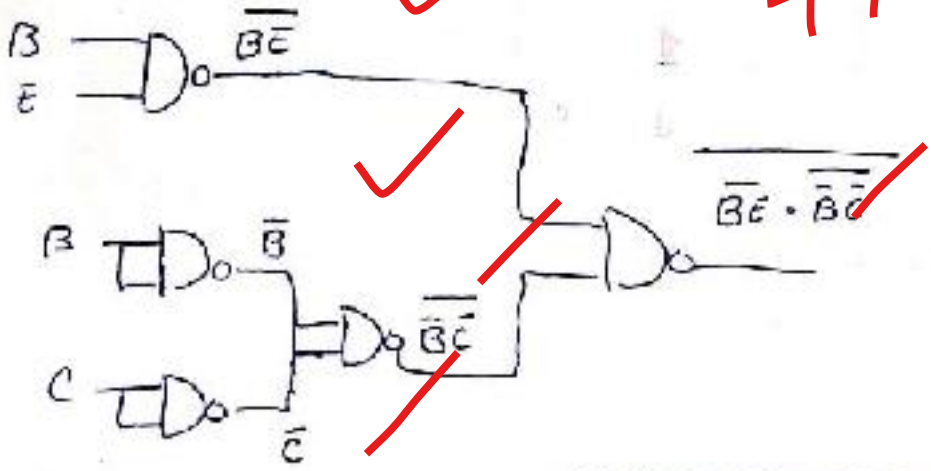
COMPUERTA NAND

JAHEL MALAVÉ TOMALÁ

EXAMEN SISTEMAS.

$$S_1 = BE + \bar{B}\bar{C} = \overline{\overline{BE + \bar{B}\bar{C}}} = \overline{\overline{BE} \cdot \overline{\bar{B}\bar{C}}}$$

$$S_1 = \overline{\overline{BE} \cdot \overline{\bar{B}\bar{C}}}$$



+1pt

JAMES HALAVÉ TORRALVA

EXAMEN SISTEMAS DIGITALES

PROBLEMAS

JAMES MALAVÉ TOAPANTA

18/25

4 $A \oplus B = \bar{A}\cdot 1 + A\cdot\bar{1}$

$\bar{A}\cdot\bar{B}$

$(\bar{A}\cdot\bar{B})\cdot(D\cdot C)$

$(\bar{A}\bar{B})(DC) + (DC)(\bar{B}A)$

$(D\cdot C)$

$(D\cdot C)\cdot(\bar{B}\cdot A)$

$[(\bar{A}\bar{B})(DC) + (DC)(\bar{B}A)] + (\bar{A}\bar{B})(DC)$

$\bar{C}$

$C+C=0$

$\bar{B}\cdot A$

$(\bar{A}\cdot B)$

$(\bar{A}\cdot B)(D\cdot C)$

$(D\cdot C)$

$(\overline{D\cdot C})\oplus 0$

$(\overline{D\cdot C})\cdot 0 + (D\cdot C)\cdot 1$

f

$A \oplus B = \bar{A}B + A\bar{B}$

$A \oplus B = A\bar{B} + \bar{A}B$

$F = [[(\bar{A}\bar{B})(DC) + (DC)(\bar{B}A)] + (\bar{A}\bar{B})(DC)]$

+1sp

$F = [(A \oplus B)\bar{B} + (D\cdot\overline{C+C}) + (\bar{B}\cdot A)\cdot(D\cdot\overline{C+C})$

$+ [(D\cdot C)\oplus 0]\cdot(\bar{A}\cdot B)] \oplus 0$

$F = DC\,[(A\bar{B}) + (\bar{B}A)] + \bar{A}B\,(DC)$

11 10 01 00 11 01 11

AB \ DC	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	1	1	0	1
10	0	0	0	0

$F = \bar{A}DC + BDC$

$F = DC\,[A\bar{B} + \bar{B}A] + \bar{A}B\,(DC)$

11 10 01 01 11

$A\bar{B}$

AB \ DC	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	1	1	0	1
10	0	0	0	0

3p

$F = A\bar{B} + \bar{A}DC$

$F = A\bar{B} + DC$

Nombre: Rafael David Mata Puente
Curso / Paralelo: 4
Fecha: 24/11/2021

90/100

Examen 1

Pregunta 1

27/30

a)

A	B	X_2	X_1	X_0	R_2	R_1	R_0
0	0	0	0	0	∅	∅	∅
				1	∅	∅	∅
			1	0	∅	∅	∅
				1	∅	∅	∅
		1	0	0	∅	∅	∅
				1	∅	∅	∅
			1	0	∅	∅	∅
				1	∅	∅	∅
0	1	0	0	0	0	0	0
				1	0	0	1
			1	0	0	1	0
				1	0	1	1
		1	0	0	1	0	0
				1	1	0	1
			1	0	1	1	0
				1	1	1	1
1	0	0	0	0	∅	∅	∅
				1	∅	∅	∅
			1	0	∅	∅	∅
				1	∅	∅	∅
		1	0	0	∅	∅	∅
				1	∅	∅	∅
			1	0	∅	∅	∅
				1	∅	∅	∅
1	1	0	0	0	0	0	0
				1	0	0	1
			1	0	0	1	0
				1	0	1	1
		1	0	0	1	0	0
				1	1	0	1
			1	0	1	1	0
				1	1	1	1

+10p

Don't care - ∅

b) R_2

A = 0

B \ X_1X_0	00	01	11	10
00	∅	∅	0	0
01	∅	∅	0	0
11	∅	∅	0	0
10	∅	∅	0	0

A = 1

B \ X_1X_0	00	01	11	10
00	0	1	∅	∅
01	0	1	∅	∅
11	0	1	∅	∅
10	0	1	∅	∅

$R_2 = \bar{B} X_2$ ✓

+10p

Pregunta 2:

a) S_1 25/25

A = 0

DE \ BC	00	01	11	10
00	1	0	0	0
01	X	0	1	X
11	X	0	X	X
10	1	0	0	0

+4p

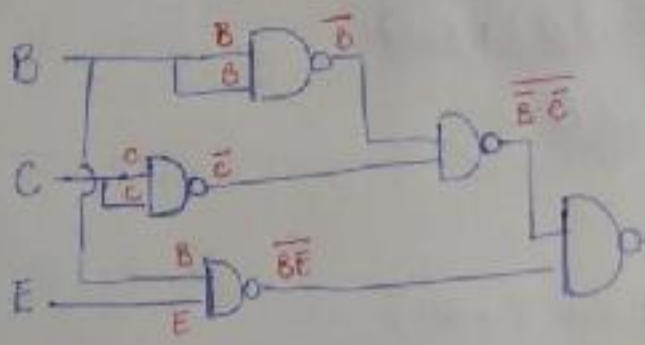
A = 1

DE \ BC	00	01	11	10
00	1	0	0	0
01	1	0	1	1
11	X	0	X	1
10	X	0	0	0

+4p

$S_1 = BE + \bar{B}\bar{C}$ +5p

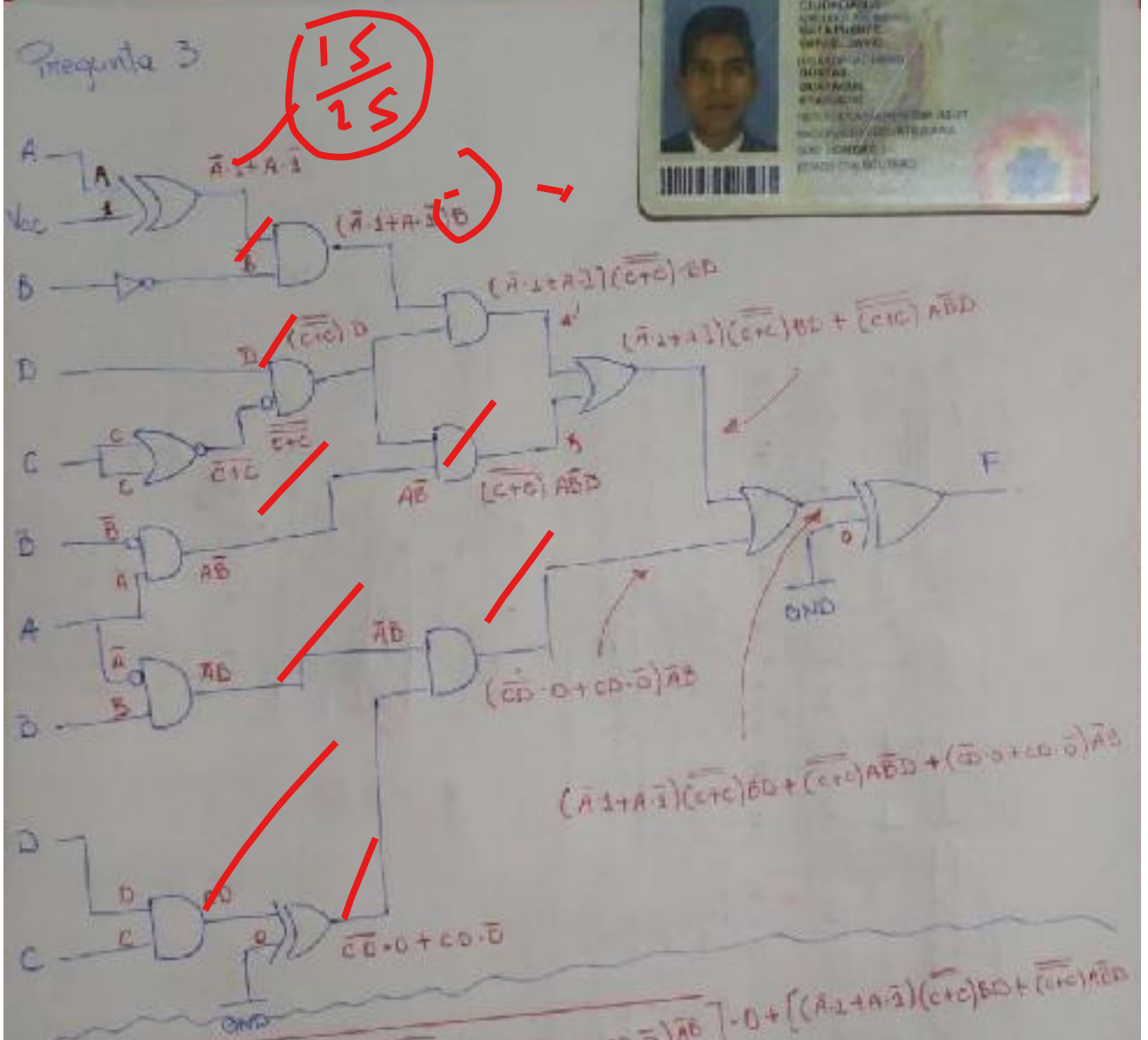
b) $S_1 = BE + \bar{B}\bar{C} \equiv \overline{BE + \bar{B}\bar{C}} = \overline{BE} \cdot \overline{\bar{B}\bar{C}}$



+10p

Pregunta 3

15/15



a) $\bar{F} = [(\bar{A}\cdot 1 + A\cdot\bar{1})(\overline{C+C})BD + (\overline{C+C})A\bar{B}\bar{D} + (\bar{C}\bar{D}\cdot 0 + CD\cdot\bar{0})\bar{A}B]\cdot 0 + [(\bar{A}\cdot 1 + A\cdot\bar{1})(\overline{C+C})BD + (\overline{C+C})A\bar{B}\bar{D} + (\bar{C}\bar{D}\cdot 0 + CD\cdot\bar{0})\bar{A}B]\cdot\bar{0}$

$F = [(\bar{A}\cdot 1 + A\cdot\bar{1})(\overline{C+C})BD + (\overline{C+C})A\bar{B}\bar{D} + (\bar{C}\bar{D}\cdot 0 + CD\cdot\bar{0})\bar{A}B]$

+10p

$F = (\bar{A})(\overline{C+C})BD + (\overline{C+C})A\bar{B}\bar{D} + (CD)\bar{A}\bar{B}$

b) Si igualo la función de salida $F = 1$, y la divido en 3 partes obtengo (separandolas por el signo "+")

$\bar{A}\,\overline{(C+C)}\,B\bar{D} = 1$

$A = 0$
$B = 1$
$D = 1$
$C = 1$

ordenando lo queda

$A = 0$
$B = 1$
$C = 1$
$D = 1$

$\overline{(C+C)}\,A\bar{B}D = 1$

$A = 1$
$B = 0$
$D = 1$
$C = 1$

ordenando lo queda

$A = 1$
$B = 0$
$C = 1$
$D = 1$

$\bar{A}\bar{B}CD = 1$

$A = 0$
$B = 0$
$C = 1$
$D = 1$

Mapa de Karnaugh

CD \ AB	00	01	11	10
00				
01				1
11	1	1		
10				

$F = \bar{A}B\bar{C}D + A\bar{B}\bar{C}D$

$\bar{A}\bar{C}D + A\bar{B}\bar{C}D$

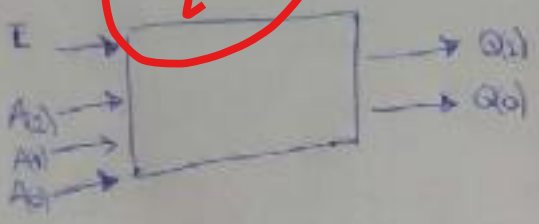
$(\bar{A} + A\bar{B})\bar{C}D$

$(\bar{A} + \bar{B})\bar{C}D$

+5p

Pregunta 4

17/20



$S_1 = \overline{A(0)}$

$S_2 = \overline{A(1)}$

$Q(0) = A(1)\,A(0)\,\bar{E}$

$Q(1) = Q(0) + S_2 + A(2) + A(0)$

$Q(1) = A(1)\,\overline{A(0)}\,\bar{E} + \overline{A(1)} + A(2) + A(0)$

$Q(1) = A(1)\cdot S_1 \cdot \bar{E} + S_2 + A(2) + A(0)$

$Q(1) = A(1)\cdot S_1 \cdot \bar{E} + \overline{A(1)} + A(2) + A(0)$

$Q(1) = A(1)\cdot \overline{A(0)} \cdot \bar{E} + \overline{A(1)} + A(2) + A(0)$

$Q(1) = \left(A(1)\cdot \overline{A(0)} \cdot \bar{E}\right) + \overline{A(1)} + A(2) + A(0)$

✓ +20p.

$Q(1) = \overline{\left(A(1)\cdot \overline{A(0)} \cdot \bar{E}\right) + \overline{A(1)} + A(2) + A(0)}$

$Q(1) = \left(\overline{A(1)} + A(0) + \bar{E}\right)\left(A(1)\cdot \overline{A(2)} \cdot \overline{A(0)}\right)$

$Q(1) = A(1)\cdot\overline{A(1)}\cdot\overline{A(2)}\cdot\overline{A(0)} + A(0)\,\overline{A(0)}\cdot\overline{A(2)}\cdot A(1) + \bar{E}\cdot\overline{A(0)}\cdot A(1)\cdot\overline{A(2)}$

$Q(1) = \bar{E}\cdot\overline{A(0)}\cdot A(1)\cdot\overline{A(2)}$

$Q(1) = A(2) + \overline{A(1)} + A(0) + E$

Prog #1

Caso A=B=0 ?

Caso A=B=1 ?

10/30

1) A

$R_2 = A \oplus X$

Use SoP y Algebra de Boul o Mapa K y tabla de Verdad completa

Pregunta #2

A = 0

BC \ DE	00	01	11	10
00	1	0	0	0
01	x	0	1	x
11	x	0	x	x
10	1	0	0	0

A = 1

BC \ DE	00	01	11	10
00	1	0	0	0
01	1	0	1	1
11	x	0	x	1
10	x	0	0	0

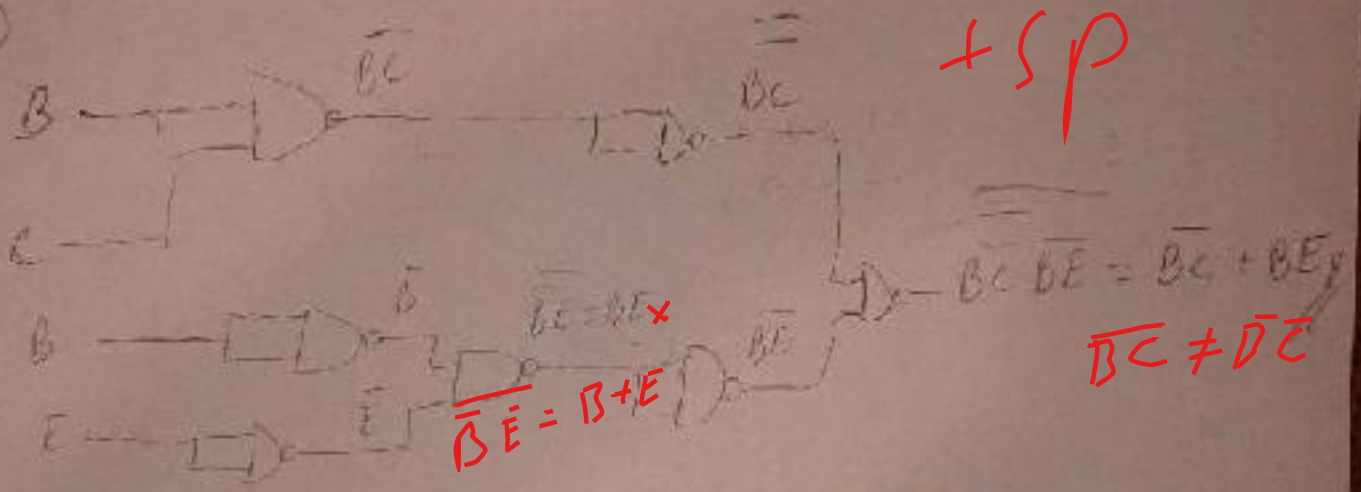
20/25

+4p

+6p

a) $F(A,B,C,D,E) = \bar{B}\bar{C} + BE$ ✓ +5p

b)

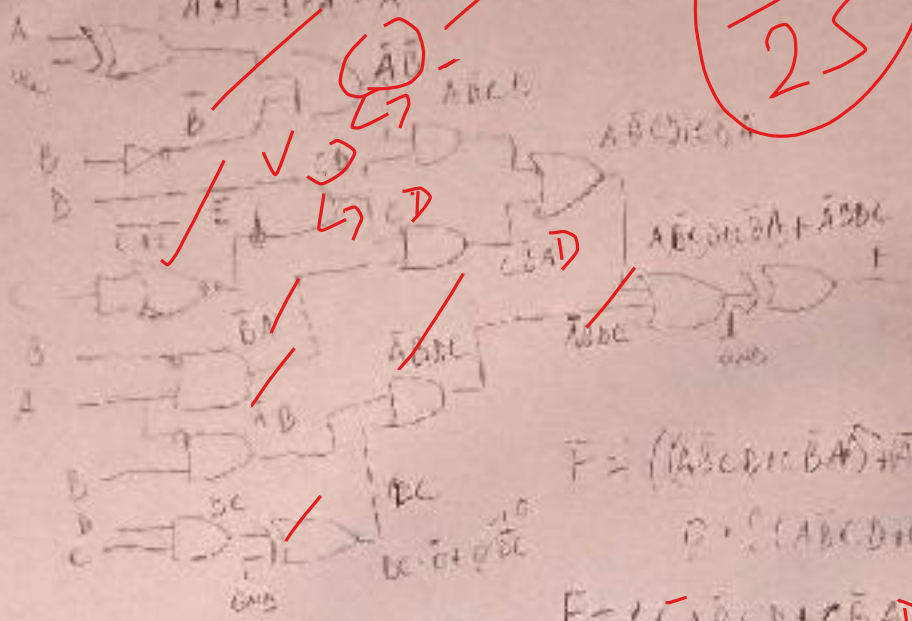


+5p

Fernando Franco

Problema 5

14/25



$F = (\bar{A}BCD + CBA) + \bar{A}BDC) + 0 + 1$

$F = ((\bar{A}BCD + CBA)(\bar{A}BDC)) + 1$

$F = ((\bar{A}BCD + CBA)(\bar{A}BDC)) + 1$

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

$\bar{A}BCD + CBA = 1$

$B=0,\ A=C=D=1$

$+10p$

$A+BC = 1$

$A=0,\ B=C=1$

$F = BCD$

$+4p$

Pregunta 1 :-

A B

20/20

a)

A	B	X_2	X_1	X_0	R_1	R_2	R_0
0	0	0	0	0	Ø	Ø	Ø
0	0	0	0	1	Ø	Ø	Ø
0	0	0	1	0	Ø	Ø	Ø
0	0	0	1	1	Ø	Ø	Ø
0	0	1	0	0	Ø	Ø	Ø
0	0	1	0	1	Ø	Ø	Ø
0	0	1	1	0	Ø	Ø	Ø
0	0	1	1	1	Ø	Ø	Ø
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	1
0	1	0	1	0	0	1	0
0	1	0	1	1	0	1	1
0	1	1	0	0	0	0	0
0	1	1	0	1	0	0	1
0	1	1	1	0	0	1	0
0	1	1	1	1	0	1	1
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	1
1	0	0	1	0	0	1	0
1	0	0	1	1	0	1	1
1	0	1	0	0	1	0	0
1	0	1	0	1	1	0	1
1	0	1	1	0	1	1	0
1	0	1	1	1	1	1	1
1	1	0	0	0	Ø	Ø	Ø
1	1	0	0	1	Ø	Ø	Ø
1	1	0	1	0	Ø	Ø	Ø
1	1	0	1	1	Ø	Ø	Ø
1	1	1	0	0	Ø	Ø	Ø
1	1	1	0	1	Ø	Ø	Ø
1	1	1	1	0	Ø	Ø	Ø
1	1	1	1	1	Ø	Ø	Ø

✓

+ 10p

1

b)

Usando minterminos (SOP):

$$S = \bar{A}B\bar{X}_2X_1\bar{X}_0 + \bar{A}B\bar{X}_2X_1X_0 +$$

$$A\bar{B}X_2X_1\bar{X}_0 + A\bar{B}X_2X_1X_0$$

$$S = X_1(\bar{A}B\bar{X}_2\bar{Y}_0 + \bar{A}B\bar{X}_2X_0 +$$

$$A\bar{B}X_2\bar{Y}_0 + A\bar{B}Y_2Y_0)$$

$$S = X_1[\bar{A}B(\bar{Y}_2\bar{Y}_0 + \bar{X}_2X_0) + A\bar{B}(Y_2\bar{Y}_1 + Y_2Y_0)]$$

$$S = X_1[\bar{A}B(\bar{X}_2(\bar{Y}_0 + Y_0)) + A\bar{B}(X_2(\bar{Y}_1 + Y_0))]$$

$$S = X_1[\bar{A}B\bar{Y}_2 + A\bar{B}X_2]$$

$$S = \bar{A}B\bar{X}_2X_1 + A\bar{B}Y_2Y_1$$

b)

Usando minterms (SOP):

$$S = \bar{A}B\bar{X}_2X_1\bar{X}_0 + \bar{A}B\bar{X}_2X_1X_0 +$$
$$A\bar{B}X_2X_1\bar{X}_0 + A\bar{B}X_2X_1X_0$$
$$S = X_1(\bar{A}B\bar{X}_2\bar{X}_0 + \bar{A}BX_1X_0 + A\bar{B}X_2\bar{X}_0 + A\bar{B}X_2X_0)$$
$$S = X_1[\bar{A}B(\bar{X}_2\bar{X}_0 + X_1X_0) + A\bar{B}(X_2\bar{X}_0 + X_2X_0)]$$
$$S = X_1[\bar{A}B(\bar{X}_2(\bar{X}_0 + X_0)) + A\bar{B}(X_2(\bar{X}_0 + X_0))]$$
$$S = X_1[\bar{A}B\bar{X}_2 + A\bar{B}X_2]$$
$$S = \bar{A}B\bar{X}_2X_1 + A\bar{B}X_2X_1$$ //Mk

14/25

Pregunta 2:-

a)

A = 0

DE \ BC	00	01	11	10
00	1	0	0	0
01	Ø	0	1	Ø
11	Ø	0	Ø	Ø
10	1	0	0	0

G1 G2

A = 1

DE \ BC	00	01	11	10
00	1	0	0	0
01	1	0	1	1
11	Ø	0	Ø	1
10	Ø	0	0	0

G3 G4

+4p +4p

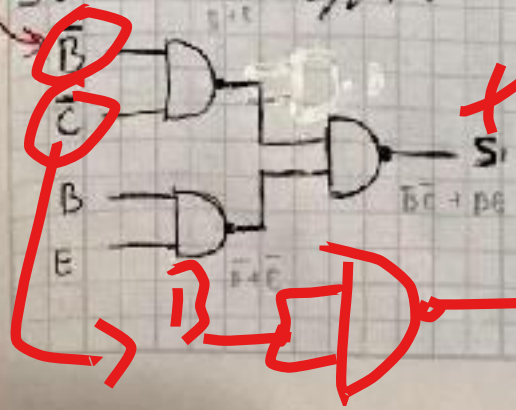
G1 U G3: 1 grupo de ocho

G2 U G4: otro grupo de ocho.

+5p

b)

$S1 = \bar{B}\bar{C} + BE$ //Mk



+4p

$\bar{B}$ => Falta

Pregunta 3.-

10/25

a) S_1 (EXOR): $\bar{A}(1) + A(\bar{1})$; $\bar{A} + 0 \Rightarrow \bar{A}$ ✓

S_2 (OR): $C + C$; C ✓

S_3 (AND): $\bar{B}A$ ✓

S_4 (AND): $\bar{A}B$ ✓

S_5 (AND): DC ✓

S_6 (AND): $S_1 \cdot \bar{B}$; $\bar{A}\bar{B}$ ✓

S_7 (AND): $D \cdot S_2$; DC ✓

S_8 (EXOR): $\bar{S}_2(0) + S_2(\bar{0})$; $\bar{D}+\bar{C}$ ✗ DC ; $\bar{D}+\bar{C} + DC$?

S_9 (AND): $S_6 \cdot S_7$; $\bar{A}\bar{B}DC$ ✓

S_{10} (AND): $S_7 \cdot S_3$; $DC\bar{B}A$ ✓

S_{11} (AND): $S_4 \cdot S_8$; $\bar{A}B(\bar{D}+\bar{C}+DC)$ ✗

S_{12} (OR): $S_1 + S_{10}$; $\bar{A}\bar{B}DC + DC\bar{B}\bar{A}$; $\bar{A}\bar{B}DC$

S_{13} (OR): $S_{12} + S_{11}$; $\bar{A}\bar{B}DC + \bar{A}B(\bar{D}+\bar{C}+DC)$ ✗ ; $\bar{A}[\bar{B}DC + B\bar{D} + B\bar{C} + BDC]$; $\bar{A}[DC(\bar{B}+B) + B\bar{D} + B\bar{C}]$; $\bar{A}[DC + B\bar{D} + B\bar{C}]$ ✗

S_{14} (EXOR): $\overline{S_{13}}(0) + S_{13}(\bar{0})$; S_{13} ; $\bar{A}[DC + B\bar{D} + B\bar{C}]$ +8P

~~$F = \bar{A}[DC + B\bar{D} + B\bar{C}]$ //R.~~

$F = \bar{A}DC + \bar{A}B\bar{D} + \bar{A}B\bar{C}$ //R. ✗

b)

AB / CD	00	01	11	10
00	0	1	0	0
01	0	1	0	0
11	1	1	0	0
10	0	1	0	0 ✗

$S = \bar{A}B + \bar{A}CD$

$S = \bar{A}(B + CD)$ //R. +2P

$2^5 = 32$

1) TABLA

A	B	x_2	x_1	x_0	R_2	R_1	R_0
0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	1
0	0	0	1	0	0	1	0
0	0	0	1	1	0	1	1
0	0	1	0	0	1	0	0
0	0	1	0	1	1	0	1
0	0	1	1	0	1	1	0
0	0	1	1	1	1	1	1
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	1
0	1	0	1	0	0	1	0
0	1	0	1	1	0	1	1
0	1	1	0	0	1	0	0
0	1	1	0	1	1	0	1
0	1	1	1	0	1	1	0
0	1	1	1	1	1	1	1
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	1
1	0	0	1	0	0	1	0
1	0	0	1	1	0	1	1
1	0	1	0	0	1	0	0
1	0	1	0	1	1	0	1
1	0	1	1	0	1	1	0
1	0	1	1	1	1	1	1
1	1	0	0	0	0	0	0
1	1	0	0	1	0	0	1
1	1	0	1	0	0	1	0
1	1	0	1	1	0	1	1
1	1	1	0	0	1	0	0
1	1	1	0	1	1	0	1
1	1	1	1	0	1	1	0
1	1	1	1	1	1	1	1

20/20

✓

+2 p

✓

(2)

A	B	C	D	E	S
0	0	0	0	0	1
0	0	0	0	1	X
0	0	0	1	0	1
0	0	0	1	1	X
0	0	1	0	0	0
0	0	1	0	1	0
0	0	1	1	0	X
0	0	1	1	1	X
0	1	0	0	0	0
0	1	0	0	1	1
0	1	0	1	0	0
0	1	0	1	1	X
0	1	1	0	0	0
0	1	1	0	1	1
0	1	1	1	0	0
0	1	1	1	1	X
1	0	0	0	0	1
1	0	0	0	1	1
1	0	0	1	0	0
1	0	0	1	1	X
1	0	1	0	0	0
1	0	1	0	1	0
1	0	1	1	0	1
1	0	1	1	1	X
1	1	0	0	0	1
1	1	0	0	1	0
1	1	0	1	0	1
1	1	0	1	1	0
1	1	1	0	0	1
1	1	1	0	1	0
1	1	1	1	0	1
1	1	1	1	1	X

24/25

a). REDUCIR → MAPA Karnaugh

DE \ ABC	000	001	011	010	110	111	101	100
00	1	0	0	0	0	0	0	1
01	∅	0	1	∅	1	1	0	1
11	∅	0	∅	∅	1	∅	0	∅
10	1	0	0	0	0	0	0	∅

+4p

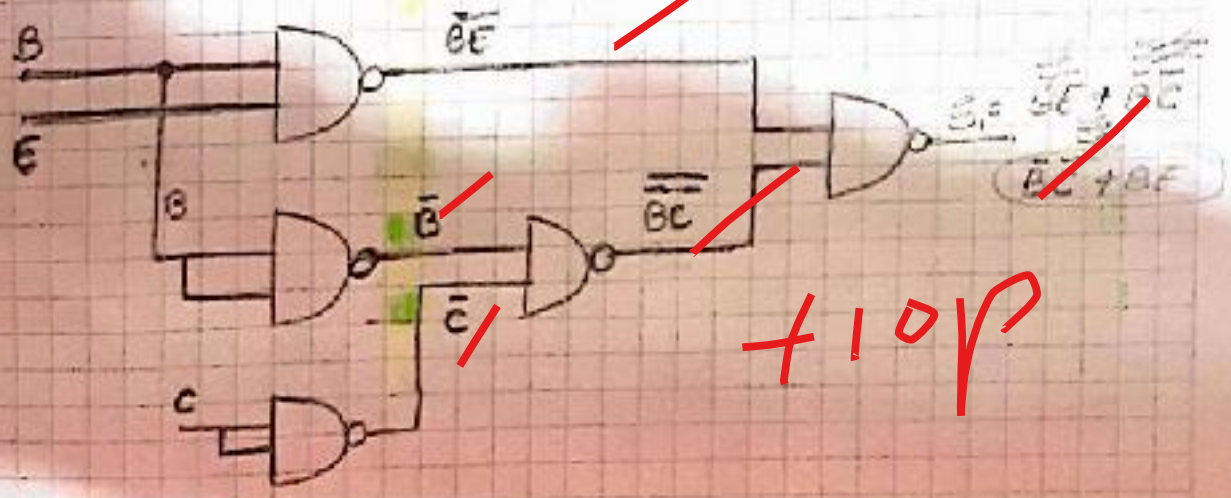
+5p

2 Cuyp > 1 de 8

$S_1 = \bar{A}\bar{B}\bar{C} + A\bar{B}\bar{C} + BE$

$S_1 = \bar{B}\bar{C} + BE$ +5p

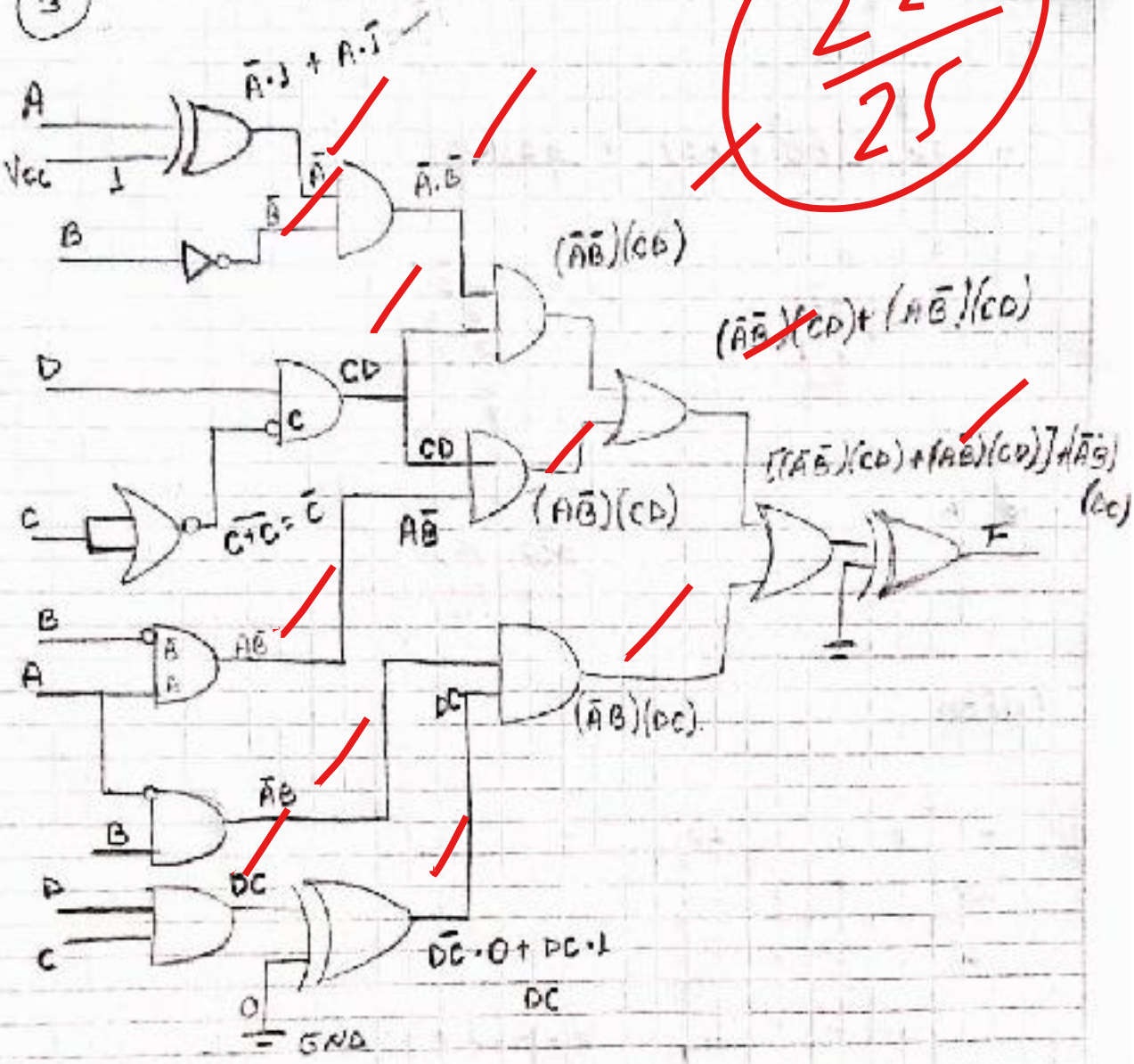
(b) PUERTAS NAND



+10p

22/25

(3)



$\bar{A}B + A\bar{B} = A \oplus B$

$\bar{A}\bar{B} + AB = A \odot B$

$F = [(\bar{A}\bar{B})(CD) + (A\bar{B})(CD)] + (\bar{A}B)(DC)]$

$F = [(A \oplus 1)\bar{B}\cdot(\overline{C+C}\cdot D) + (A\bar{B})\cdot(C+\bar{C}\cdot D) + (CD)\oplus D\cdot(\bar{A}B)\oplus 0$

FACTOR COMÚN

$F = (CD)[(\bar{A}\bar{B}) + (A\bar{B})] + (\bar{A}B)(DC)$ ✓ +15p

*SE AMPLIFA

(CD) → C = 1, D = 1

$(A\bar{B})$ → 1 0

$(\bar{A}\bar{B})$ → 0 0

$(\bar{A}B)(DC)$ → 0 1 1 1

*MAPA

DC \ AB	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	I	I	0	II
10	0	0	0	0

+7p

$F = \bar{A}DC + A\bar{B}DC = (\bar{A} + A\bar{B})DC$

»Grupo de 2

$(\bar{A} + \bar{B})DC$

$F = A\bar{B} + DC$??

Tema 4:

32/30

	A	B	X_2	X_1	X_0	R_2	R_1	R_0
menor igual que 3	0	1	0	0	0	0	0	0
			0	0	1	0	0	1
			0	1	0	0	1	0
			0	1	1	0	1	1
			1	0	0	0	0	0
			1	0	1	0	0	0
mayor a 7			1	1	0	0	0	0
			1	1	1	0	0	0
	1	0	0	0	0	0	0	0
			0	0	1	0	0	0
			0	1	0	0	0	0
			0	1	1	0	0	0
-			1	0	0	1	0	0
			1	0	1	1	0	1
.			1	1	0	1	1	0
			1	1	1	1	1	0
Casos imposibles	0	0				Ø	Ø	Ø
	1	1				Ø	Ø	Ø

+20p

✓

✓

A=0 B=0

R_2

X_0 \ X_2X_1	00	01	11	10
0	Ø	Ø	Ø	Ø
1	Ø	Ø	Ø	Ø

A=0 B=1

	00	01	11	10
0	0	0	0	0
1	0	0	0	0

$R_2 = AX_2$

A=1 B=0

	00	01	11	10
0	0	0	1	1
1	0	0	1	1

A=1 B=1

	00	01	11	10
0	Ø	Ø	Ø	Ø
1	Ø	Ø	Ø	Ø

+10p

LICENCIA DE CONDUCIR

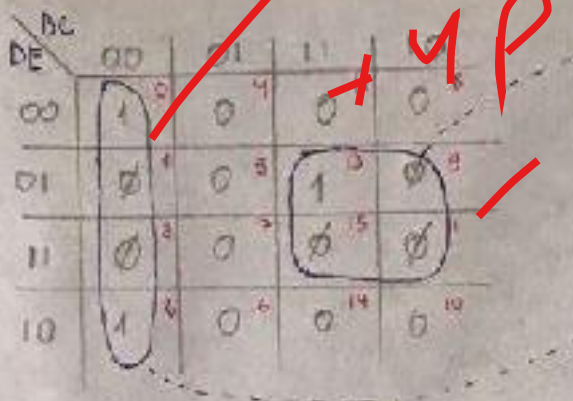
REPUBLICA DEL ECUADOR

O+

1250507264

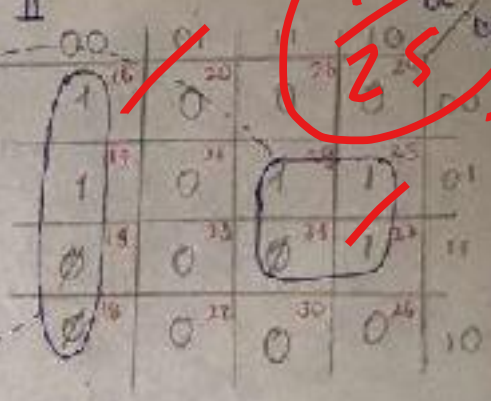
Tema 2.

A = 0



I

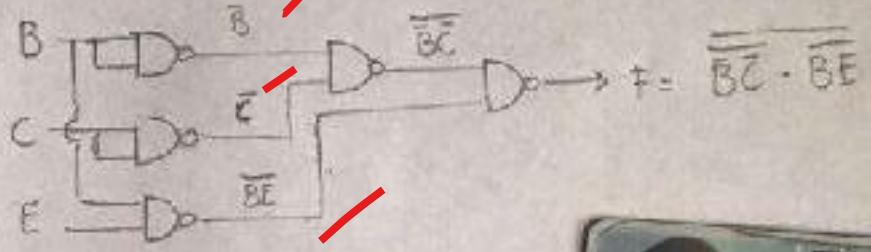
A = 1



II

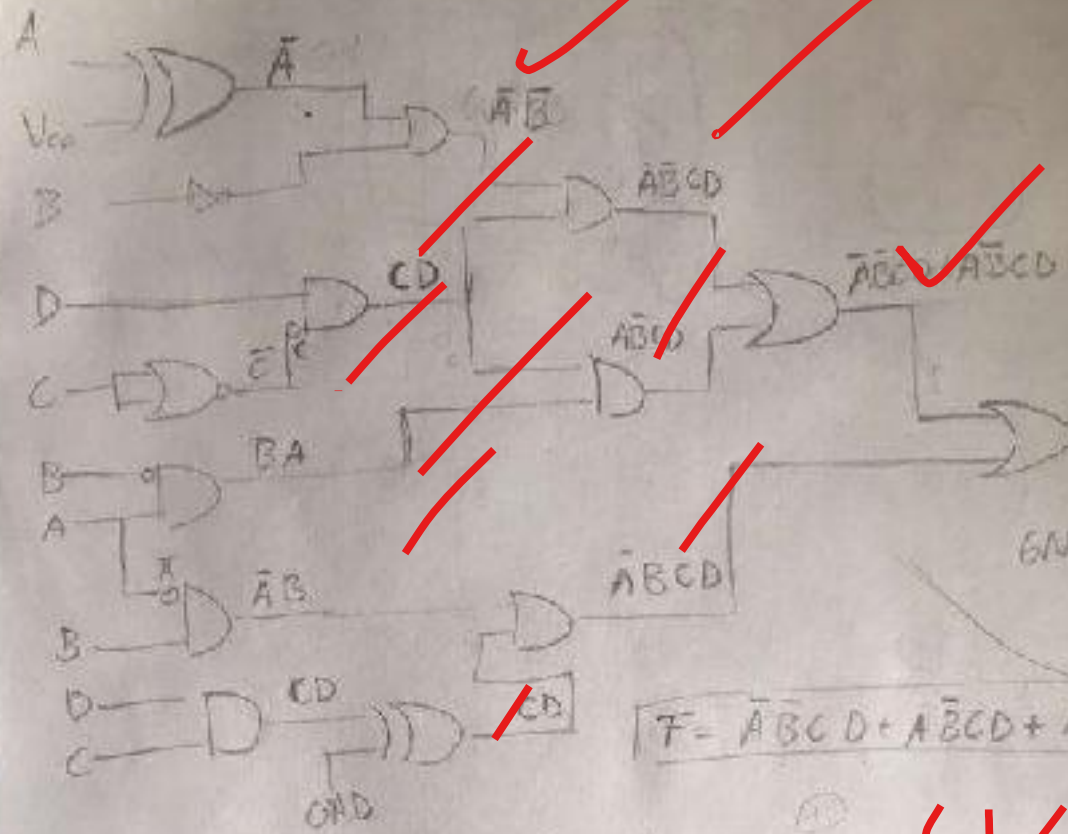
I + II

$F = B\bar{C} + BE \Rightarrow \overline{\overline{B\bar{C}} + \overline{BE}} = \overline{\overline{B\bar{C}} \cdot \overline{BE}}$



Tema 3

0 0 = 1
1 1 = 0
xor

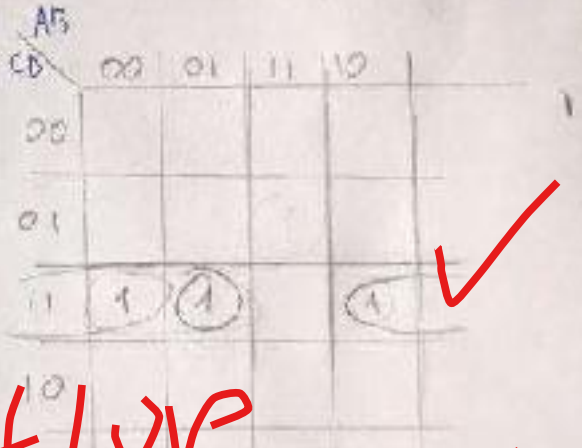


$F = \bar{A}B\bar{C}D + A\bar{B}CD + \bar{A}BCD$

0 0 = 0
1 0 = 1
xor

flip

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



flip

$F = \bar{B}CD + \bar{A}BCD$

$F = \bar{A}CD + A\bar{B}CD$

Dos posibles reducciones

25/25

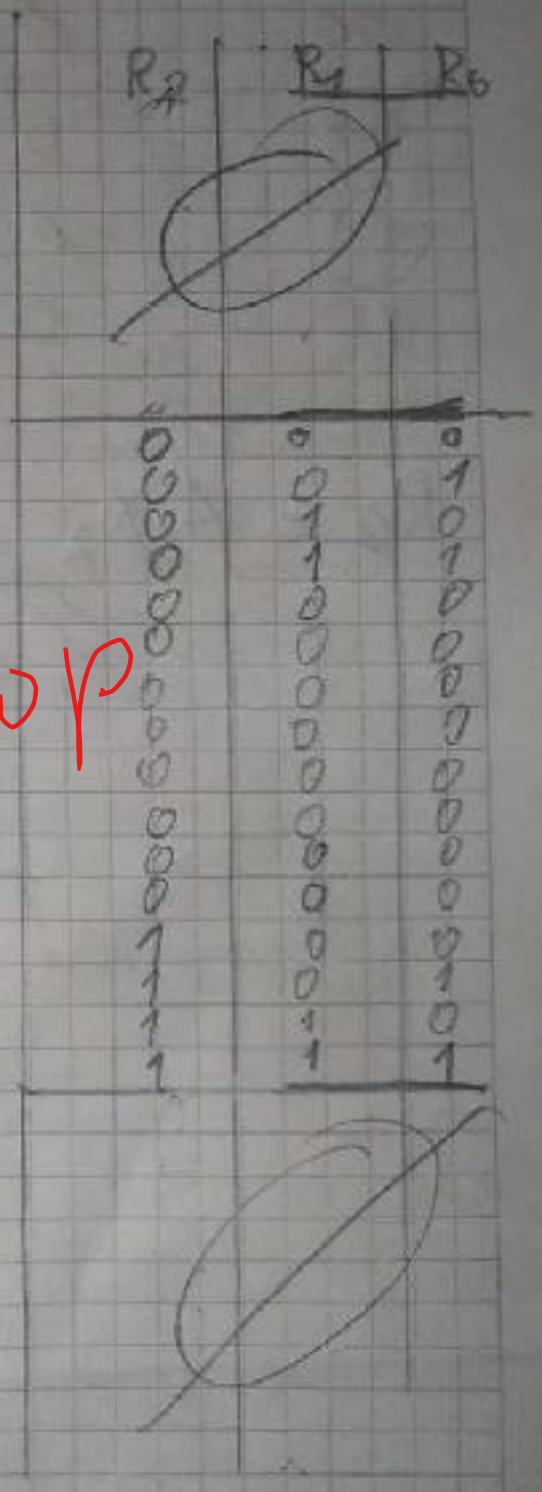
Sistemas Digitales

Examen Primer Parcial

Portocarrero Ramón Marcos Andrés

30/30

A	B	X_2	Y_n	X_0
0	0	0	0	0
0	0	0	1	1
0	0	0	1	0
0	0	0	1	1
0	0	0	1	0
0	0	0	1	1
0	1	0	1	0
0	1	0	0	1
0	1	0	0	0
0	1	0	0	1
0	1	0	0	0
0	1	0	0	1
0	1	1	1	0
0	1	1	1	1
0	1	1	1	0
0	1	1	1	1
0	1	1	0	0
0	1	1	0	1
1	0	0	0	0
1	0	0	0	1
1	0	0	0	0
1	0	0	0	1
1	0	0	0	0
1	0	0	0	1
1	0	1	1	0
1	0	1	1	1
1	0	1	1	0
1	0	1	1	1
1	0	1	0	0
1	0	1	0	1
1	1	0	0	0
1	1	0	0	1
1	1	0	0	0
1	1	0	0	1
1	1	0	0	0
1	1	0	0	1
1	1	1	1	0
1	1	1	1	1
1	1	1	1	0
1	1	1	1	1
1	1	1	0	0
1	1	1	0	1



+20p

R_2

$X_2 X_1 X_0$ / AB	000	001	011	010	100	101	111	110
00	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø
01	0	0	0	0	0	0	0	0
11	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø
10	0	0	0	0	1	1	1	1

$R_2 = A X_2$

+10p

Ejercicio 2

16/25

S1

ABC / DE	000	001	011	010	100	101	111	110
00	1	Ø	0	0	1	0	0	0
01	Ø	0	1	Ø	1	0	1	1
11	Ø	0	Ø	Ø	Ø	0	Ø	1
10	1	0	0	0	Ø	0	0	0

Grupo 8

+4p

+4p

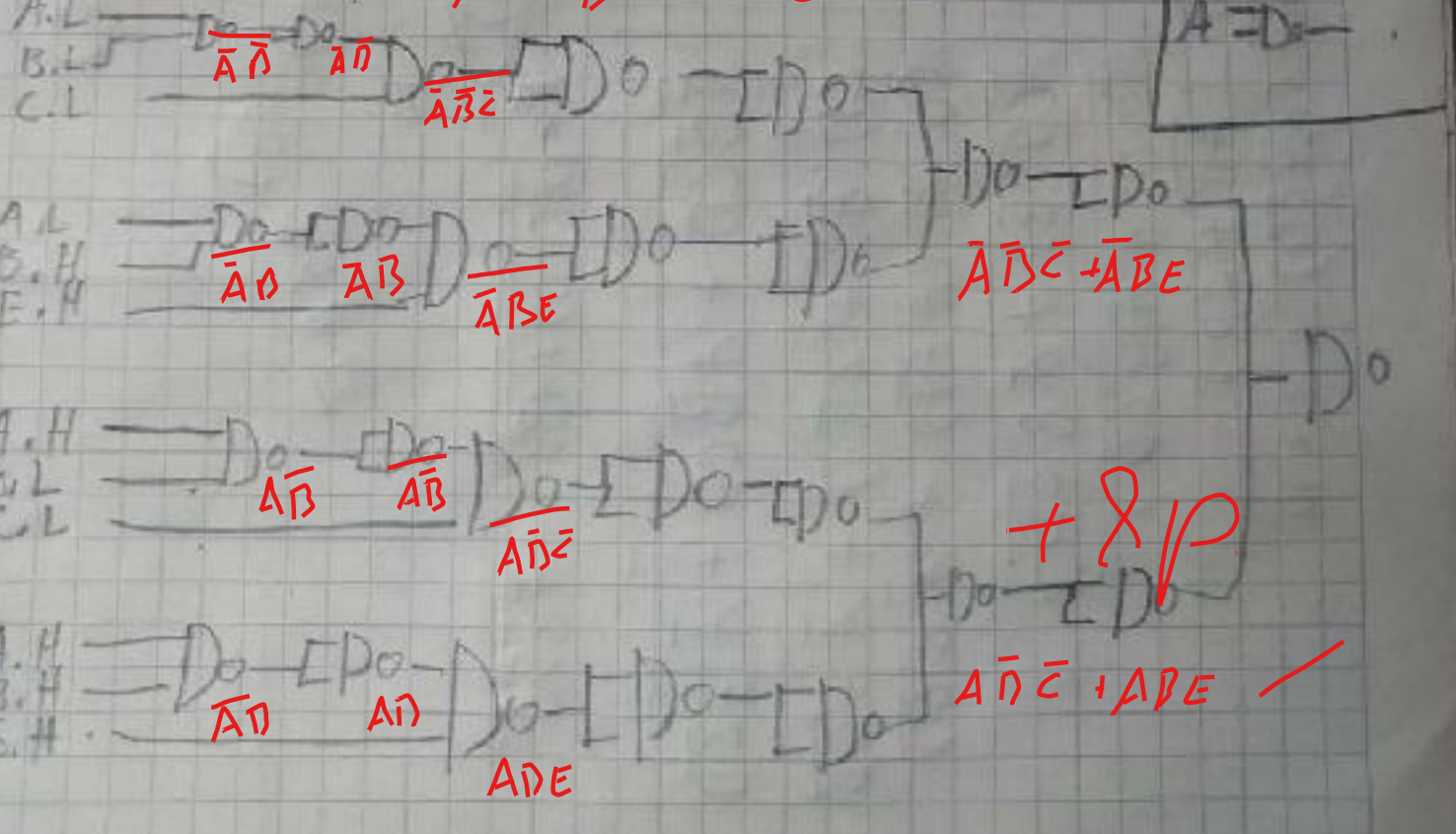
Grupo 8

$S_1 = \bar{A}\bar{B}\bar{C} + \bar{A}BE + A\bar{B}\bar{C} + ABE$

$S_1 = \bar{D}\bar{C} + \bar{D}E$

$X = L$

$A = D$



13

$F = \overline{(\bar{A}\bar{B}CD) + A\bar{B}CD + \bar{A}B\bar{D}C}$ X

$\bar{A}\bar{B}CD + A\bar{B}CD + \bar{A}B\bar{C}D$

$CD(\bar{A}\bar{B} + A\bar{B}) + \bar{A}B\bar{C}D$

$CD(B(A+\bar{A})) + \bar{A}B\bar{C}D$

$\overline{CD(B) + \bar{A}B\bar{C}D}$ + 3p

$\overline{\bar{B}CD} + \bar{A}B\bar{C}D$

$\overline{\bar{B}CD} \cdot \overline{\bar{A}B\bar{C}D} = (B + \overline{CD}) \cdot (\bar{A}B + CD)$

$\bar{A}B \cdot B + BCD + \bar{A}B\bar{C}D = \bar{A}B(B + \overline{CD}) + BCD$

$DC\bar{D} + \bar{D}C\bar{D} = DC$

$(A \cdot 0 + \bar{A} \cdot 1)$

$(\bar{A} \cdot \bar{B} \cdot CD) + DC \cdot A\bar{B}$

$+ A\bar{B} \cdot \bar{D}C$

$\bar{A} \cdot \bar{B} \cdot CD$

$DC \cdot A\bar{B}$

$A\bar{B}$

$A \cdot B\bar{D}C$

+3p

Ejercicio 3

Examen #1 SD1

Pregunta 1:

15/20

A	B	X_2	X_1	X_0	Z_2	R_1	R_0
0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	1
0	0	0	1	0	0	1	0
0	0	0	1	1	0	1	1
0	0	1	0	0	0	0	0
0	0	1	0	1	0	0	1
0	0	1	1	0	0	1	0
0	0	1	1	1	0	1	1
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	1
0	1	0	1	0	0	1	0
0	1	0	1	1	0	1	1
0	1	1	0	0	0	0	0
0	1	1	0	1	0	0	1
0	1	1	1	0	0	1	0
0	1	1	1	1	0	1	1
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	1
1	0	0	1	0	0	1	0
1	0	0	1	1	0	1	1
1	0	1	0	0	0	0	0
1	0	1	0	1	0	0	1
1	0	1	1	0	0	1	0
1	0	1	1	1	0	1	1
1	1	0	0	0	0	0	0
1	1	0	0	1	0	0	1
1	1	0	1	0	0	1	0
1	1	0	1	1	0	1	1
1	1	1	0	0	0	0	0
1	1	1	0	1	0	0	1
1	1	1	1	0	0	1	0
1	1	1	1	1	0	1	1

+10p

Resultado

A:D = 1 ?

A:B = 0 ?

+5p

$AB\backslash X_1X_0$	00	01	11	10
000	0	0	0	0
001	0	0	0	0
011	0	0	0	0
010	0	0	0	0
100	0	0	0	0
101	1	1	1	1
111	0	0	0	0
110	0	0	0	0

$Q_2 = A\bar{B}X_2$

Grupo 06

4/5

Pregunta #2

A	B	C	D	E	S1	S2
0	0	0	0	0	1	ϕ
0	0	0	0	1	ϕ	0
0	0	0	1	0	1	0
0	0	0	1	1	ϕ	0
0	0	1	0	0	0	0
0	0	1	0	1	0	0
0	0	1	1	0	0	0
0	0	1	1	1	0	0
0	1	0	0	0	0	0
0	1	0	0	1	ϕ	ϕ
0	1	0	1	0	0	0
0	1	0	1	1	ϕ	ϕ
0	1	1	0	0	0	0
0	1	1	0	1	1	1
0	1	1	1	0	0	0
0	1	1	1	1	ϕ	ϕ
1	0	0	0	0	1	0
1	0	0	0	1	1	0
1	0	0	1	0	ϕ	0
1	0	0	1	1	ϕ	0
1	0	1	0	0	0	ϕ
1	0	1	0	1	0	1
1	0	1	1	0	0	ϕ
1	0	1	1	1	0	1
1	1	0	0	0	0	0
1	1	0	0	1	1	0
1	1	0	1	0	0	1
1	1	0	1	1	0	0
1	1	1	0	0	0	0
1	1	1	0	1	1	0
1	1	1	1	0	0	1
1	1	1	1	1	ϕ	0

Grupo 1

Grupo 2

a)

DE \ ABC	000	001	011	010	110	111	101	100
00	1	0	0	0	0	0	1	1
01	ϕ		1	ϕ	1	1	0	1
11	ϕ	0	ϕ	ϕ	1	ϕ	0	ϕ
10	1	0	0	0	0	0	0	ϕ

Grup

$\overline{A}\,\overline{B}\,\overline{C}\,\overline{D}$

$A\,B\,C\,\overline{E}$

$A\,B\,\overline{C}\,\overline{D}\,E$

$\overline{A}\,B\,C\,\overline{E}$

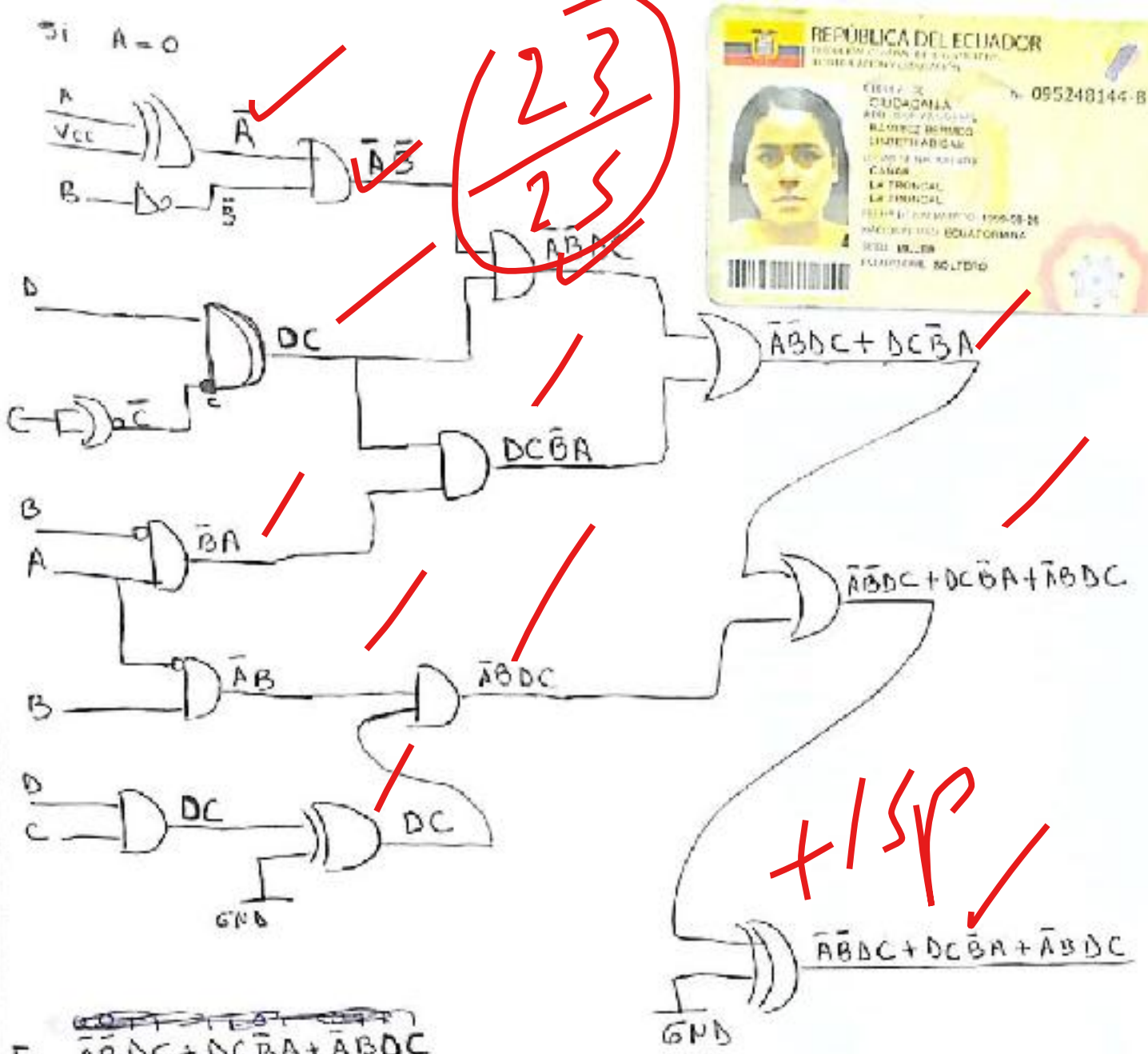
$\overline{A}\,\overline{B}\,C\,D\,E$

S.ϕ = 1

$f = \overline{B}CDE + A\overline{B}\overline{C}D + AB\overline{D}E + AB\overline{C}\overline{E} + \overline{A}BC\overline{E}$

5 ∨ 3

Si A = 0

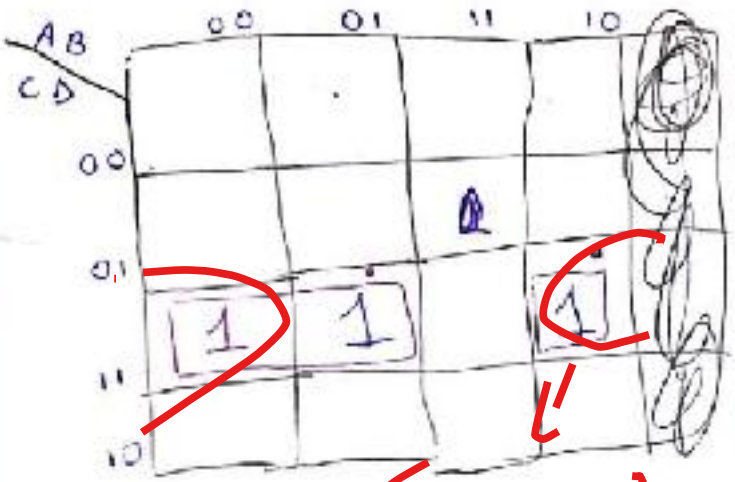


$F = \bar{A}\bar{B}DC + DC\bar{B}A + \bar{A}BDC$

$2^4 = 16$

ordenado

$F = \bar{A}\bar{B}CD + A\bar{B}CD + \bar{A}BCD$



- $A\bar{B}CD$
- $CD\bar{A}$

$F = A\bar{B}CD + \bar{A}CD$

+8p

Grupo 2

1 Problema

30/30

A	B	X_2	X_1	X_0	R_2	R_1	R_0
0	0	0	0	0	Ø	Ø	Ø
0	0	0	0	1	Ø	Ø	Ø
0	0	0	1	0	Ø	Ø	Ø
0	0	0	1	1	Ø	Ø	Ø
0	0	1	0	0	Ø	Ø	Ø
0	0	1	0	1	Ø	Ø	Ø
0	0	1	1	0	Ø	Ø	Ø
0	0	1	1	1	Ø	Ø	Ø
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	1
0	1	0	1	0	0	1	0
0	1	0	1	1	0	1	1
0	1	1	0	0	0	0	0
0	1	1	0	1	0	0	0
0	1	1	1	0	0	0	0
0	1	1	1	1	0	0	0
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0
1	0	0	1	0	0	0	0
1	0	0	1	1	0	0	0
1	0	1	0	0	0	0	0
1	0	1	0	1	0	0	0
1	0	1	1	0	0	0	0
1	0	1	1	1	0	0	0
1	1	0	0	0	Ø	Ø	Ø
1	1	0	0	1	Ø	Ø	Ø
1	1	0	1	0	Ø	Ø	Ø
1	1	0	1	1	Ø	Ø	Ø
1	1	1	0	0	Ø	Ø	Ø
1	1	1	0	1	Ø	Ø	Ø
1	1	1	1	0	Ø	Ø	Ø
1	1	1	1	1	Ø	Ø	Ø

✓ +2p

Mintermos

$R_2 = A\bar{B}X_2\bar{X}_1\bar{X}_0 + A\bar{B}X_2\bar{X}_1X_0 + A\bar{B}X_2X_1\bar{X}_0 + A\bar{B}X_2X_1X_0$

$R_2 = A\bar{B}(X_2\bar{X}_1\bar{X}_0 + X_2\bar{X}_1X_0 + X_2X_1\bar{X}_0 + X_2X_1X_0)$

$R_2 = A\bar{B}X_2(\bar{X}_1\bar{X}_0 + \bar{X}_1X_0 + X_1\bar{X}_0 + X_1X_0)$

$R_2 = A\bar{B}X_2(\bar{X}_1(\bar{X}_0 + X_0) + X_1(\bar{X}_0 + X_0))$

$R_2 = A\bar{B}X_2(\bar{X}_1 + X_1)$

2) $R_2 = A\bar{B}X_2$ ✓

+1p

S1 2 Parte

DE \ BC	00	01	11	10
00	1	0	0	0
01	∅	0	1	∅
11	∅	0	∅	∅
10	1	0	0	0

2
2
2
0

A = 0

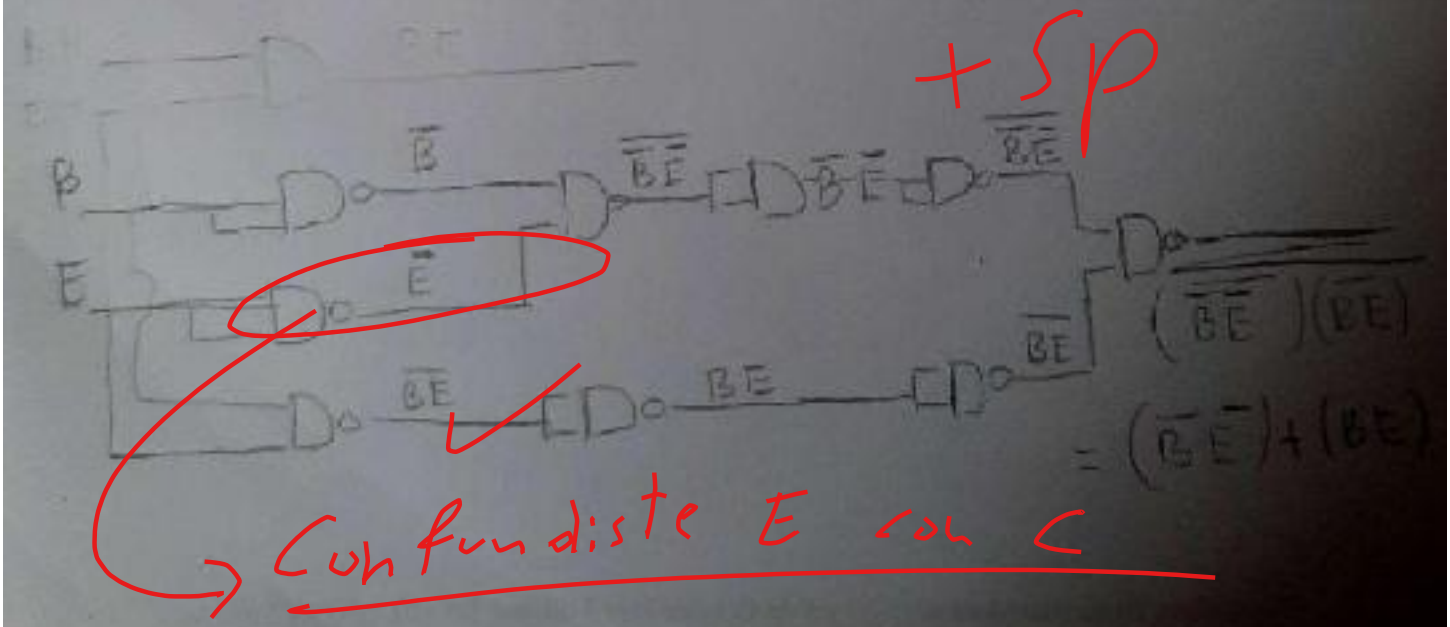
$S_1 = BE + \bar{B}\bar{C}$ +5p

DE \ BC	00	01	11	10
00	1	0	0	0
01	1	0	1	1
11	∅	0	∅	1
10	∅	0	0	0

+6p

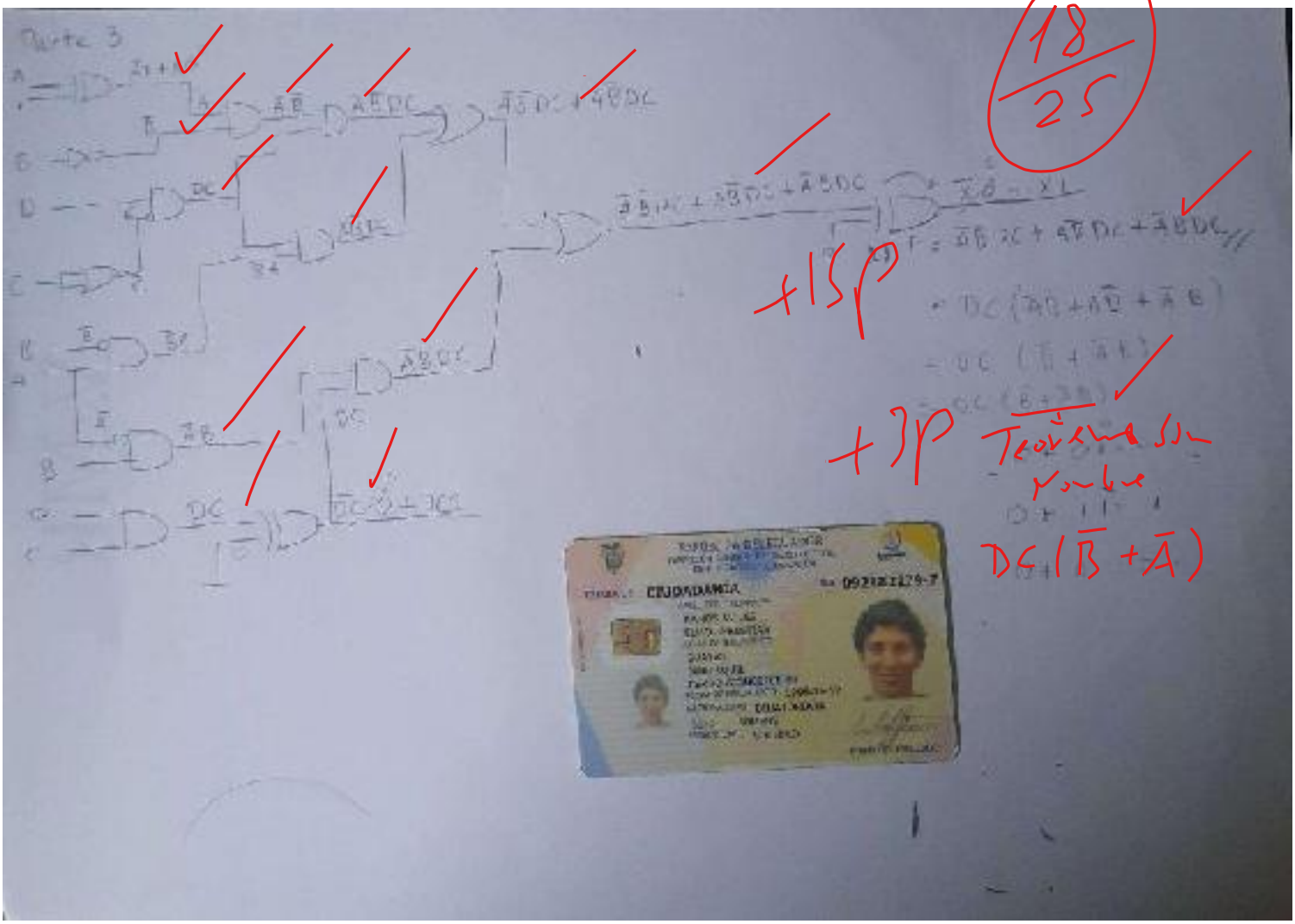
+4p

A_1



+5p

Confundiste E con C



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

CD \ AB	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	1	1	1	1
10	0	0	0	0

$$F = \bar{A}CD + \bar{B}CD$$

$$F = CD(\bar{A} + \bar{B})$$

Rodriguez Astudillo Milca Dayana

P 4

24/30

Examen 1

Pregunta #1

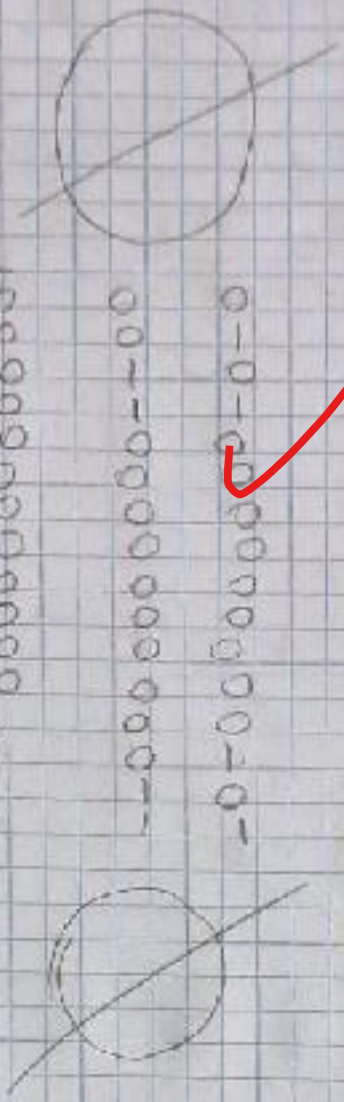
A	B	R_2	R_1	R_0
0	0	∅	∅	∅
0	1	X_2	X_1	X_0
1	0	0	0	0
1	1	∅	∅	∅

→ Cuando $X_2, X_1, X_0 < (3)_{10}$

A	B	R_2	R_1	R_0
0	0	∅	∅	∅
0	1	0	0	0
1	0	X_2	X_1	X_0
1	1	∅	∅	∅

→ Cuando $X_2, X_1, X_0 > (3)_{10}$

A	B	X_2	X_1	X_0	R_2	R_1	R_0
0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	1
0	0	0	1	0	0	1	0
0	0	0	1	1	0	1	1
0	0	1	0	0	1	0	0
0	0	1	0	1	1	0	1
0	0	1	1	0	1	1	0
0	0	1	1	1	1	1	1
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	1
0	1	0	1	0	0	1	0
0	1	0	1	1	0	1	1
0	1	1	0	0	1	0	0
0	1	1	0	1	1	0	1
0	1	1	1	0	1	1	0
0	1	1	1	1	1	1	1
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	1
1	0	0	1	0	0	1	0
1	0	0	1	1	0	1	1
1	0	1	0	0	1	0	0
1	0	1	0	1	1	0	1
1	0	1	1	0	1	1	0
1	0	1	1	1	1	1	1
1	1	0	0	0	0	0	0
1	1	0	0	1	0	0	1
1	1	0	1	0	0	1	0
1	1	0	1	1	0	1	1
1	1	1	0	0	1	0	0
1	1	1	0	1	1	0	1
1	1	1	1	0	1	1	0
1	1	1	1	1	1	1	1



R_2

X_1X_0 \ $AB X_2$	000	001	011	010	110	111	101	100
00	Ø 0	Ø 4	0 12	0 8	Ø 24	Ø 28	1 20	0 16
01	Ø 1	Ø 5	0 13	0 9	Ø 25	Ø 29	1 21	0 17
11	Ø 3	Ø 7	0 15	0 11	Ø 27	Ø 31	1 23	0 19
10	Ø 2	Ø 6	0 14	0 10	Ø 26	Ø 30	1 22	0 18

B

Don't care

$R_2 = A$

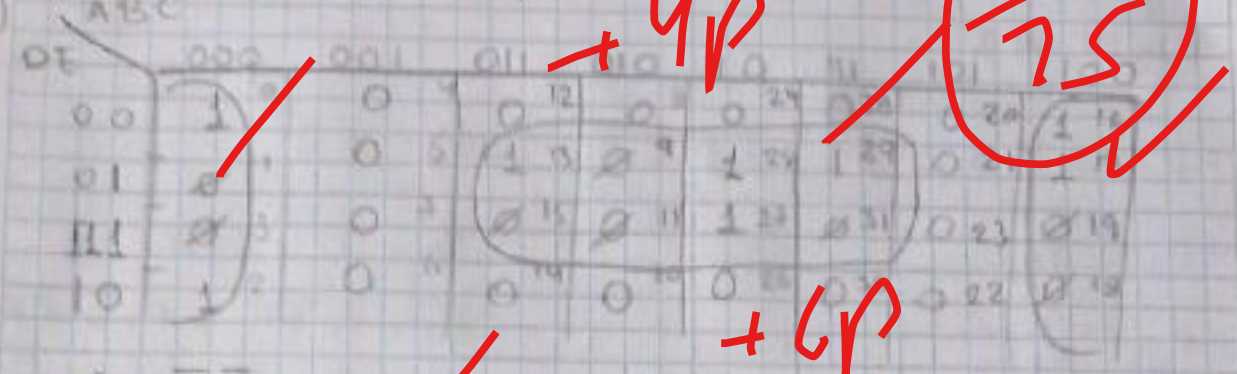
+ YP ✓

Grupos 2-4-8-16

92 ...

Pregunta #2

a)



$S_1 = \bar{B}\bar{C} + EB$

+4p

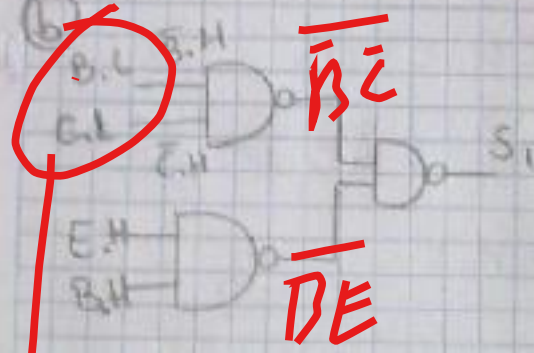
+6p

+5p

+10p

25/25

b)



$\bar{B}\bar{C}$ $\bar{E}B$

$\bar{B}\bar{C}$ $B\bar{E}$

$S_1 = \overline{(\bar{B}\bar{C})(\bar{E}B)} = \overline{\overline{B\bar{C}}} + \overline{\overline{EB}} = \bar{B}\bar{C} + EB$

c) Ingeniosa

Pregunta #3

(a)

$-P_1 = A \oplus 1 = A\bar{1} + \bar{A}1 = A$ $\quad -P_7 = \bar{A}B$

$-P_2 = \bar{B}$

$-P_3 = \bar{C}$

$-P_4 = \bar{B}A$

$-P_5 = \bar{A}B$

$-P_6 = DC$

$-P_8 = D\bar{C} = DC$

$-P_9 = P_6 \oplus 0 = P_6\bar{0} + \bar{P_6}0$

$P_9 = P_6 = DC$

$-P_{10} = P_2 P_8$

$P_{10} = \bar{A}\bar{B}DC$

$-P_{11} = P_8 P_4$

$P_{11} = DC\bar{B}A$

$-P_{12} = P_5 P_9$

$= \bar{A}BCD$

$-P_{13} = P_{10} + P_{11}$

$= \bar{A}\bar{B}DC + ABCD$

$-P_{14} = P_{13} + P_{12}$

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

$+ \bar{A}BCD$

$-P_{15} = P_{14} \oplus 0$

$= P_{14}\bar{0} + \bar{P_{14}}0$

$= \bar{A}\bar{B}CD + A\bar{B}CD$

$+ \bar{A}BCD$

23/25

+1 sp

(b)

A	B	C	D	S_1
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	0
1	1	0	1	0
1	1	1	0	0
1	1	1	1	0

S_1

CD \ AB	00	01	11	10
00	0 (0)	0 (4)	0 (12)	0 (8)
01	0 (1)	0 (5)	0 (13)	0 (9)
11	1 (3)	1 (7)	0 (15)	1 (11)
10	0 (2)	0 (6)	0 (14)	0 (10)

D

C

Cuvm 2

+8p

$S_1 = \bar{A}CD + A\bar{B}CD$ //

Evaluacion Primer Parcial

Nombre: Rodriguez Vieto Eduardo Javier

Paralelo: 4

25/30

Problema 1

A	B	X_2	X_1	X_0	Q_i	R_i	Q_0
0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0
0	0	0	1	0	0	0	0
0	0	0	1	1	0	0	0
0	0	1	0	0	0	0	0
0	0	1	0	1	0	0	0
0	0	1	1	0	0	0	0
0	0	1	1	1	0	0	0
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	1
0	1	0	1	0	0	1	0
0	1	0	1	1	0	1	1
0	1	1	0	0	0	1	0
0	1	1	0	1	0	1	1
0	1	1	1	0	0	1	0
0	1	1	1	1	0	1	1
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	1
1	0	0	1	0	0	1	0
1	0	0	1	1	0	1	1
1	0	1	0	0	0	1	0
1	0	1	0	1	0	1	1
1	0	1	1	0	0	1	0
1	0	1	1	1	0	1	1
1	1	0	0	0	0	0	0
1	1	0	0	1	0	0	1
1	1	0	1	0	0	1	0
1	1	0	1	1	0	1	1
1	1	1	0	0	0	1	0
1	1	1	0	1	0	1	1
1	1	1	1	0	0	1	0
1	1	1	1	1	0	1	1

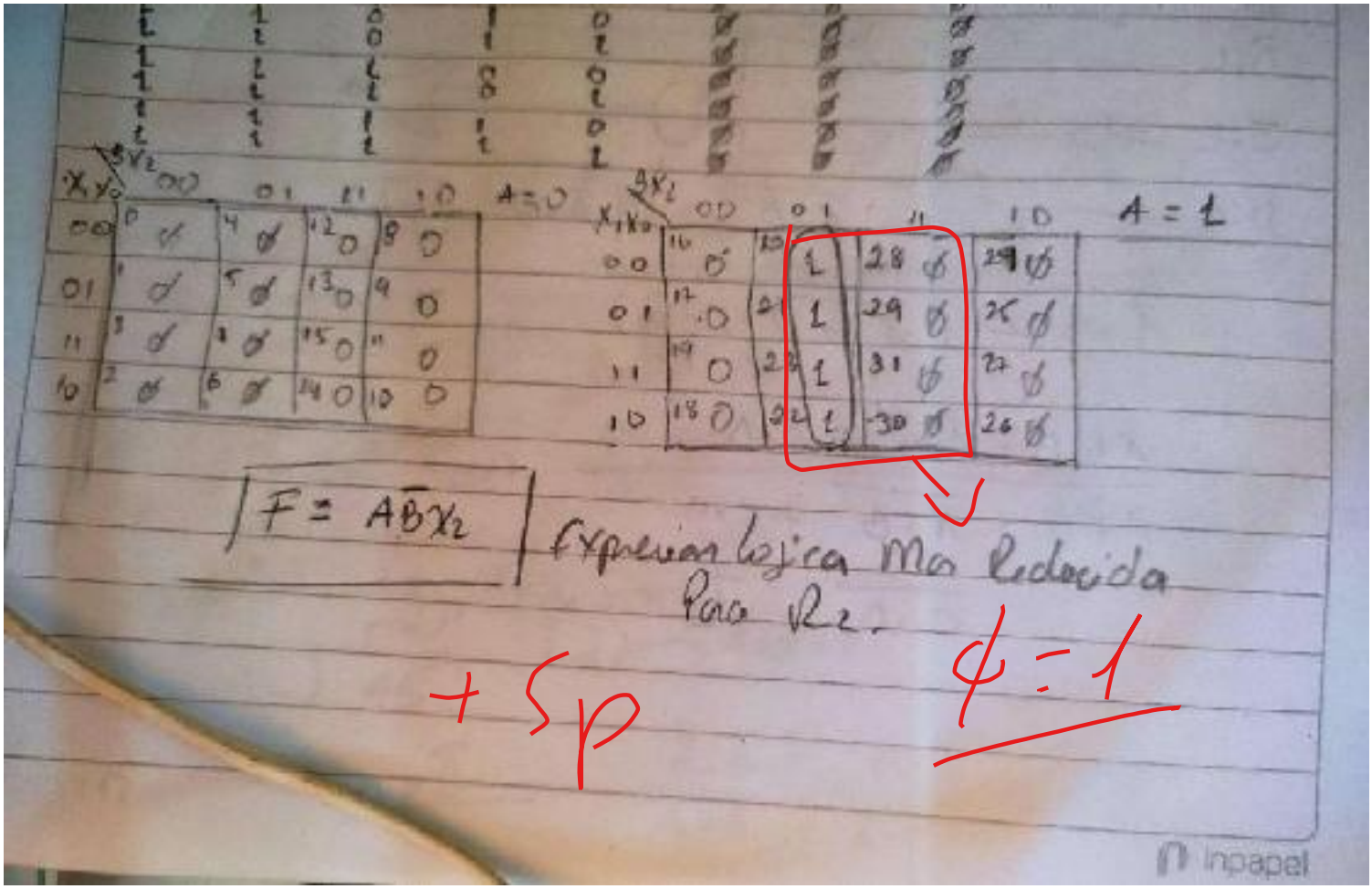
+2p

$A = 0$

X_1X_0 \ BX_2	00	01	11	10
00	0 ∅	4 ∅	12 0	8 0
01	1 ∅	5 ∅	13 0	9 0
11	3 ∅	7 ∅	15 0	11 0
10	2 ∅	6 ∅	14 0	10 0

$A = 1$

X_1X_0 \ BX_2	00	01	11	10
00	16 0	20 1	28 ∅	24 ∅
01	17 0	21 1	29 ∅	25 ∅
11	19 0	23 1	31 ∅	27 ∅
10	18 0	22 1	30 ∅	26 ∅


A = 0
A = 1
F = AB̄X₂
Expressão lógica Mais Reduzida Para R2.
+ Sp
ϕ = 1

Pregunta 2

a)

A=0

DE \ BC	00	01	11	10
00	1	0	0	0
01	Ø	0	1	Ø
11	Ø	0	Ø	Ø
10	1	0	0	0

A=1

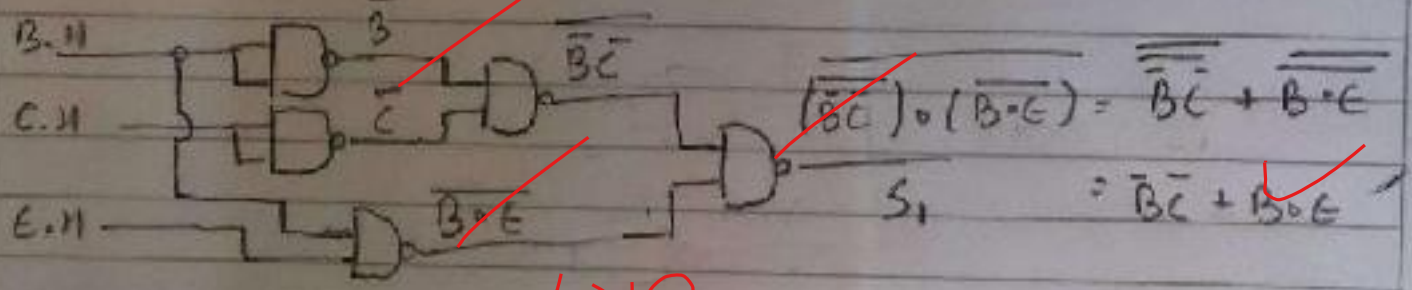
DE \ BC	00	01	11	10
00	1	0	0	0
01	1	0	1	1
11	Ø	0	Ø	1
10	Ø	0	0	0

$S_1 = \bar{B}\bar{C} + BE$ ✓ +5p

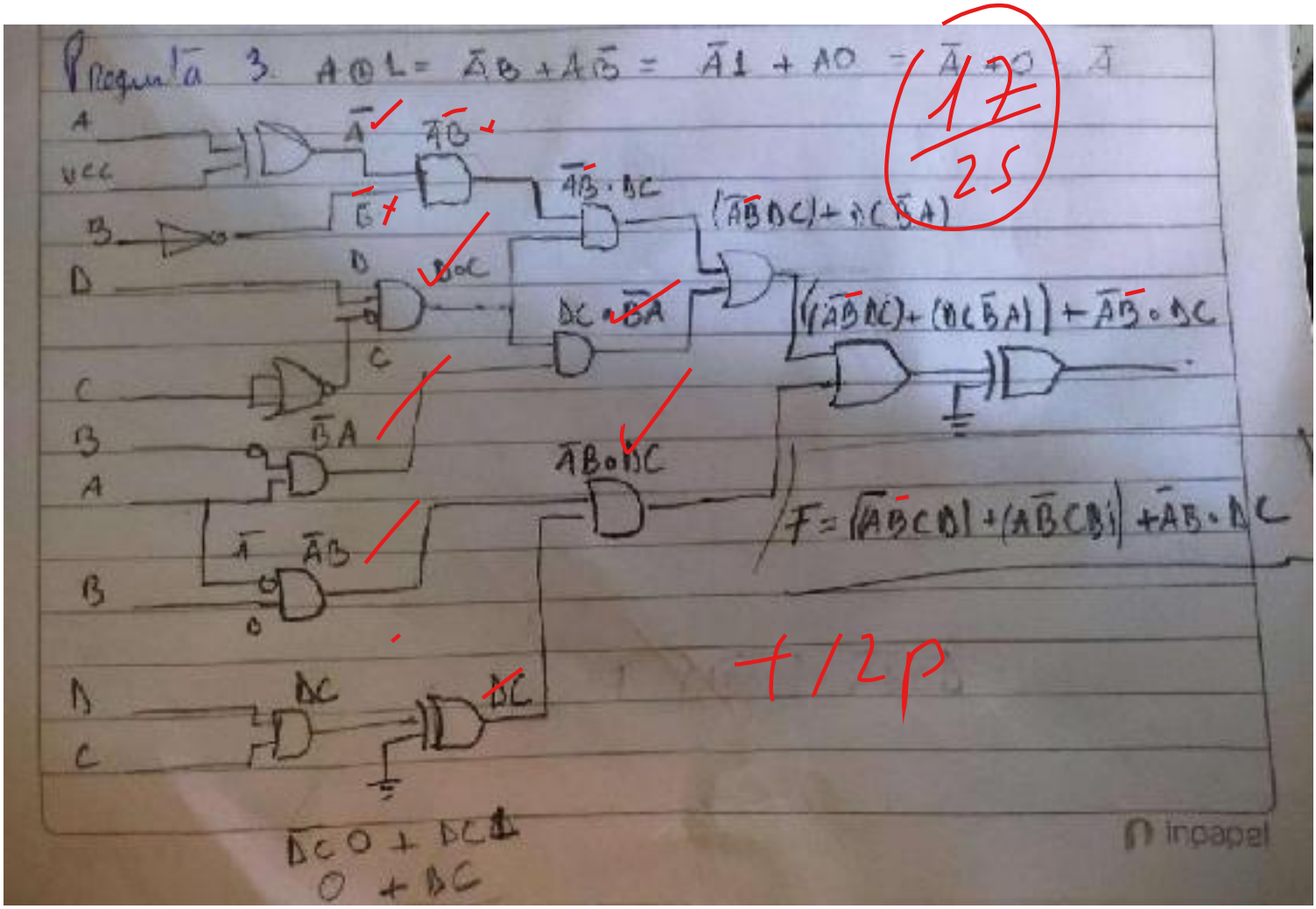
+4p +6p

b)

$S_1 = \bar{B}\bar{C} + BE$



+10p


Pregunta 3
A
VCC
B
D
C
B
A
B
D
C
F = (ĀB̄CD) + (ĀBCB̄) + ĀB · DC
+12p
DCO + DC
O + DC
inpapel

$F = (\bar{A}\bar{B}CD) + A\bar{B}CD + \bar{A}BCD$

CD \ AB	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	0	1	0	1
10	0	0	0	0

$(A\bar{B}CD) = 1$

1 0 1 1

$\bar{A}BCD = 1$

0 1 1 1 = 1

$F = \bar{A}BCD + A\bar{B}CD$ ✗

+ Sp

Examen Primera Evaluación

Aldo Salvador Infante. Paralelo 4

30/30

Problema #1

TABLA DE VERDAD

A	B	X_2	X_1	X_0	R_2	R_1	R_0
0	0	0	0	0	x	x	x
0	0	0	0	1	x	x	x
0	0	0	1	0	x	x	x
0	0	0	1	1	x	x	x
0	0	1	0	0	x	x	x
0	0	1	0	1	x	x	x
0	0	1	1	0	x	x	x
0	0	1	1	1	x	x	x
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	1
0	1	0	1	0	0	1	0
0	1	0	1	1	0	1	1
0	1	1	0	0	0	0	0
0	1	1	0	1	0	0	0
0	1	1	1	0	0	0	0
0	1	1	1	1	0	0	0
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0
1	0	0	1	0	0	0	0
1	0	0	1	1	0	0	0
1	0	1	0	0	1	0	0
1	0	1	0	1	1	0	1
1	0	1	1	0	1	1	0
1	0	1	1	1	1	1	1
1	1	0	0	0	x	x	x
1	1	0	0	1	x	x	x
1	1	0	1	0	x	x	x
1	1	0	1	1	x	x	x
1	1	1	0	0	x	x	x
1	1	1	0	1	x	x	x
1	1	1	1	0	x	x	x
1	1	1	1	1	x	x	x

MAPA DE KARNAUGH R_2

X_1X_0 \ BX_2	00	01	11	10
00	x	x	0	0
01	x	x	0	0
11	x	x	0	0
10	x	x	0	0

A=1

X_1X_0 \ BX_2	00	01	11	10
00	0	1	x	x
01	0	1	x	x
11	0	1	x	x
10	0	1	x	x

+1 vp

+1 vp

$R_2 = AX_2$

o'

$R_2 = \bar{B}X_2$

Perfecto

PROBLEMA #2

MAPA DE KARNAUGH PARA S1

A = 0

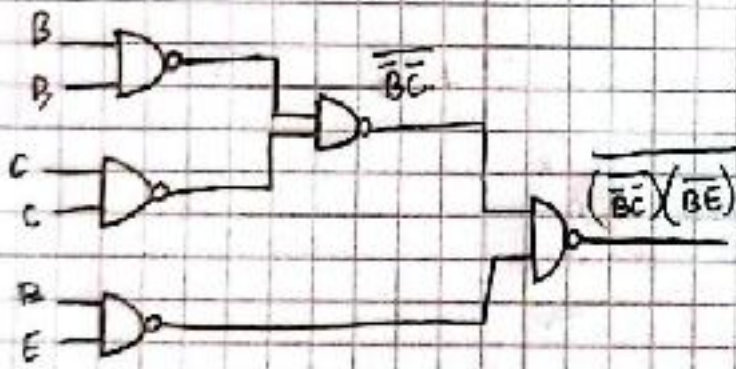
DE \ BC	00	01	11	10
00	1	0	0	0
01	x	0	1	x
11	x	0	x	x
10	1	0	0	0

A = 1

DE \ BC	00	01	11	10
00	1	0	0	0
01	1	0	1	1
11	x	0	x	1
10	x	0	0	0

$S1 = \bar{B}\bar{C} + BE$

NAND DE 2 ENTRADAS

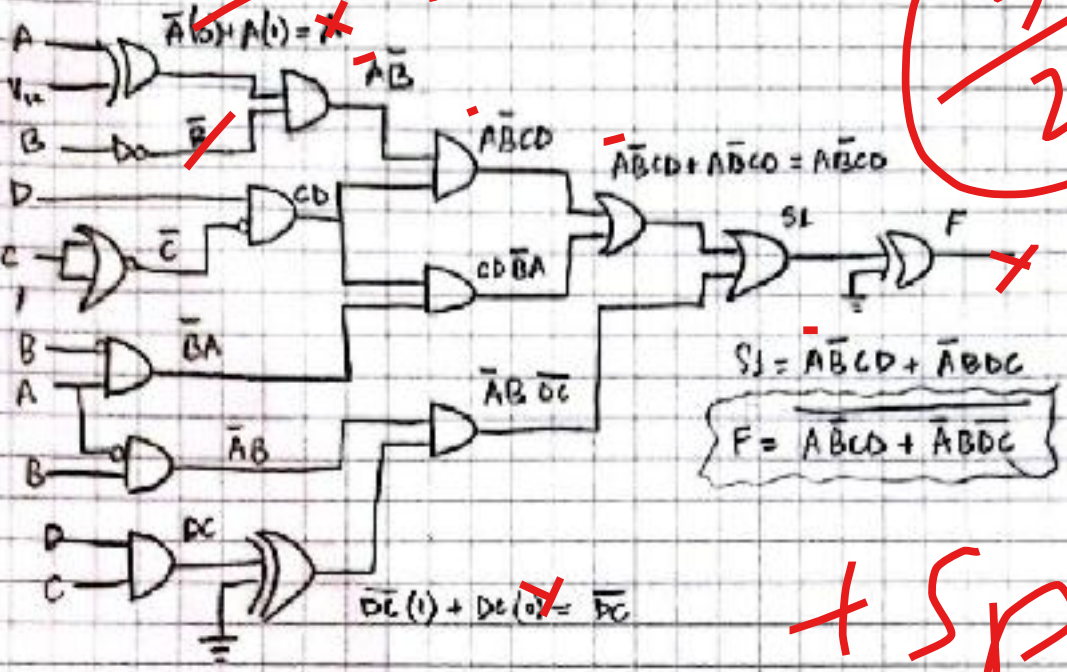


$\overline{(\bar{B}\bar{C})(BE)} \equiv \bar{B}\bar{C} + BE$

Problema #2

$A\bar{I} + \bar{A}I$

$\frac{7}{25}$



$SI = \bar{A}\bar{B}CD + \bar{A}BDC$

$F = \overline{\bar{A}\bar{B}CD + \bar{A}BDC}$

+5p

MAPA DE KARNAUGH

CD \ AB	00	01	11	10
00	0	0	1	0
01	0	0	1	0
11	0	0	1	0
10	0	0	1	0

$\bar{A}\bar{B}CD = 0$

$A = 1$

$D = 1$

$\bar{A}B\bar{D}\bar{C} = 0$

$C < {}^{0}_{1}$

$0 < {}^{0}_{1}$

$F = AB$

+2p

Nombre: Juan Manuel Shaman Hidalgo

Examen Primer Parcial //

Problema #1

Tabla de Verdad.

A	B	x_2	x_1	x_0	R_2	R_1	R_0
0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	1
0	0	0	1	0	0	1	0
0	0	0	1	1	0	1	1
0	0	1	0	0	1	0	0
0	0	1	0	1	1	0	1
0	0	1	1	0	1	1	0
0	0	1	1	1	1	1	1
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	1
0	1	0	1	0	0	1	0
0	1	0	1	1	0	1	1
0	1	1	0	0	1	0	0
0	1	1	0	1	1	0	1
0	1	1	1	0	1	1	0
0	1	1	1	1	1	1	1
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0
1	0	0	1	0	0	0	0
1	0	0	1	1	0	0	0
1	0	1	0	0	0	0	0
1	0	1	0	1	0	0	0
1	0	1	1	0	0	0	0
1	0	1	1	1	0	0	0
1	1	0	0	0	1	0	0
1	1	0	0	1	1	0	1
1	1	0	1	0	1	1	0
1	1	0	1	1	1	1	1
1	1	1	0	0	X	X	X

(Aquí en adelante A=B por lo tanto se pone X (no es posible)

14/20

+1 p.

Tabla de verdad de si fuera para todas las combinaciones A=B las cuales no son posibles

Expresiones Reducidas:

$R_2 = A\bar{B}x_2\bar{x}_1\bar{x}_0 + A\bar{B}x_2\bar{x}_1x_0 + AB x_2x_1\bar{x}_0 + A\bar{B}x_2x_1x_0$

sacar factor común

$= A\bar{B}(x_2\bar{x}_1\bar{x}_0 + x_2\bar{x}_1x_0 + x_2x_1\bar{x}_0 + x_2x_1x_0)$

$= x_2(\bar{x}_1\bar{x}_0 + x_1x_0 + x_1\bar{x}_0)$

$= x_2(\bar{x}_1x_0 + x_1\bar{x}_0 + 1)$

$= x_2(\bar{x}_1x_0 + x_1\bar{x}_0)$

$R_2 = x_2(x_1 \oplus x_0)$ //

$\therefore R_2 = x_2(x_1 \oplus x_0)$ // ✓

$x_1 \oplus x_0 = \bar{x}_1x_0 + x_1\bar{x}_0$

$\bar{x}_1 + x_1 = 1$

Problema 2

10/15

+4p

+4p

Grupo 8

Grupo 8

a) S_1 cuando A=0

$S_1 = \bar{B}C + B\bar{D}E + BE$ ✗

S_1 cuando A=1

$S_1 = \bar{B}C + BE$ ✓

S_2 cuando A=0

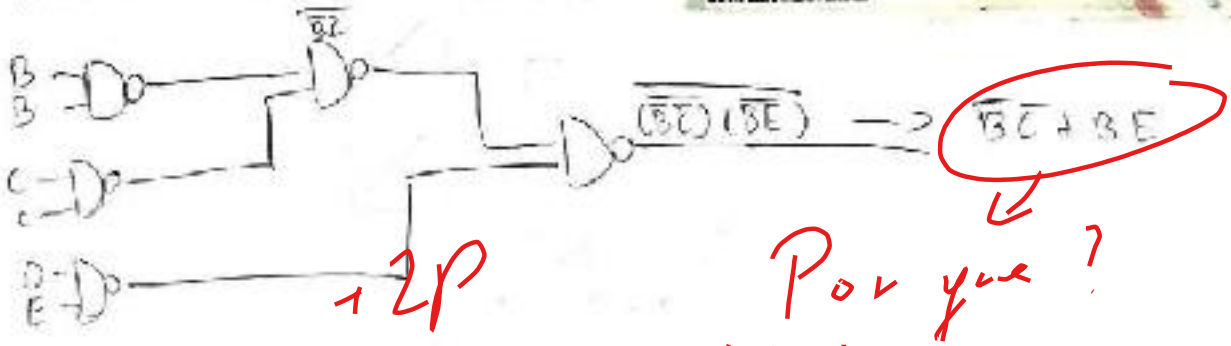
$S_2 = BE$ ✓

S_2 cuando A=1

$S_2 = \bar{B}C + B\bar{D}E$ ✓

Resultados

b) NAND de dos Entradas



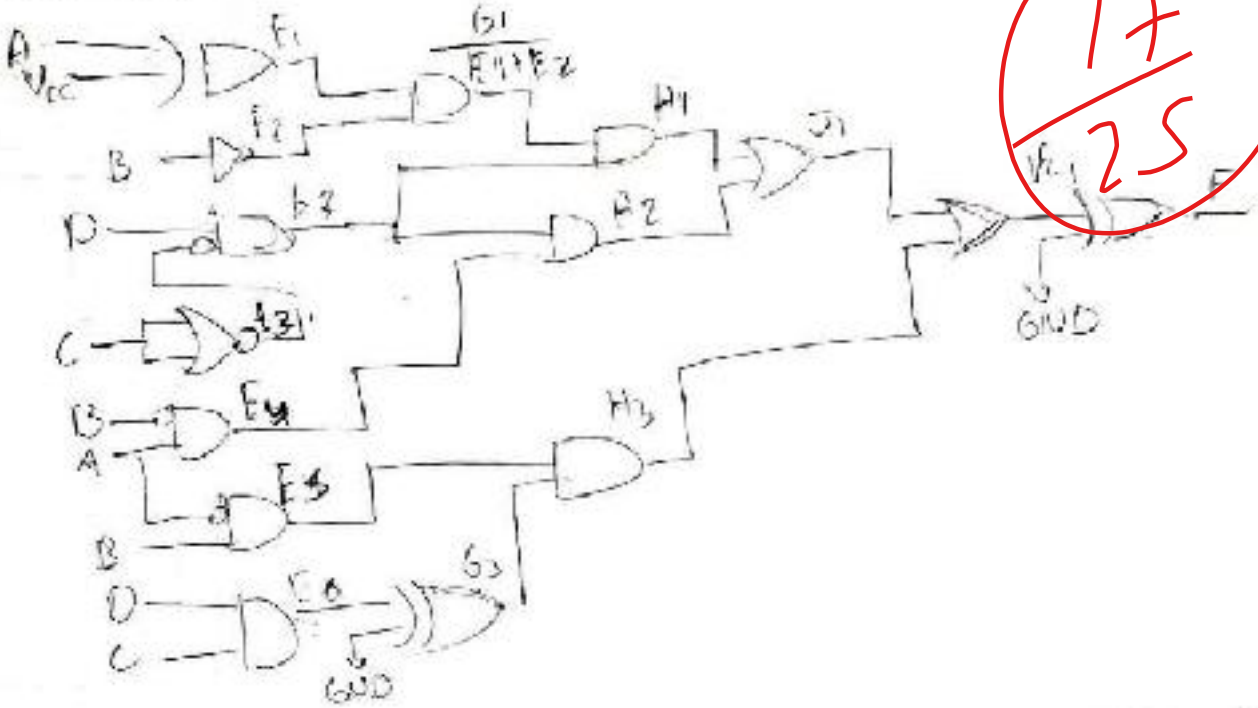
+2p

Por que?

Usted tiene 2 expresiones
De donde sale el circuito

Problema 3

17/25



$E_1 = A \oplus 1$ $\quad E_5 = \bar{A} \cdot D$ | $G_1 = E_1 \cdot E_2$ | $P_1 = G_1 \cdot G_2$

$E_2 = B$ $\quad E_6 = D \cdot C$ | $G_2 = D \cdot \bar{E}_3$ | $H_2 = G_2 \cdot E_4$

$E_3 = \bar{C}$ | $G_3 = E_6 \oplus D$ | $H_3 = E_5 \cdot G_3$

$E_4 = \bar{B} \cdot A$

$J_1 = H_1 + H_2$ $\quad L_1 = J_1 + H_3$

$L_1 = J_1 \oplus D$ //

$C(J_1 + H_3) \oplus D$

$[(H_1 + H_2) + H_3] \oplus D$

$[G_1 G_2 + G_2 E_4 + E_5 G_3] \oplus D$

$[E_1 E_2 D \bar{E}_3 + \bar{D} \bar{E}_3 E_4 + E_5 (E_6 \oplus D)] \oplus D$

$[(A \oplus 1)(\bar{B} \cdot D \cdot 1 + [D \cdot \bar{C}(\bar{B} \cdot A) + (\bar{A} \cdot B)((D \cdot C) \oplus D)]) \oplus D = F$ //

+7p

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

E_1	E_2	E_3	E_4	E_5	E_6
1	1	1	0	0	0
1	1	0	0	0	0
1	0	1	0	0	1
1	0	0	0	0	0
0	1	1	0	1	0
0	1	0	1	0	0
0	0	1	1	0	0
0	0	0	1	0	1

G_1	G_2	G_3	P_1	P_2	P_3
1	0	0	0	0	0
1	0	0	0	0	1
1	0	0	0	1	0
1	0	0	0	1	1
0	1	0	1	0	0
0	1	0	1	0	1
0	0	1	1	1	0
0	0	1	1	1	1

S_1	R_1	L_1
0	0	0
0	0	1
0	1	0
0	1	1
1	0	0
1	0	1
1	1	0
1	1	1

AB \ CD	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	1	1	0	1
10	0	0	0	0

$L = \bar{A}CD + A\bar{B}CD$

$L = CD(\bar{A} + A\bar{B})$

$L = CD(\bar{A} + \bar{B})$ 10p

Nombre: Cristopher Terán Otero Examen Sistemas Digitales 2
Matrícula: 20162018210

Tema #1
Razonamiento:

A y B		X_2	X_1	X_0	R_2	R_1	R_0
0	0	0	0	0			
		0	0	1			
0	1	0	1	0			
		0	1	1			
1	0	1	0	0			
		1	0	1			
1	1	1	1	0			
		1	1	1			

A	B	R_2	R_1	R_0
0	0	∅	∅	∅

1	0	R_2	R_1	R_0 =	X_2	Y_1	X_0
					1	0	0
					1	0	1
					1	1	0
					1	1	1

Caso Contrario

R_2	R_1	R_0
0	0	0

0	1	R_2	R_1	R_0 =	X_2	X_1	X_0
					0	0	0
					0	0	1
					0	1	0
					0	1	1

Caso Contrario

R_2	R_1	R_0
0	0	0

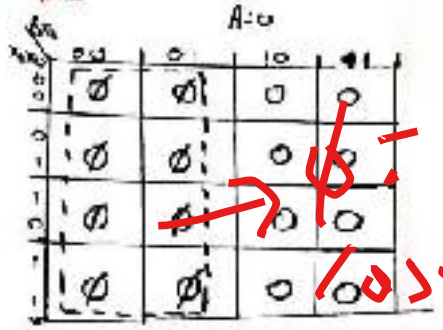
A	B	R_2	R_1	R_0
1	1	∅	∅	∅

Tema #1

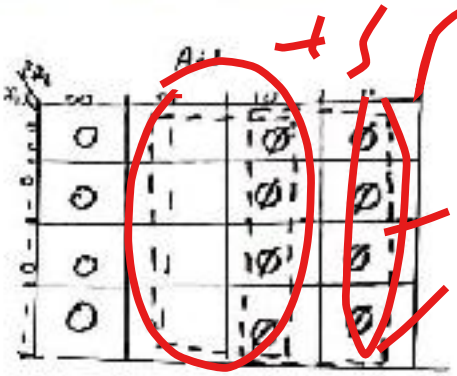
A	B	X_2	X_1	X_0	Z_2	Z_1	Z_0
0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0
0	0	0	1	0	0	0	0
0	0	0	1	1	0	0	0
0	0	1	0	0	0	0	0
0	0	1	0	1	0	0	0
0	0	1	1	0	0	0	0
0	0	1	1	1	0	0	0
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	1
0	1	0	1	0	0	1	0
0	1	0	1	1	0	1	1
0	1	1	0	0	0	0	0
0	1	1	0	1	0	0	0
0	1	1	1	0	0	0	0
0	1	1	1	1	0	0	0
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0
1	0	0	1	0	0	0	0
1	0	0	1	1	0	0	0
1	0	1	0	0	0	0	0
1	0	1	0	1	0	0	1
1	0	1	1	0	0	1	0
1	0	1	1	1	0	1	1
1	1	0	0	0	0	0	0
1	1	0	0	1	0	0	1
1	1	0	1	0	0	1	0
1	1	0	1	1	0	1	1
1	1	1	0	0	1	0	0
1	1	1	0	1	1	0	1
1	1	1	1	0	1	1	0
1	1	1	1	1	1	1	1

flip

Tema #1



$\Rightarrow \phi = 0$
todos 1



$\Rightarrow \phi = 0$
todos 2

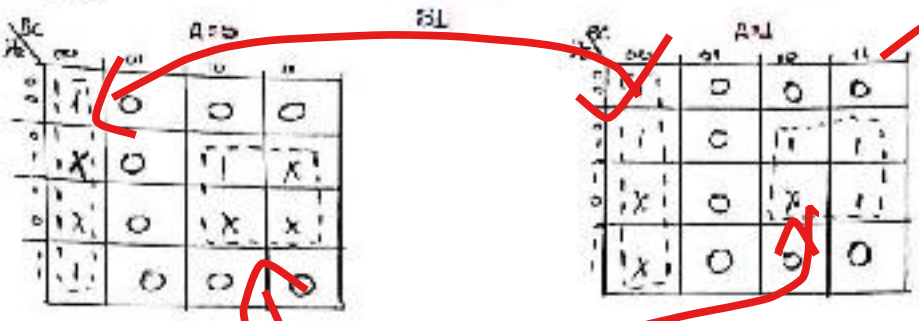
$R_2 = \bar{B} + X_2 + B$

Mapa de Grupos

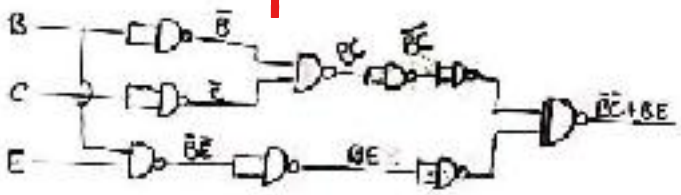
Si $\phi = 0$ en todos 1 y 2

tengo 1 Grupo

Tema #2

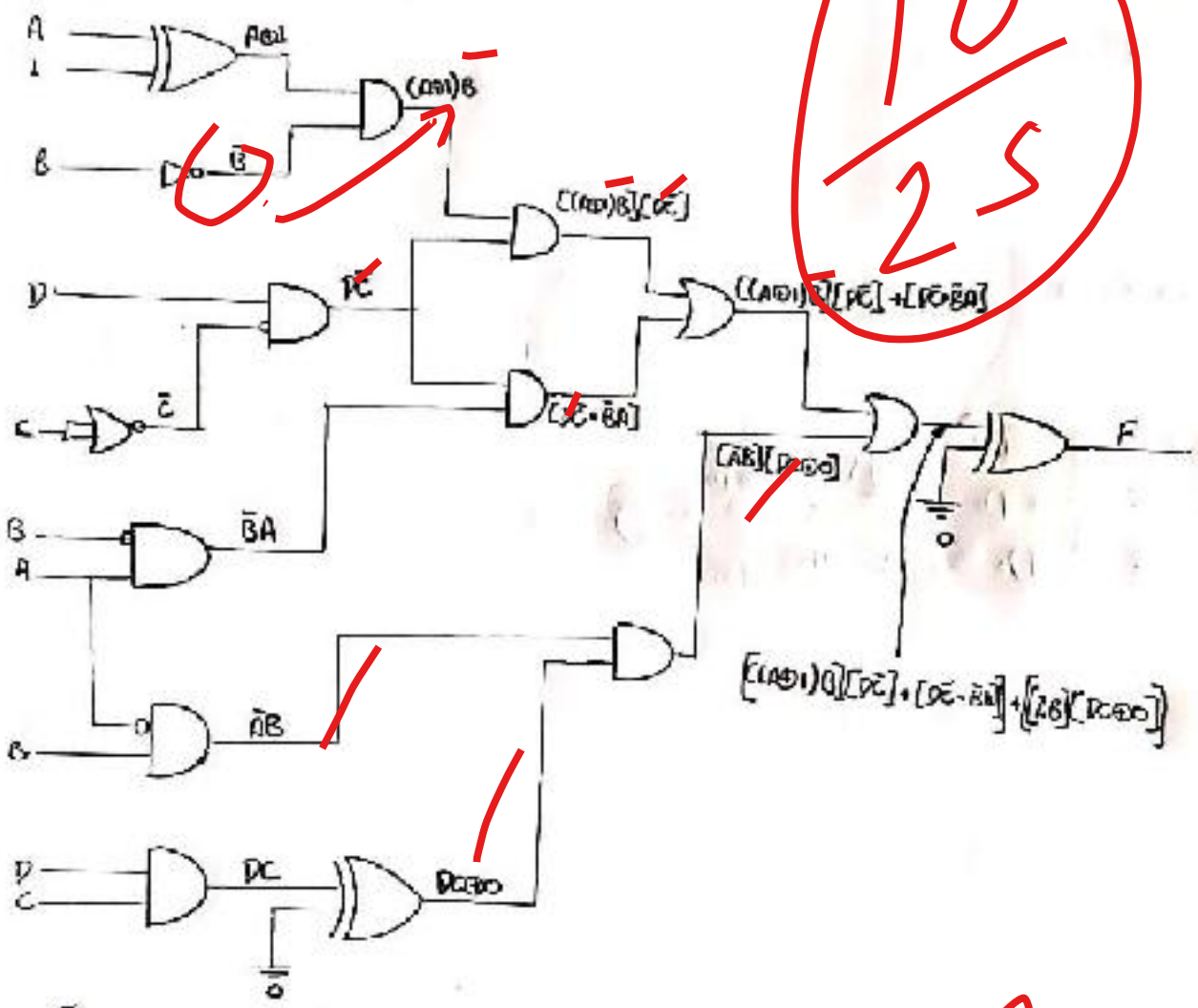


$S_1 = \bar{B}\bar{C} + \bar{C}B$



Exc. #3

a)



$$F = \left[[(A \oplus 1)\bar{B}][D\bar{E}] + [DC][\bar{B}A]\right] + \left[[\bar{A}B][DC \oplus D]\right] \oplus 0$$

10/25

+7p

b)

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

+3p

CD \ AB	00	01	10	11
00	0	0	0	0
01	0	1	1	1
11	0	0	0	0
10	0	0	0	0

$f = B\bar{C}D + A\bar{C}D$ X

Nombre Cristina Tigrero Tigrero P4

Examen - Sistemas Digitales I

20/20

Pregunta 1:

Tabla de verdad

A	B	4 x_2	2 x_1	1 x_0	R_2	R_1	R_0
0	0	0	0	0			
0	0	0	0	1			
0	0	0	1	0			
0	0	0	1	1			
0	0	1	0	0			
0	0	1	0	1			
0	0	1	1	0			
0	0	1	1	1			
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	1
0	1	0	1	0	0	1	0
0	1	0	1	1	0	1	1
0	1	1	0	0	1	0	0
0	1	1	0	1	1	0	1
0	1	1	1	0	1	1	0
0	1	1	1	1	1	1	1
1	0	0	0	0			
1	0	0	0	1			
1	0	0	1	0			
1	0	0	1	1			
1	0	1	0	0			
1	0	1	0	1			
1	0	1	1	0			
1	0	1	1	1			
1	1	0	0	0			
1	1	0	0	1			
1	1	0	1	0			
1	1	0	1	1			
1	1	1	0	0			
1	1	1	0	1			
1	1	1	1	0			
1	1	1	1	1			

$\emptyset \rightarrow \emptyset$

$\emptyset \rightarrow \emptyset$

+ 2pts ✓

$A + A = A$

2 Expresión lógica mas reducida de la variable R_2

R_2 mediante los • 1

$R_2 = A\bar{B}[(x_2\bar{x}_1\bar{x}_0)+(x_2\bar{x}_1x_0)+(x_2x_1\bar{x}_0)+(x_2x_1x_0)]$

$A\bar{B}\,x_2[(\bar{x}_1\bar{x}_0)+(\bar{x}_1x_0)+(x_1\bar{x}_0)+(x_1x_0)]$

$A\bar{B}\,x_2[(\bar{x}_1(\bar{x}_0+x_0))+(x_1(\bar{x}_0+x_0))]$

VERIZATE

$\bar{x}+x=1$

$R_2 = A\bar{B}x_2[\bar{x}_1(\bar{x}_0+x_0) + x_1(\bar{x}_0+x_0)]$ $\quad \bar{x}_0+x_0=1$

$R_2 = A\bar{B}x_2[\bar{x}_1 + x_1]$ $\quad \bar{x}_1+x_1=1$

$R_2 = A\bar{B}x_2$

+10p.

$R_2 = A\bar{B}x_2[\bar{x}_1(\bar{x}_0 + x_0) + x_1(\bar{x}_0 + x_0)]$

$R_2 = A\bar{B}x_2[\bar{x}_1 + x_1]$

$R_2 = A\bar{B}x_2$ //

$\bar{x}_0 + x_0 = 1$

$\bar{x}_1 + x_1 = 1$

25/25

P= Mapack Karnaugh

Para S_1

DE \ ABC	000	001	011	010	110	111	101	100
00	1							1
01	Ø		1	Ø	1	1		1
11	Ø		Ø	Ø	1	Ø		Ø
10	1							Ø

+4p +6p

mismo grupo de B

Grupo de E

2 grupos de x

$S_1 = B\bar{E} + \bar{B}\bar{C}$

$S_1 = B\bar{E} + \bar{B}\bar{C}$ // Expresión reducida +5p

Implementación

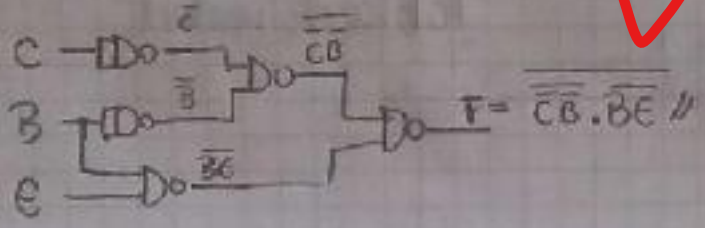
$S_1 = \overline{B.\bar{E}} + \overline{\bar{B}.\bar{C}}$

Tigrero

Implementación con compuertas NAND

$S_1 = BE + \bar{B}\bar{C}$ //

$S_1 = \overline{BE + \bar{B}\bar{C}} = \overline{\overline{BE} \cdot \overline{\bar{B}\bar{C}}}$ //



✓ +10

Pregunta 3:

$S_1 = (\bar{A}1 + A0) = \bar{A}$ (AB + AB̄)

$S_2 = \bar{B}$

$S_3 = \overline{C+C} = \bar{C}$

$S_4 = \bar{B}A$

$S_5 = \bar{A}B$

$S_6 = DC$

$S_7 = \bar{A}\bar{B}$

$S_8 = D\bar{C} = DC$

$S_9 = \overline{DC}(0) + DC(1) = DC$

$S_{10} = \bar{A}\bar{B}DC$

$S_{11} = DC\bar{B}A$

$S_{12} = \bar{A}BDC$

~~$S_{13} = \bar{A}\bar{B}DC$~~ $S_{13} = \bar{A}\bar{B} + DC\bar{B}A$ $S_{13} = \bar{A}BDC + DC\bar{B}A$

$S_{14} = \bar{A}BCD + A\bar{B}CD + \bar{A}BCD$

$F = (\overline{\bar{A}\bar{B}CD + A\bar{B}CD + \bar{A}BCD}).0 + (\bar{A}\bar{B}CD + A\bar{B}CD + \bar{A}BCD).1$

$F = (\bar{A}\bar{B}CD + A\bar{B}CD + \bar{A}BCD)$ //

R_1 R_2 R_3

b) Minimice usando mapas de K Carnaugh

CD \ AB	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	1	1	0	1
00	0	0	0	0

$F = \bar{A}CD + \bar{B}CD$ //

A	B	C	D	R_1	R_2	R_3	F
0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0
0	0	1	0	0	0	0	0
0	0	1	1	1	0	0	1
0	1	0	0	0	0	0	0
0	1	0	1	0	0	0	0
0	1	1	0	0	0	0	0
0	1	1	1	0	0	1	1
1	0	0	0	0	0	0	0
1	0	0	1	0	0	0	0
1	0	1	0	0	0	0	0
1	0	1	1	0	0	1	1
1	1	0	0	0	0	0	0
1	1	0	1	0	0	0	0
1	1	1	0	0	0	0	0
1	1	1	1	0	0	0	0

25/25

+1 sp

+1 sp

excelente

5 señales IN ⟶ A B X_2 X_1 X_0
3 señales OUT ⟶ R_2 R_1 R_0

Problema #1 // $2^5 = 32$ combinaciones

A	B	X_2	X_1	X_0	R_2	R_1	R_0
0	0	0	0	0	X	X	X
0	0	0	0	1	X	X	X
0	0	0	1	0	X	X	X
0	0	0	1	1	X	X	X
0	0	1	0	0	X	X	X
0	0	1	0	1	X	X	X
0	0	1	1	0	X	X	X
0	0	1	1	1	X	X	X
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	1
0	1	0	1	0	0	1	0
0	1	0	1	1	0	1	1
0	1	1	0	0	1	0	0
0	1	1	0	1	1	0	1
0	1	1	1	0	1	1	0
0	1	1	1	1	1	1	1
1	0	0	0	0	X	X	X
1	0	0	0	1	X	X	X
1	0	0	1	0	X	X	X
1	0	0	1	1	X	X	X
1	0	1	0	0	X	X	X
1	0	1	0	1	X	X	X
1	0	1	1	0	X	X	X
1	0	1	1	1	X	X	X
1	1	0	0	0	X	X	X
1	1	0	0	1	X	X	X
1	1	0	1	0	X	X	X
1	1	0	1	1	X	X	X
1	1	1	0	0	X	X	X
1	1	1	0	1	X	X	X
1	1	1	1	0	X	X	X
1	1	1	1	1	X	X	X

25/32

+2p

R_2

X_2X_1 \ X_0	00	01	11	10
00	X	X	0	0
01	X	X	0	0
11	X	X	0	0
10	X	X	0	0

R_1

X_2X_1 \ X_0	00	01	11	10
00	0	1	X	X
01	0	1	X	X
11	0	1	X	X
10	0	1	X	X

$R_2 = A\bar{B}X_2$

+5p

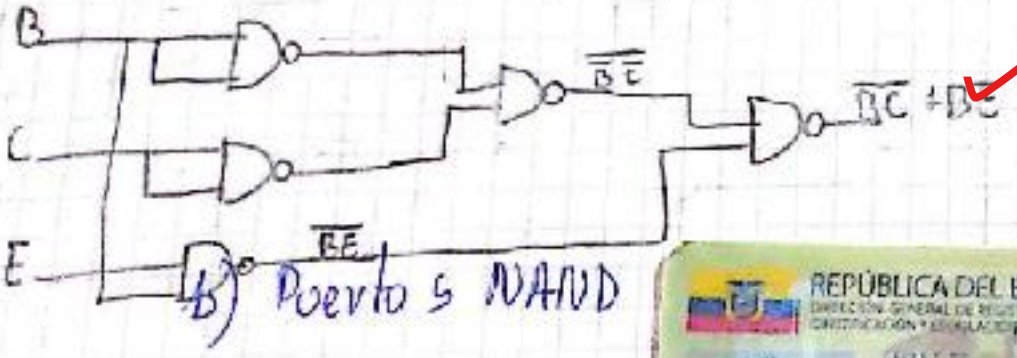
Problema #2

AB \ CD	00	01	11	10
00	1	0	0	0
01	X	0	1	X
11	X	0	X	X
10	1	0	0	0

AB \ CD	00	01	11	10
00	1	0	0	0
01	1	0	1	1
11	X	0	X	1
10	X	0	0	0

$y = \overline{B}\overline{C} + BE$

a) +5p



b) Puerta NAND +10p

+4p +4p

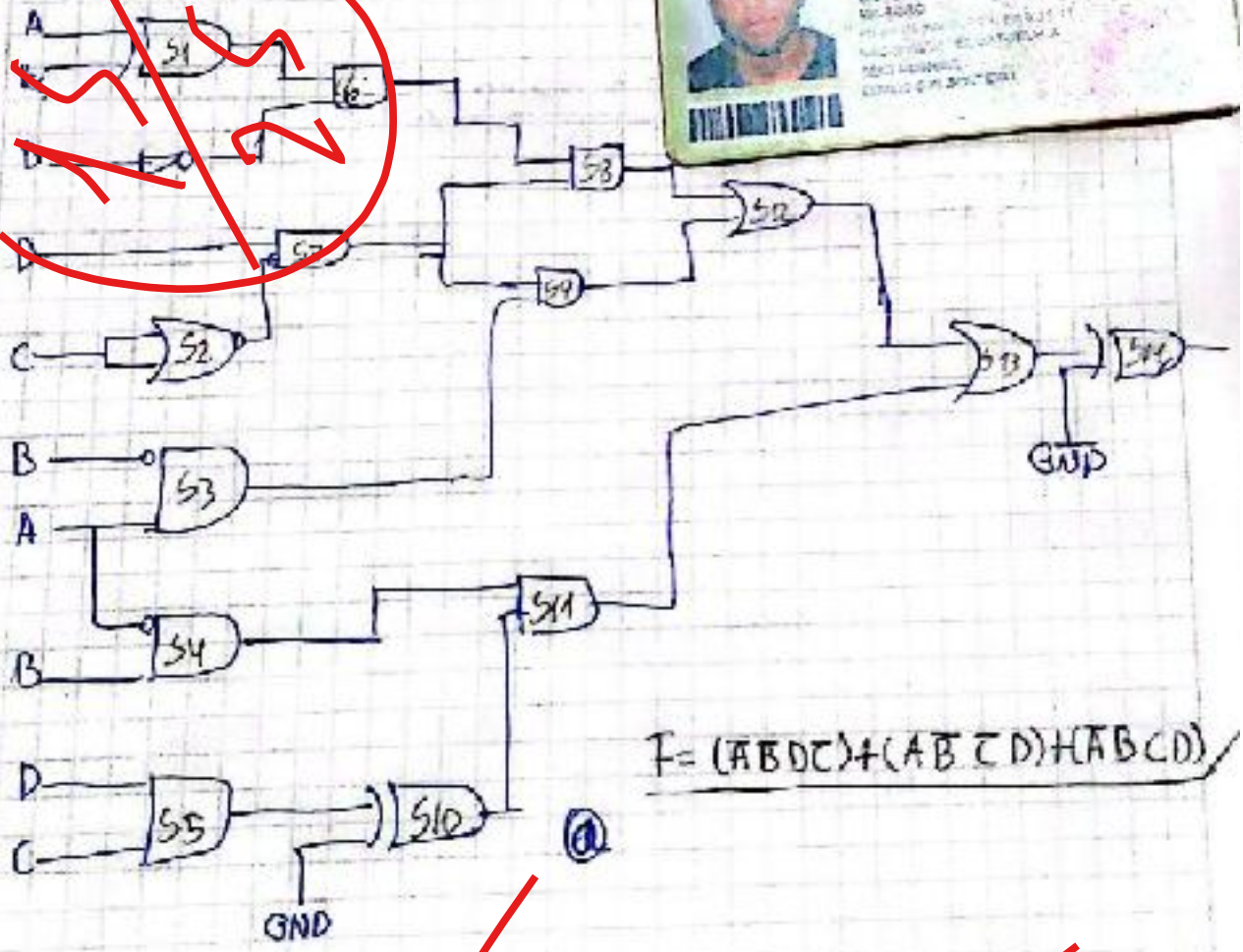
23/25

Jean Carlos Torres

Mat: 20805561

Examen SD

Problema #3



$F = (\bar{A}B\bar{D}C) + (A\bar{B}\bar{C}D) + (\bar{A}BCD)$

@

$S_1 = A \oplus 1 = \bar{A}1 + A\bar{1} = \bar{A}$

$S_2 = \bar{C}$

$S_3 = A \cdot \bar{B}$

$S_4 = \bar{A} \cdot B$

$S_5 = D \cdot C$

$S_6 = S_1 \cdot \bar{B} = \bar{A} \cdot \bar{B}$

$S_7 = D \cdot S_2 = D \cdot C$

$S_8 = S_6 \cdot S_7 = \bar{A} \cdot \bar{B} \cdot D \cdot C$

$S_9 = S_7 \cdot S_3 = DC \cdot A \cdot \bar{B}$

$S_{10} = S_5 \oplus 0 = S_5 0 + S_5 1 = D \cdot C$

$S_{11} = S_4 \cdot S_{10} = \bar{A} \cdot B \cdot D \cdot C$

$S_{12} = S_8 + S_9 = (\bar{A} \cdot \bar{B} \cdot D \cdot C) + (DC \cdot A \cdot \bar{B})$

$S_{13} = S_{12} + S_{11} = (\bar{A} \cdot \bar{B} \cdot D \cdot C) + (DC \cdot A \cdot \bar{B}) + (\bar{A}$

$S_{14} = S_{13} \oplus 0 = S_{13} 0 + S_{13}$

$(\bar{A}\bar{B}DC) + (DC \cdot A\bar{B}) + (\bar{A} \cdot B \cdot D \cdot C)$

b)

	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	1	1	0	1
10	0	0	0	0

$F = A\bar{B} + \bar{A}C$

Tumbaco Hulga Steven

Examen

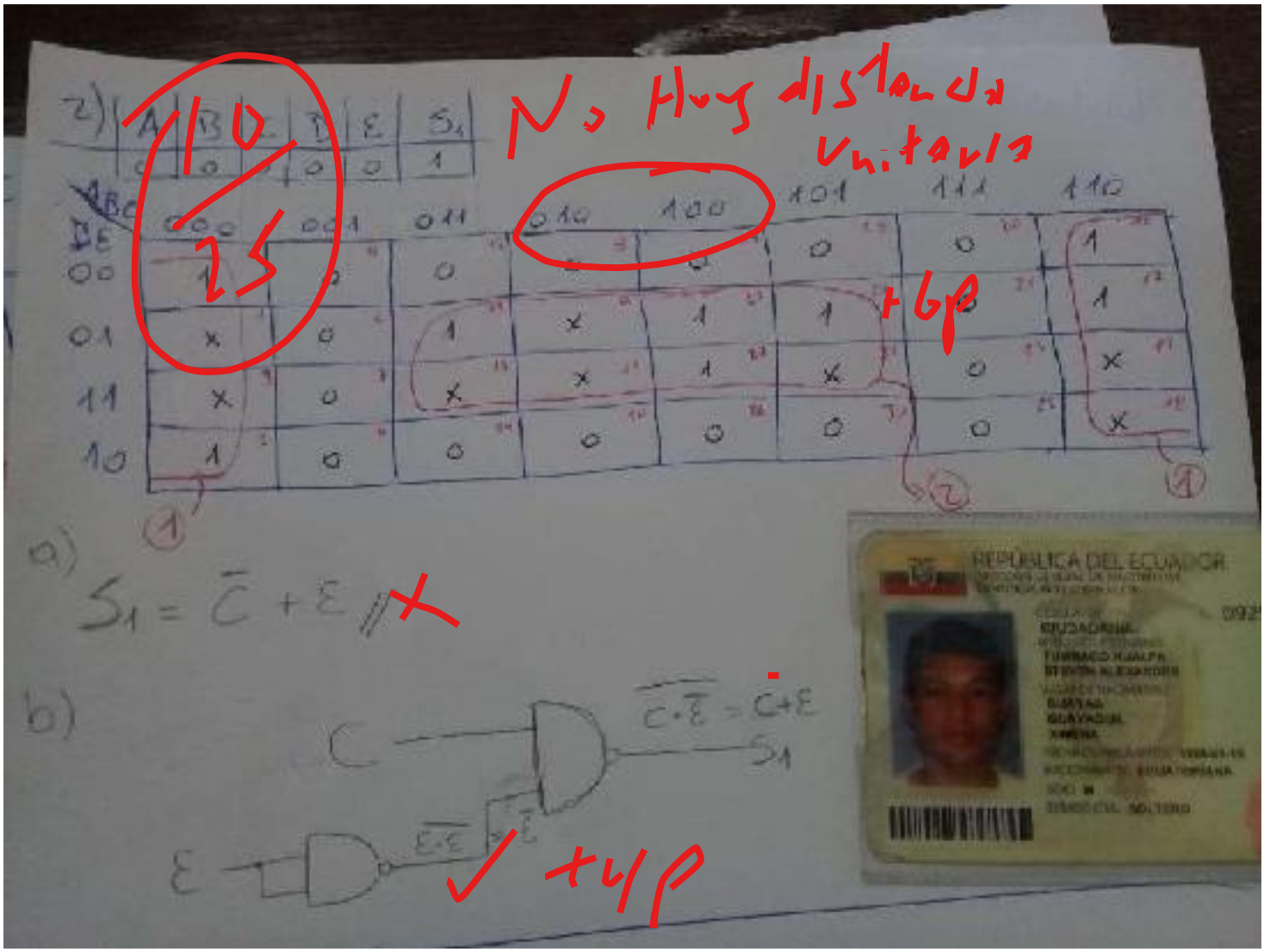
1)

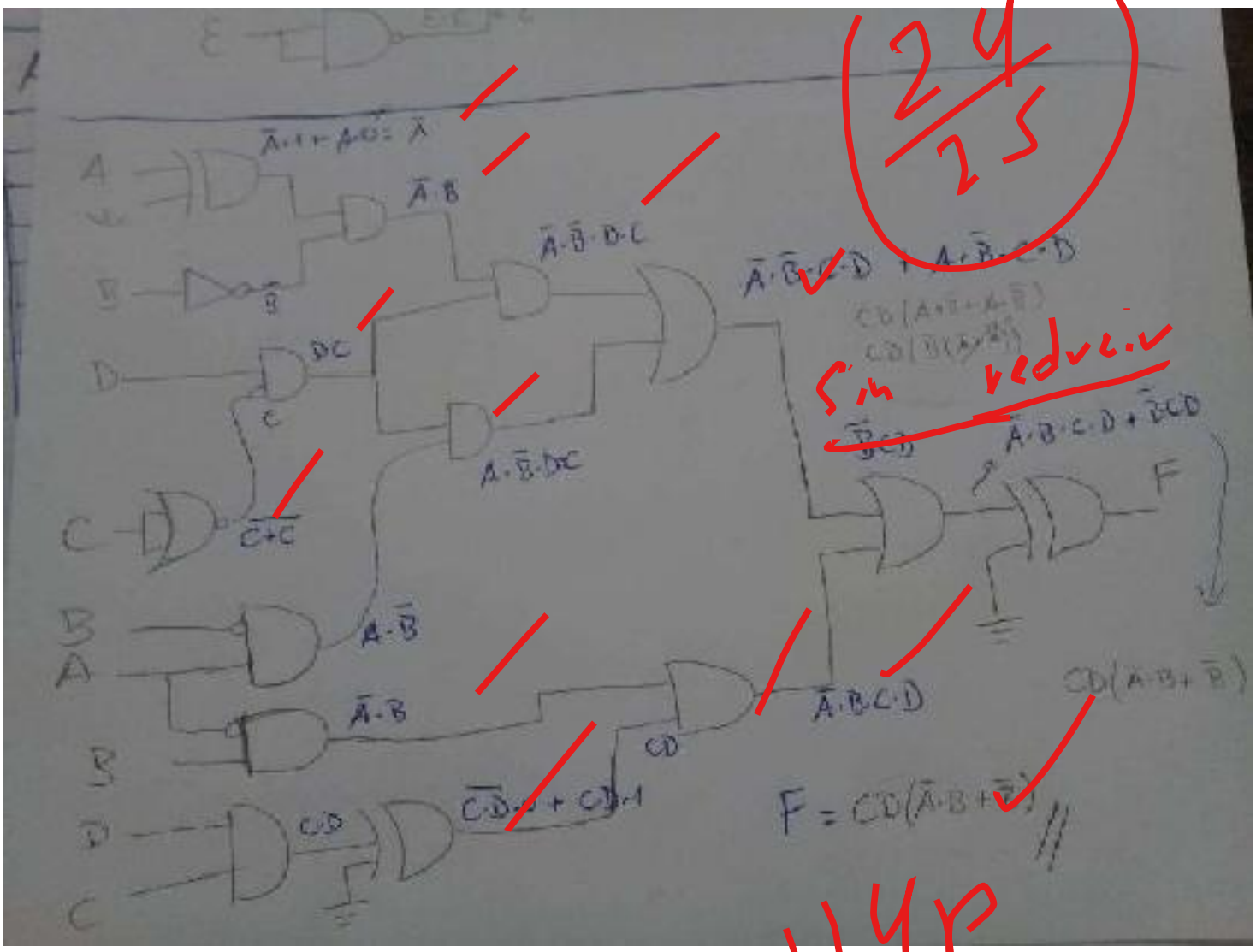
A	B	X_3	X_4	X_5	R_2	R_1	R_0	
0	0	0	0	0	X	X	X	0
0	0	0	0	1	X	X	X	1
0	0	0	1	0	X	X	X	2
0	0	0	1	1	X	X	X	3
0	0	1	0	0	X	X	X	4
0	0	1	0	1	X	X	X	5
0	0	1	1	0	X	X	X	6
0	0	1	1	1	X	X	X	7
0	1	0	0	0	0	0	0	8
0	1	0	0	1	0	0	1	9
0	1	0	1	0	0	1	0	10
0	1	0	1	1	0	1	1	11
0	1	1	0	0	0	0	0	12
0	1	1	0	1	0	0	0	13
0	1	1	1	0	0	0	0	14
0	1	1	1	1	0	0	0	15
0	1	1	0	0	0	0	0	16
0	0	0	0	1	0	0	0	17
1	0	0	0	0	0	0	0	18
1	0	0	0	1	0	0	0	19
1	0	0	1	0	0	1	0	20
1	0	0	1	1	0	1	1	21
1	0	1	0	0	0	1	0	22
1	0	1	0	1	0	1	1	23
1	0	1	1	0	1	0	0	24
1	0	1	1	1	X	X	X	25
1	1	0	0	0	X	X	X	26
1	1	0	0	1	X	X	X	27
1	1	0	1	0	X	X	X	28
1	1	0	1	1	X	X	X	29
1	1	1	0	0	X	X	X	30
1	1	1	0	1	X	X	X	31
1	1	1	1	0	X	X	X	
1	1	1	1	1	X	X	X	

20/30

√ +2 p


R2
ABC
DE
000 001 011 010 100 101 111 110
00
01
11
10
R2 = A·C
REPUBLICA DEL ECUADOR
092557363-6
ECUADORIANA
GUAYAS
GUAYAQUIL
EMORA
ECUATORIANA


2)
No hay distancia Unitaria
15
+6p
a)
$S_1 = \bar{C} + \bar{E}$ //x
b)
$\bar{C} \cdot \bar{E} = \bar{C} + \bar{E}$
S_1
$\bar{E} \cdot \bar{E}$
$\bar{E}$
✓ +4p
REPÚBLICA DEL ECUADOR


24/25
Sin reducir
F = CD(Ā·B + B̄)
+1 Pt

$F = CD(\bar{A} \cdot B + \bar{B})$

A	B	C	D	F	
0	0	0	0	0	0
0	0	0	1	0	1
0	0	1	0	0	2
0	0	1	1	1	3
0	1	0	0	0	4
0	1	0	1	0	5
0	1	1	0	0	6
0	1	1	1	1	7
1	0	0	0	0	8
1	0	0	1	0	9
1	0	1	0	0	10
1	0	1	1	1	11
1	1	0	0	0	12
1	1	0	1	0	13
1	1	1	0	0	14
1	1	1	1	0	15

$CD(\bar{A} \cdot B + \bar{B})$

1 1 1

0 1 0

$(1 + 0) = 1$

1 0 1

$(0 + 1) = 1$

0 0

$0 \cdot 1 = 0$

1 1

$0 \cdot 0 = 0$

AB / CD	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	1	1	0	1
10	0	0	0	0

$F = \bar{A}CD + \bar{B}CD$

$F = CD(\bar{A} + \bar{B})$ //

+10p

Víctor Urgilés

Pregunta 1

a)

A	B	X_2	X_1	X_0	F_2
0	0	0	0	0	0
0	0	0	0	1	0
0	0	0	1	0	0
0	0	0	1	1	0
0	0	1	0	0	0
0	0	1	0	1	0
0	0	1	1	0	0
0	0	1	1	1	0
0	1	0	0	0	0
0	1	0	0	1	0
0	1	0	1	0	0
0	1	0	1	1	0
0	1	1	0	0	0
0	1	1	0	1	0
0	1	1	1	0	0
0	1	1	1	1	0
1	0	0	0	0	0
1	0	0	0	1	0
1	0	0	1	0	0
1	0	0	1	1	0
1	0	1	0	0	0
1	0	1	0	1	0
1	0	1	1	0	0
1	0	1	1	1	0
1	1	0	0	0	0
1	1	0	0	1	0
1	1	0	1	0	0
1	1	0	1	1	0
1	1	1	0	0	0
1	1	1	0	1	0
1	1	1	1	0	0
1	1	1	1	1	0

P_2 P_1 P_0

P_0

15/20

+2p

b)

$\bar{A}$

BX_2 / X_1X_0	00	01	11	10
00	Ø	Ø	0	0
01	Ø	Ø	0	0
11	Ø	Ø	0	0
10	0	Ø	0	0

A

BX_2 / X_1X_0	00	01	11	10
00	0	1	Ø	Ø
01	0	1	Ø	Ø
11	0	1	Ø	Ø
10	0	1	0	0

$\therefore F_2 = A\bar{B}X_2$

+5p

Pregunta 2

Héctor Urgilés

$\bar{E}=0$

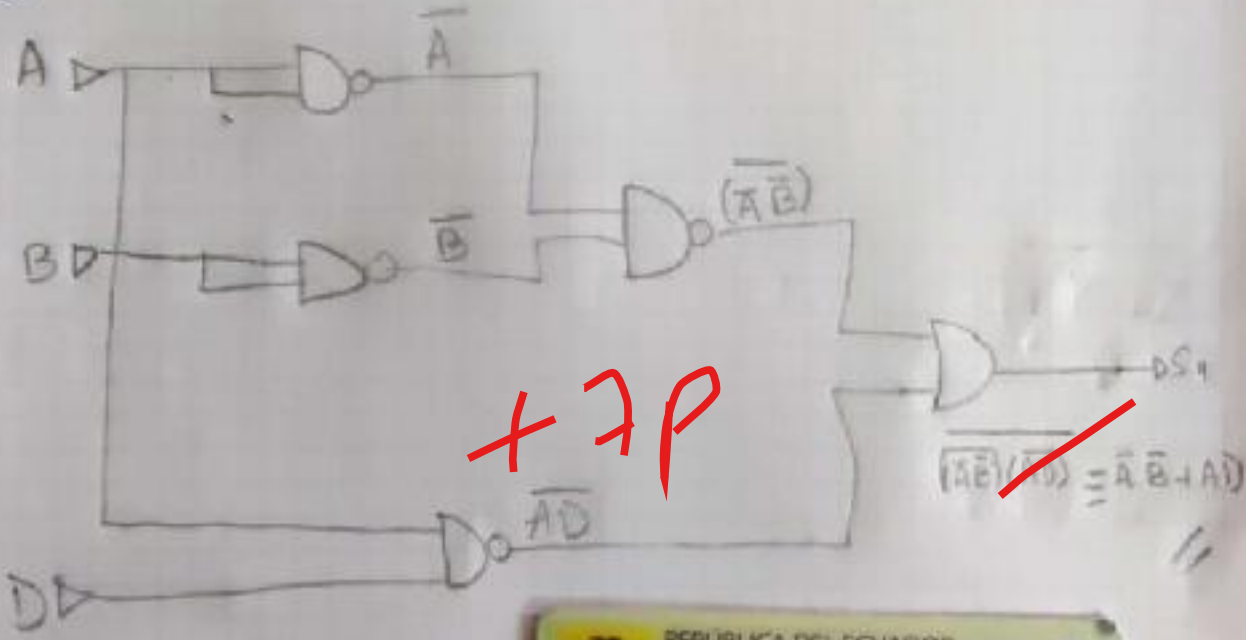
CD \ AB	00	01	11	10
00	1	0	0	0
01	1	0	0	X
11	0	0	0	0
10	0	0	0	0

$S_1 = \bar{A}\bar{B} + AD$ X

$E=1$

CD \ AB	00	01	11	10
00	1	0	0	0
01	X	0	1	X
11	0	0	X	0
10	0	0		

b)



+7p

$\overline{(\bar{A}\bar{B})(\bar{A}D)} = A\bar{B} + \bar{A}\bar{D}$

Tema 3

Héctor Urgilés.

15/15

$S_1 = A \cdot 1 = \bar{A} \cdot 1 + \bar{A} \cdot 0 = \bar{A}$

$S_2 = \bar{C}$

$S_3 = A \cdot \bar{B}$

$S_4 = \bar{A} \cdot B$

$S_5 = D \cdot C$

$S_6 = S_1 \cdot \bar{B} - \bar{A} \cdot \bar{B}$

$S_7 = D \cdot S_2 = D \cdot C$

$S_8 = S_5 \cdot S_7 = \bar{A} \cdot \bar{B} \cdot D \cdot C$

$S_9 = S_7 \cdot S_3 = D \cdot C \cdot A \cdot \bar{B}$

$S_{10} = S_5 \textcircled{1} 0 = S_5 \cdot 0 + S_5 \cdot 1 = S_5 = D \cdot C$

$S_{11} = S_4 \cdot S_{10} = \bar{A} \cdot B \cdot D \cdot C$

$S_{12} = S_8 + S_4 = (\bar{A} \cdot \bar{B} \cdot D \cdot C) + (D \cdot C \cdot A \cdot \bar{B})$

$S_{13} = S_{12} + S_{11} = (\bar{A} \cdot \bar{B} \cdot D \cdot C) + (D \cdot C \cdot A \cdot \bar{B}) + (\bar{A} \cdot B \cdot D \cdot C)$

$S_4 = S_{12} \textcircled{1} 0 = S_{12} \cdot 0 + S_8 \cdot 1 = (\bar{A}\bar{B}DC) + (D \cdot C \cdot A\bar{B}) + (\bar{A}BDC)$

(a) $\therefore F = (\bar{A}\bar{B}DC) + (A\bar{B}CD) + (\bar{A}BCD)$ +1 sp

(b)

CD \ AB	00	01	11	10
00	0	0	0	Ø
01	0	0	0	Ø
11	1	1	0	1
10	Ø	Ø	0	Ø

$\therefore F = A\bar{B} + \bar{A}C$

Examen Primer Parcial

Sistemas digitales

Nombre: Erick Roberto Vega Cobos

Tema 1

A	B	K	R	R_2	R_1	R_0
0	0	0	0	0	0	0
0	0	0	0	1	0	0
0	0	0	1	0	0	0
0	0	0	1	0	0	1
0	0	1	0	0	0	0
0	0	1	0	0	0	1
0	0	1	1	0	0	0
0	0	1	1	0	0	1
0	1	0	0	0	0	0
0	1	0	0	0	0	1
0	1	0	0	0	1	0
0	1	0	0	0	1	1
0	1	0	1	0	0	0
0	1	0	1	0	0	1
0	1	0	1	0	1	0
0	1	0	1	0	1	1
0	1	1	0	0	0	0
0	1	1	0	0	0	1
0	1	1	0	0	1	0
0	1	1	0	0	1	1
0	1	1	1	0	0	0
0	1	1	1	0	0	1
0	1	1	1	0	1	0
0	1	1	1	0	1	1
1	0	0	0	0	0	0
1	0	0	0	0	0	1
1	0	0	0	0	1	0
1	0	0	0	0	1	1
1	0	0	1	0	0	0
1	0	0	1	0	0	1
1	0	0	1	0	1	0
1	0	0	1	0	1	1
1	0	1	0	0	0	0
1	0	1	0	0	0	1
1	0	1	0	0	1	0
1	0	1	0	0	1	1
1	0	1	1	0	0	0
1	0	1	1	0	0	1
1	0	1	1	0	1	0
1	0	1	1	0	1	1
1	1	0	0	0	0	0
1	1	0	0	0	0	1
1	1	0	0	0	1	0
1	1	0	0	0	1	1
1	1	0	1	0	0	0
1	1	0	1	0	0	1
1	1	0	1	0	1	0
1	1	0	1	0	1	1
1	1	1	0	0	0	0
1	1	1	0	0	0	1
1	1	1	0	0	1	0
1	1	1	0	0	1	1
1	1	1	1	0	0	0
1	1	1	1	0	0	1
1	1	1	1	0	1	0
1	1	1	1	0	1	1

b) Desarrollo Problema

$R_2 = A\bar{B}K\bar{R}_2\bar{R}_1\bar{R}_0 + A\bar{B}K\bar{R}_2\bar{R}_1R_0 + A\bar{B}K\bar{R}_2R_1\bar{R}_0$
$+ A\bar{B}KR_2R_1R_0$

$R_1 = \bar{A}\bar{B}K\bar{R}_2\bar{R}_1R_0 + \bar{A}\bar{B}KR_2\bar{R}_1\bar{R}_0 + A\bar{B}\bar{K}\bar{R}_2\bar{R}_1R_0$
$+ A\bar{B}\bar{K}R_2\bar{R}_1\bar{R}_0 + A\bar{B}KR_2\bar{R}_1R_0$

$R_0 = A\bar{B}\bar{K}\bar{R}_2\bar{R}_1\bar{R}_0 + A\bar{B}KR_2\bar{R}_1\bar{R}_0$

$A = B = \phi$

Tema 2

A	B	C	D	E	S_1	S_0
0	0	0	0	0	1	0
0	0	0	0	1	X	0
0	0	0	1	0	1	0
0	0	0	1	1	X	0
0	0	1	0	0	0	0
0	0	1	0	1	0	0
0	0	1	1	0	0	0
0	0	1	1	1	0	0
0	1	0	0	0	0	0
0	1	0	0	1	X	X
0	1	0	1	0	0	0
0	1	0	1	1	X	X
0	1	1	0	0	0	0
0	1	1	0	1	1	1
0	1	1	1	0	0	0
0	1	1	1	1	X	X
1	0	0	0	0	1	0
1	0	0	0	1	1	0
1	0	0	1	0	X	0
1	0	0	1	1	X	0
1	0	1	0	0	0	X
1	0	1	0	1	0	1
1	0	1	1	0	0	X
1	0	1	1	1	0	1
1	1	0	0	0	0	0
1	1	0	0	1	1	0
1	1	0	1	0	0	0
1	1	0	1	1	1	0
1	1	1	0	0	0	0
1	1	1	0	1	1	0
1	1	1	1	0	0	1
1	1	1	1	1	X	0

$S_1 = \bar{B}\bar{C} + B\bar{E}$ //

+5p

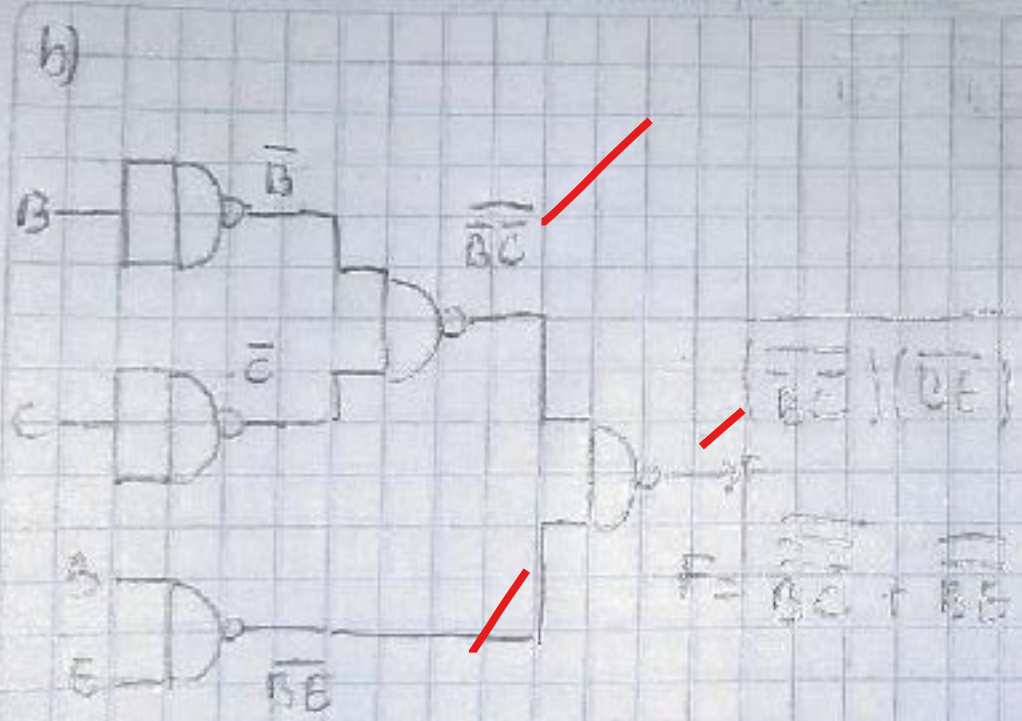
+4p

+6p

DÍA MES AÑO

"El deseo de estudio aumenta a medida que se escribe"

b)



$F = \overline{B\bar{C}} \cdot \overline{AE} = B\bar{C} + AE$ //

+10p

Nombre: Fecha: Año:

Nota

Tema 3

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

$\bar{A}\bar{B}DC + DC\bar{B}\bar{A} + \bar{A}BDC$

$F = \bar{A}\bar{B}DC + DC\bar{B}A + \bar{A}BDC$ //

CD \ AB	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	1	1	0	1
10	0	0	0	0

$F = \bar{B}CD + \bar{B}C\bar{D}$

25/25

+1 sp

+1 sp

Tema 1

25/20

A	B	x_2	x_1	x_0	R_2	R_1	R_0
0	0				x	x	x
1	1				x	x	x

Combinaciones estados imposible

0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	1
0	1	0	1	0	0	1	0
0	1	0	1	1	0	1	1
0	1	1	0	0	0	0	0
0	1	1	0	1	0	0	0
0	1	1	1	0	0	0	0
0	1	1	1	1	0	0	0
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0
1	0	0	1	0	0	0	0
1	0	0	1	1	0	0	0
1	0	1	0	0	1	0	0
1	0	1	0	1	1	0	1
1	0	1	1	0	1	1	0
1	0	1	1	1	1	1	1

Tema 1

X_2X_3 \ ABx_1	000	001	011	010	110	111	101	100
00	x	x	0	0	x	x	1	0
01	x	x	0	0	x	x	1	0
11	x	x	0	0	x	x	1	0
10	x	x	0	0	x	x	1	0

R_1

$R_2 = A\bar{B}\bar{x}_1$

Pregunta 2

Salida S1

DE \ ABC	000	001	011	010	110	111	101	100
00	1	0	0	0	0	0	0	1
01	x	0	1	x	1	1	0	1
11	x	0	x	x	1	x	0	x
10	1	0	0	0	0	0	0	x

Grupo de 8

7/15

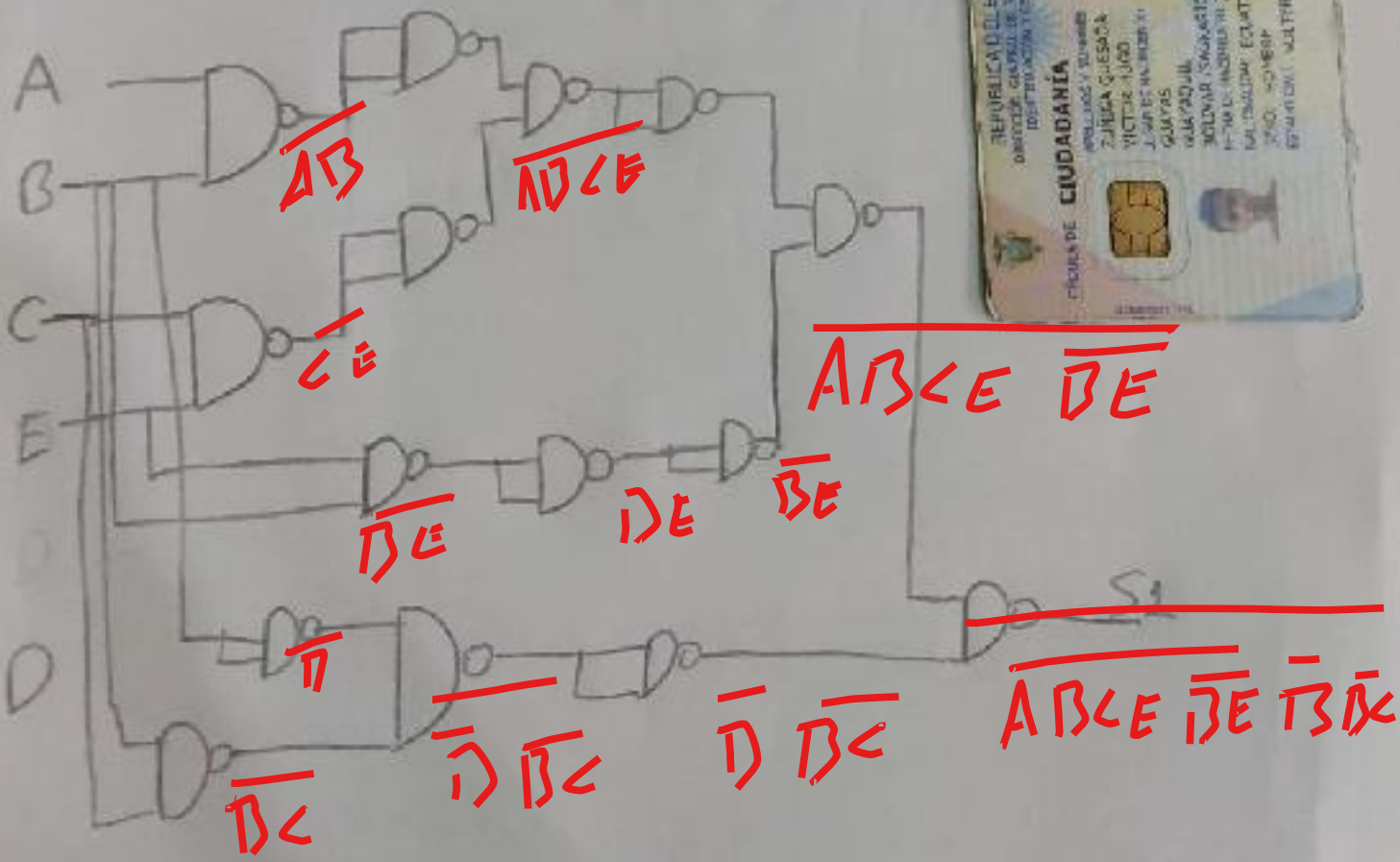
+3p

+4p

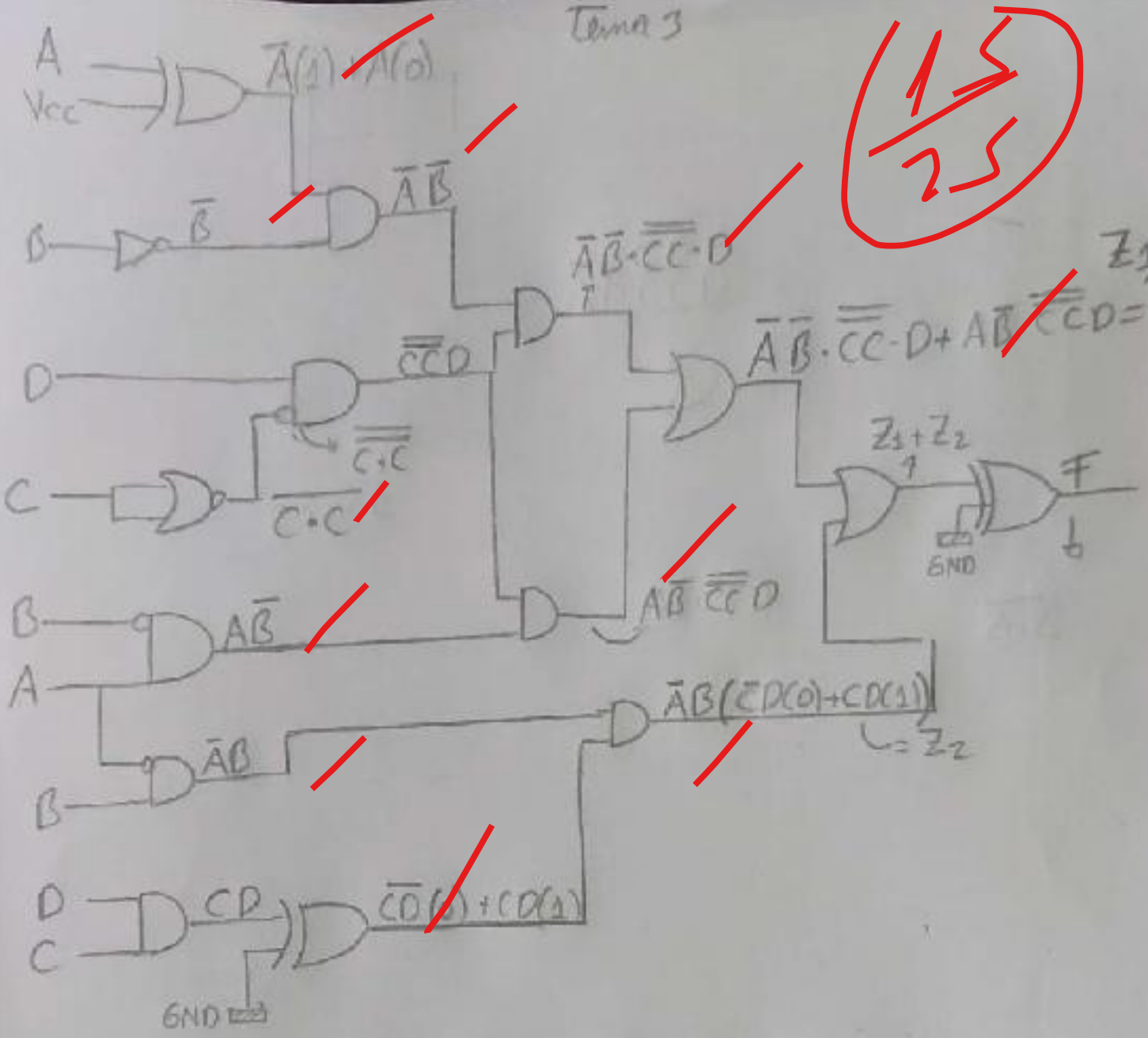
Si $\phi = 1$

$S_1 = \overline{ABCE} + BE + A\overline{BCD}$

$S_1 = \overline{\overline{ABCE} \cdot BE \cdot A\overline{BCD}}$ X



Tema 3



$F = \overline{Z_1+Z_2}\,(0) + (Z_1+Z_1)(1) = Z_1+Z_2$

$F = \bar{A}\bar{B}\cdot\overline{\overline{C}C}\,D + A\bar{B}\,\overline{\overline{C}C}\,D + \bar{A}B(\bar{C}D(0)+CD(1))$

$F = \bar{A}\bar{B}\cdot\overline{\overline{C}C}\,D + A\bar{B}\,\overline{\overline{C}C}\,D + \bar{A}BCD$

+15 p