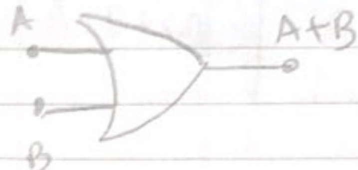
1) a)

Porta lógica: "Ou" "OR"

A	B	$X = A + B$
0	0	0
0	1	1
1	0	1
1	1	1

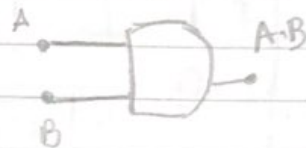
$X = A + B$



Porta lógica "E" "AND"

A	B	$X = A \cdot B$
0	0	0
0	1	0
1	0	0
1	1	1

$X = A \cdot B$



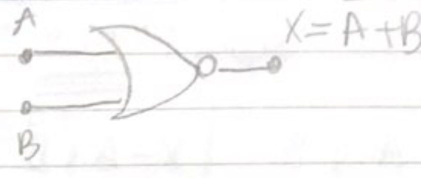
Porta lógica inversora "Não" "Not"

A	$X = \bar{A}$
0	1
1	0

$X = \overline{A}$

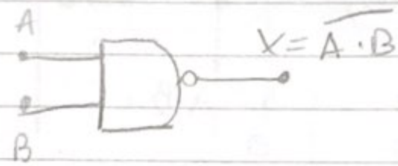
2) Porta "NOR"

A	B	$X = \overline{A+B}$
0	0	1
0	1	0
1	0	0
1	1	0



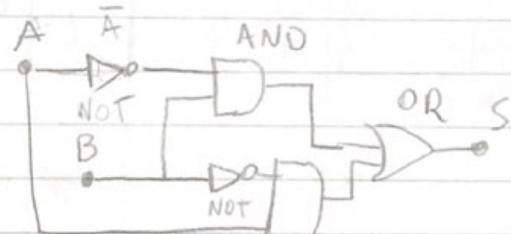
Porta "NAND"

A	B	$X = \overline{A \cdot B}$
0	0	1
0	1	1
1	0	1
1	1	0



3) a) $(\bar{A} \cdot B) + A\bar{B}$

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

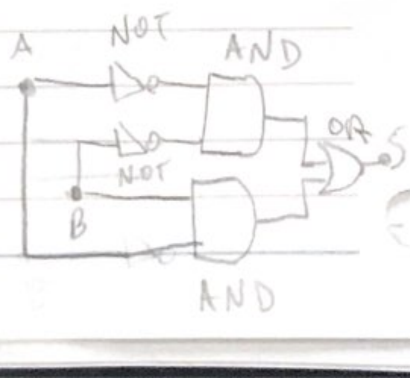


A	B	$\bar{A}$	$\bar{B}$	$\bar{A}B$	$A \cdot \bar{B}$	$\bar{A}B + A\bar{B}$	S	AND
0	0	1	1	0	0	0	0	
0	1	1	0	1	0	1	1	
1	0	0	1	0	1	1	1	
1	1	0	0	0	0	0	0	

b)

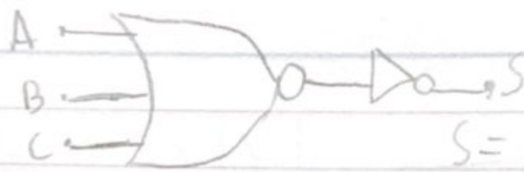
A	B	S
0	0	1
0	1	0
1	0	0
1	1	1

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



4)

a)

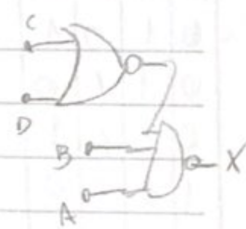


$S = \overline{\overline{A+B+C}}$

A	B	C	$A+B+C$	$\overline{A+B+C}$	$\overline{\overline{A+B+C}}$	S
0	0	0	0	1	0	0
0	0	1	1	0	1	1
0	1	0	1	0	1	1
0	1	1	1	0	1	1
1	0	0	1	0	1	1
1	0	1	1	0	1	1
1	1	0	1	0	1	1
1	1	1	1	0	1	1

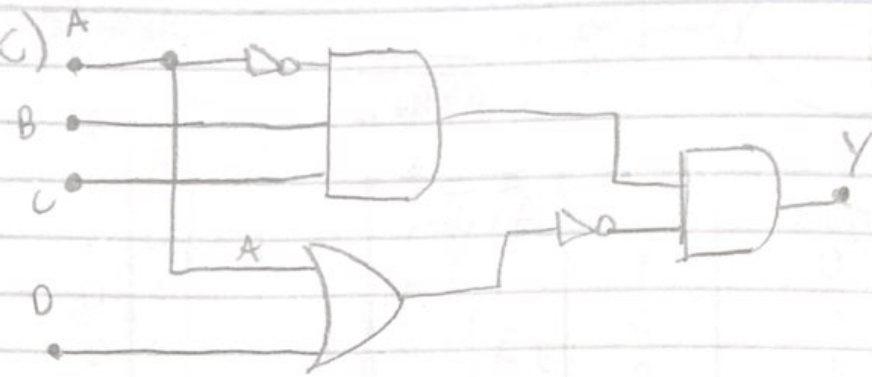
b)

A	B	C	D	AB	$C+D$	$\overline{C+D}$	$AB\cdot(\overline{C+D})$	S
0	0	0	0	0	0	1	0	1
0	0	0	1	0	1	0	0	1
0	0	1	0	0	1	0	0	1
0	0	1	1	0	1	0	0	1
0	1	0	0	0	0	1	0	1
0	1	0	1	0	1	0	0	1
0	1	1	0	0	1	0	0	1
0	1	1	1	0	1	0	0	1
1	0	0	0	0	0	1	0	1
1	0	0	1	0	1	0	0	1
1	0	1	0	0	1	0	0	1
1	0	1	1	0	1	0	0	1
1	1	0	0	1	0	1	1	0
1	1	0	1	1	1	0	0	1
1	1	1	0	1	1	0	0	1
1	1	1	1	1	1	0	0	1



$X = AB\cdot(\overline{C+D})$

c)



A	B	C	D	$A+D$	$\overline{A+D}$	$\bar{A}$	BC	$\bar{A}BC$	$(\bar{A}BC)\cdot\overline{A+D}$
0	0	0	0	0	1	1	0	0	0
0	0	0	1	1	0	1	0	0	0
0	0	1	0	0	1	1	0	0	0
0	0	1	1	1	0	1	0	0	0
0	1	0	0	0	1	1	0	0	0
0	1	0	1	1	0	1	0	0	0
0	1	1	0	0	1	1	1	1	1
0	1	1	1	1	0	1	1	1	0
1	0	0	0	1	0	0	0	0	0
1	0	0	1	1	0	0	0	0	0
1	0	1	0	1	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0
1	1	0	0	1	0	0	0	0	0
1	1	0	1	1	0	0	0	0	0
1	1	1	0	1	0	0	1	0	0
1	1	1	1	1	0	0	1	0	0

$Y = (\bar{A}BC)\cdot\overline{A+D}$

5) a)

A	B	C	S	Y	S	Y
0	0	0	1	1	$\bar{A}\bar{B}\bar{C}$	
0	0	1	0	1		$\bar{A}\bar{B}C$
0	1	0	0	0		
0	1	1	1	0	$\bar{A}BC$	
1	0	0	1	1	$A\bar{B}\bar{C}$	$A\bar{B}\bar{C}$
1	0	1	0	1		$A\bar{B}C$
1	1	0	1	1	$AB\bar{C}$	$AB\bar{C}$
1	1	1	0	0		

$$S = \bar{A}\bar{B}\bar{C} + \bar{A}BC + A\bar{B}\bar{C} + AB\bar{C}$$
$$Y = \bar{A}\bar{B}C + A\bar{B}\bar{C} + A\bar{B}C + AB\bar{C}$$

b)

A	B	C	D	S	Y	
0	0	0	0	1		$\bar{A}\bar{B}\bar{C}\bar{D}$
0	0	0	1	0		
0	0	1	0	0		
0	0	1	1	1		$\bar{A}\bar{B}CD$
0	1	0	0	1		
0	1	0	1	0		
0	1	1	0	1		$\bar{A}BC\bar{D}$
0	1	1	1	0		
1	0	0	0	1		$A\bar{B}\bar{C}\bar{D}$
1	0	0	1	1		$A.\bar{B}\bar{C}D$
1	0	1	0	0		
1	0	1	1	0		
1	1	0	0	1		$AB\bar{C}\bar{D}$
1	1	0	1	1		
1	1	1	0	1		$ABC\bar{D}$
1	1	1	1	0		

$$S = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}CD + \bar{A}BC\bar{D} + A\bar{B}\bar{C}\bar{D} + A\bar{B}\bar{C}D + AB\bar{C}\bar{D} + ABC\bar{D}$$

7)

a)

A	B	$\bar{A}$	$\bar{B}$	$\bar{A}\cdot\bar{B}$	AB	$\overline{AB}$
0	0	1	1	1	0	1
0	1	1	0	0	0	1
1	0	0	1	0	0	1
1	1	0	0	0	1	0

b)

A	B	$\bar{A}$	$\bar{B}$	A+B	$\overline{A+B}$	$\bar{A}+\bar{B}$
0	0	1	1	0	1	1
0	1	1	0	1	0	1
1	0	0	1	1	0	1
1	1	0	0	1	0	0

c)

A	B	$\bar{A}$	$\bar{B}$	$\bar{A}\bar{B}$	$\overline{A+B}$
0	0	1	1	1	1
0	1	1	0	0	0
1	0	0	1	0	0
1	1	0	0	0	0

d)

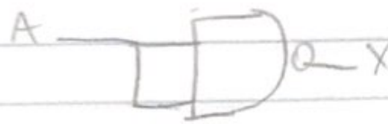
A	B	$\bar{A}$	$\bar{B}$	$\bar{A}+\bar{B}$	$\overline{A\cdot B}$
0	0	1	1	1	1
0	1	1	0	1	1
1	0	0	1	1	1
1	1	0	0	0	0

8) Teorema que prova que:

1) $\overline{A\cdot B} = \bar{A} + \bar{B}$

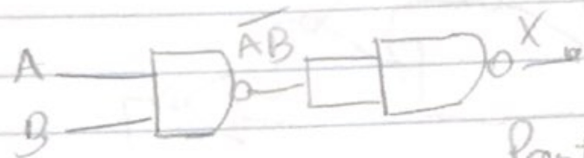
2) $\bar{A} + \bar{B} = \overline{AB}$.

9) a)



$= \overline{A}$ Porta Not

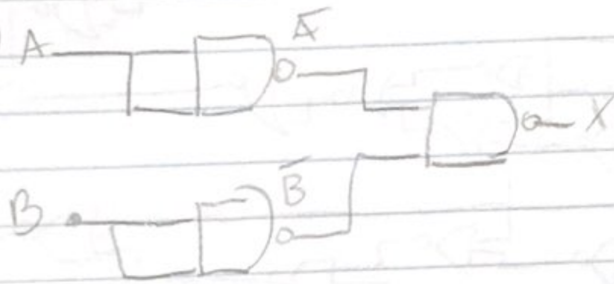
b)



$X = AB$

Porta AND

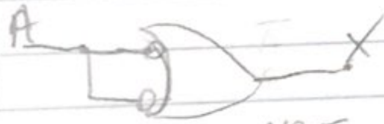
c)



$X = A \cdot B$

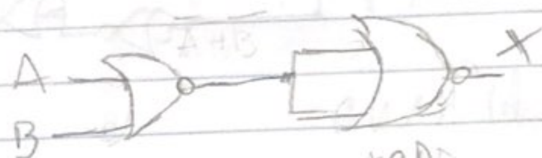
Porta OR.

10) a)



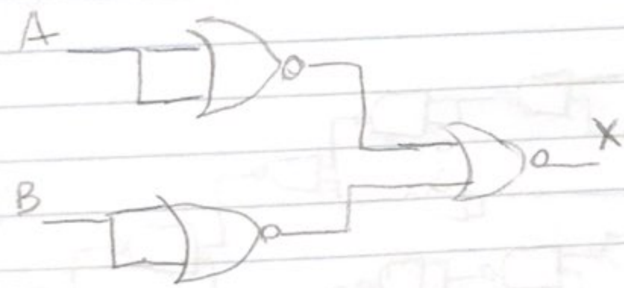
NOT

b)



NOR

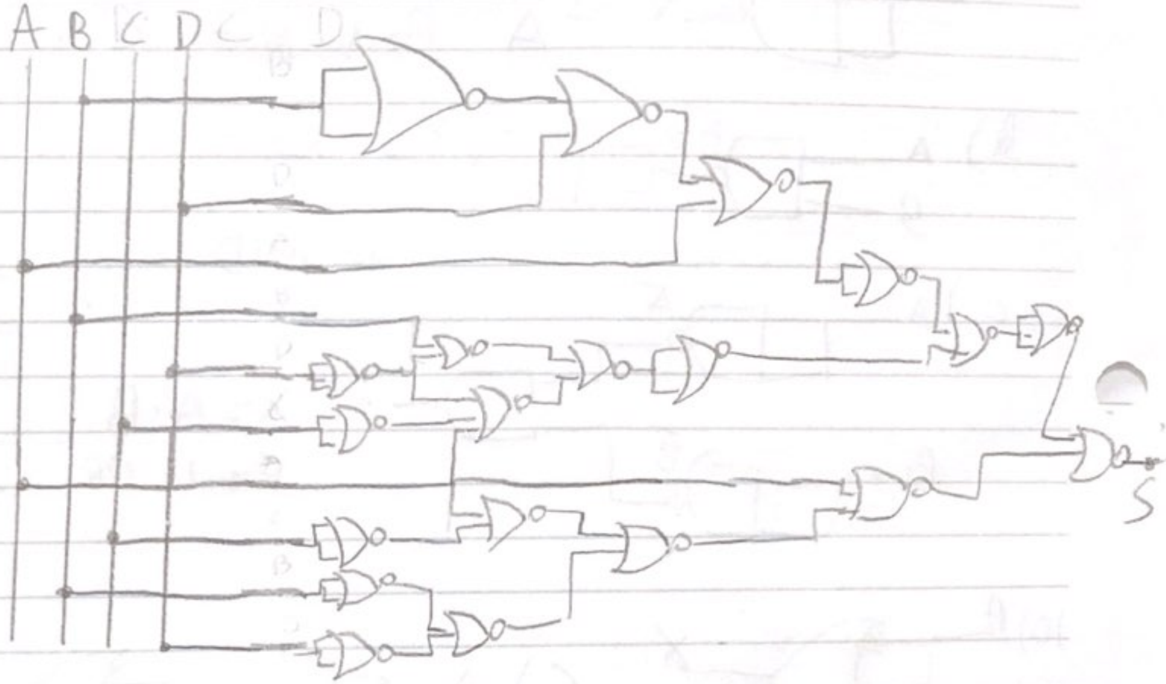
b)



AND

11)

a) NOR



b) NAND