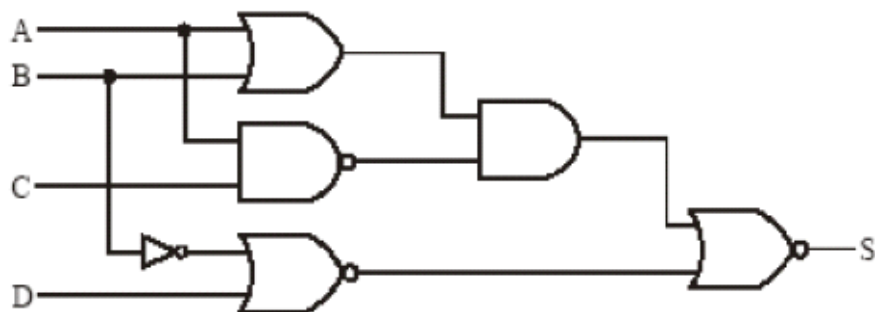


Nome MATHEUS MIKSZA

### Exercícios sobre Portas Lógicas

1) Determine as expressões das funções lógicas dos circuitos abaixo:

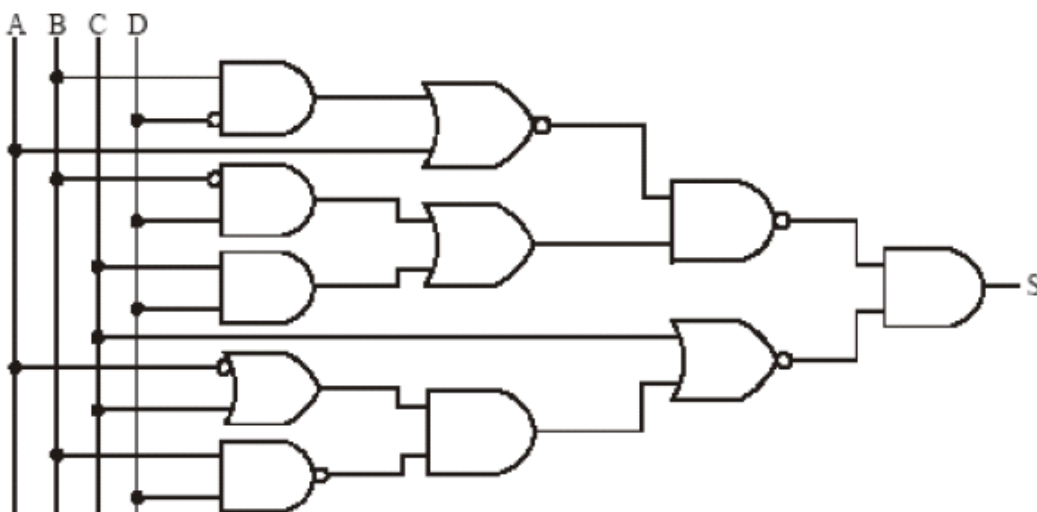
a)



a)

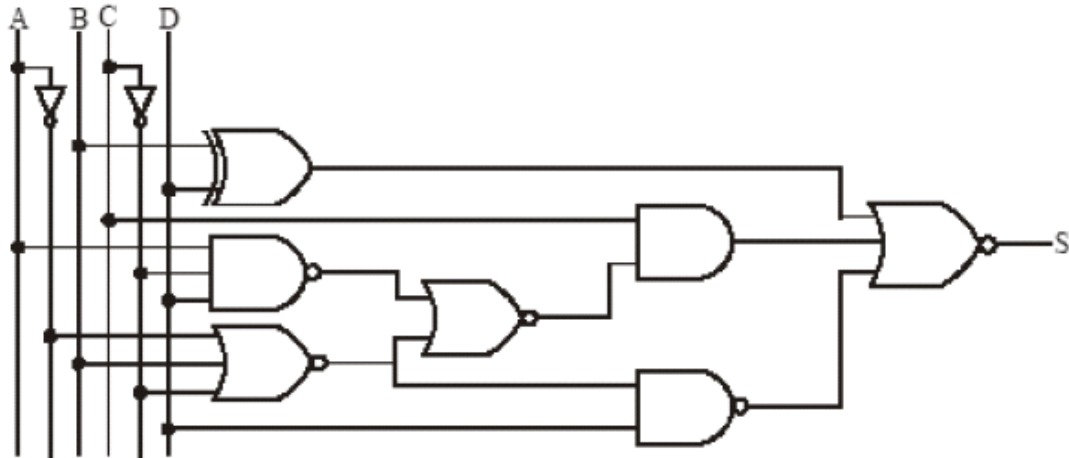
$$(A+B) \cdot (\overline{A} \cdot C) \cdot (\overline{B} + D)$$

b)



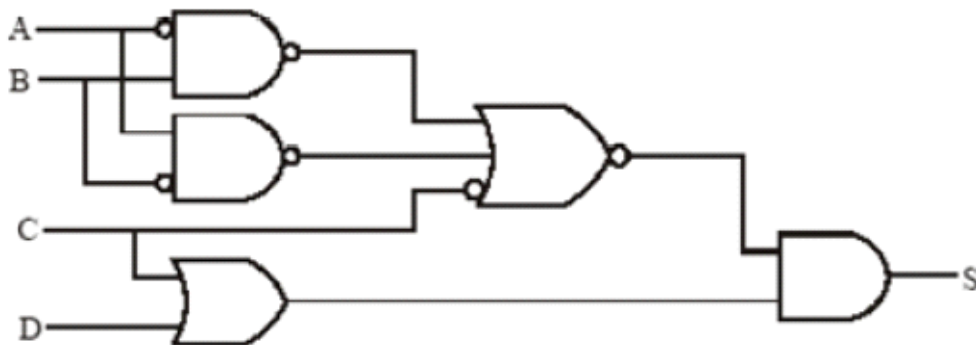
$$b) \overline{(B\bar{D}+A)(\bar{B}D+CD)} \overline{((\bar{A}+C)(\bar{B}D)+C)}$$

c)



$$c) (B \oplus D) + ((\overline{A \cdot \bar{C} \cdot D} + \overline{\bar{A} + B + \bar{C}}) \cdot C) + (\overline{\bar{A} + B + \bar{C}}) \cdot D$$

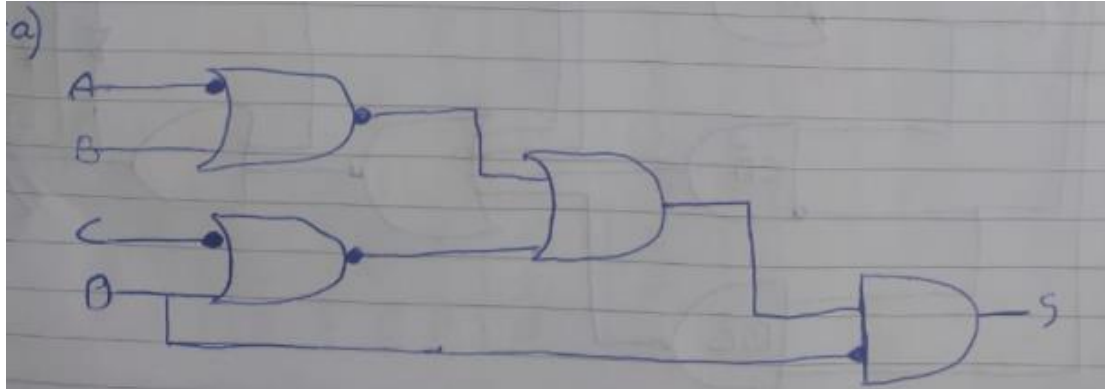
d)



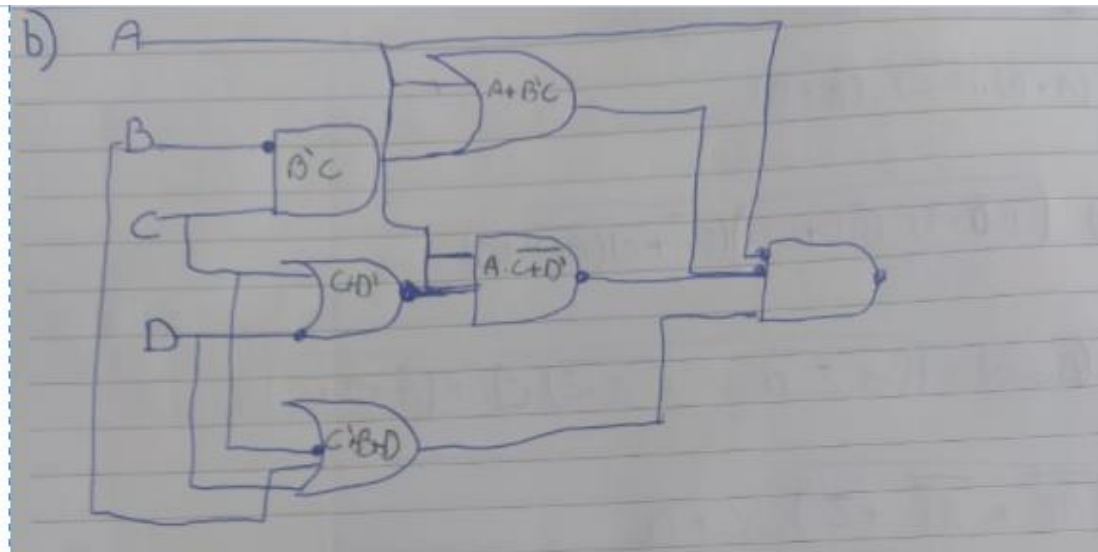
$$d) \overline{(\bar{A}\bar{B} + \bar{A}\bar{B} + \bar{C})} \cdot C + D$$

2) Desenhe o circuito que executa as seguintes expressões:

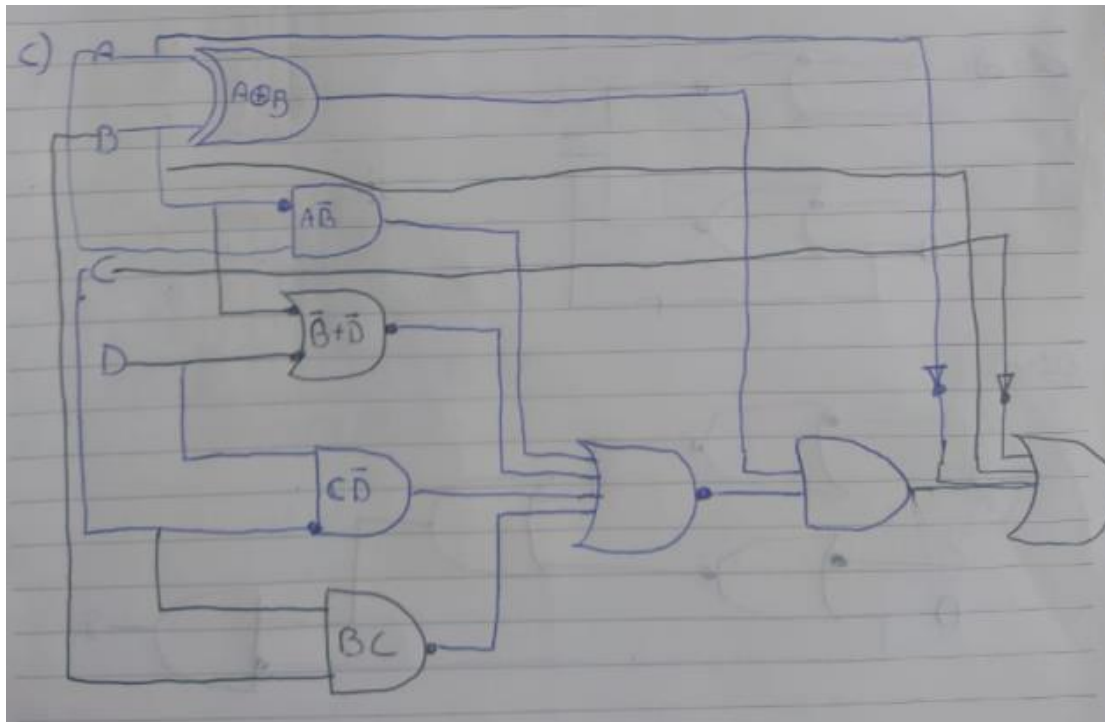
a)  $[(\bar{A} + B) + (\bar{C} + D)]\bar{D}$



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



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



3) Faça a tabela verdade das seguintes expressões:

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

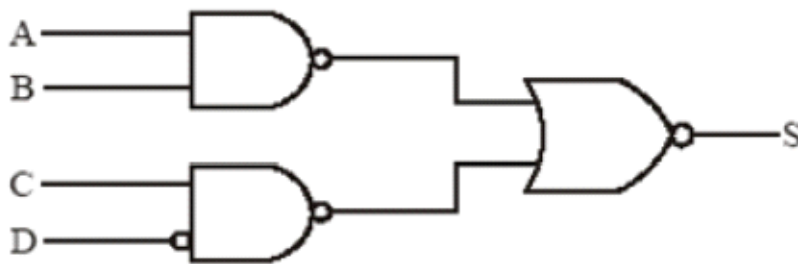
03) a)

A	B	C	$\bar{A}$	$\bar{B}$	$\bar{C}$	$A\bar{B}$	$\bar{A} + C$	$B\bar{A} + C$	$B\bar{A} + C + A\bar{B}$	$\bar{C} [B\bar{A} + C + A\bar{B}]$
0	0	0	1	1	1	0	1	0	0	0
0	0	1	1	1	0	0	1	0	0	0
0	1	0	1	0	1	0	1	1	1	1
0	1	1	1	0	0	0	1	1	1	0
1	0	0	0	1	1	1	0	0	1	1
1	0	1	0	1	0	1	1	0	1	0
1	1	0	0	0	1	0	0	0	0	0
1	1	1	0	0	0	0	1	1	1	0

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

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

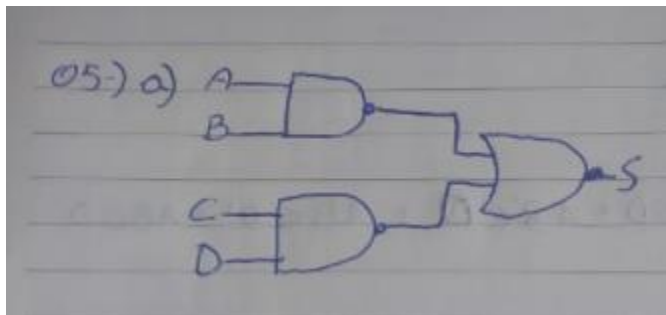
4) Escreva a expressão característica do circuito abaixo e faça a respectiva tabela verdade:



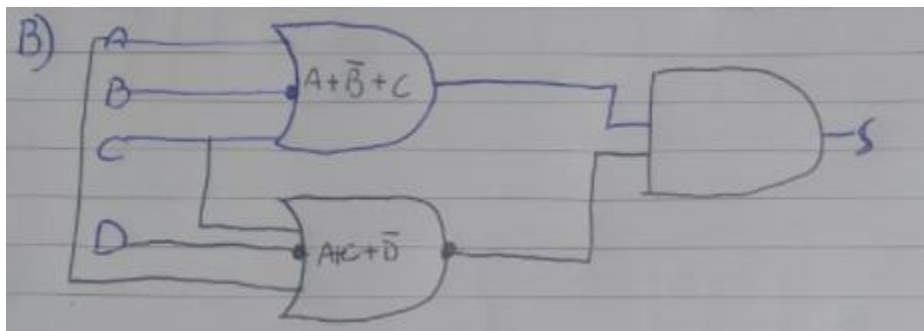
$$\overline{AB} + \overline{CD}$$

5) Esboce os circuitos obtidos a partir das seguintes expressões:

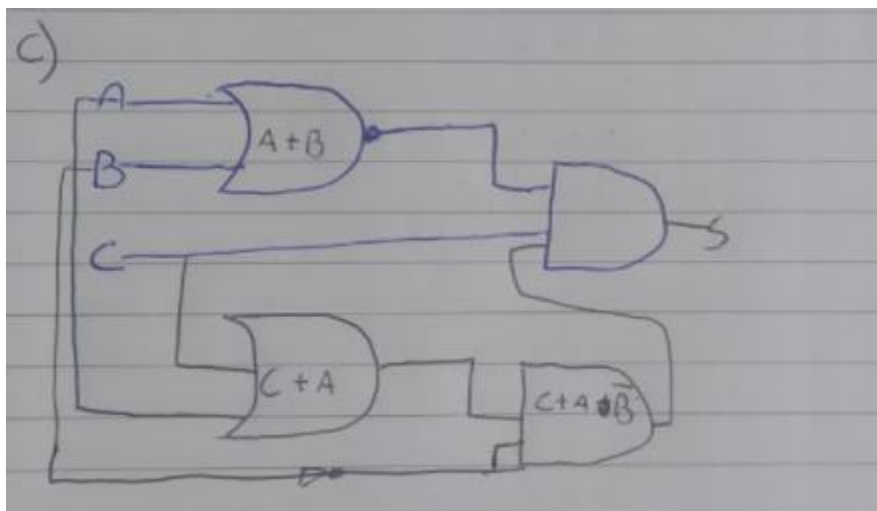
a)  $(\overline{AB} + \overline{CD})$



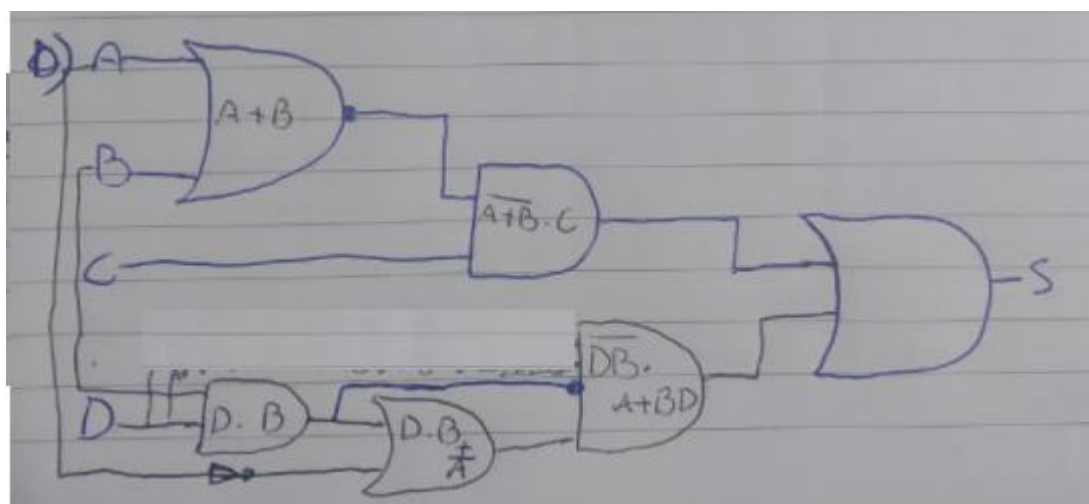
b)  $(A + \bar{B} + C)(\overline{A + C + \bar{D}})$



c)  $(\overline{A + B})C(A + C)\bar{B}$



d)  $((\overline{A+B})C) + (\overline{BD}(\overline{A} + (BD)))$



6) Determine a expressão booleana a partir das seguintes tabelas:

a)

A	B	C	S
0	0	0	1

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

$$A'B'C' + A'BC + AB'C' + ABC$$

b)

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

$$A'B'C'D + A'B'CD' + A'BCD + AB'C'D + ABC'D' + ABCD$$

c)

P (porta)	M (motor)	F (Farol)	C (cinto)	S (alarme)
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
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		1
1	1	0	0		1
1	1	0	1		1
1	1	1	0		1
1	1	1	1		1

$P'M'FC' + P'M'FC + P'MF'C' + P'MFC' + PM'FC' + PM'FC + PMF'C' + PMF'C + PMFC$

#### Alarme:

- Motor desligado e Farol ligado
- Motor ligado e Porta aberta
- Motor ligado e Sem Cinto de Segurança

#### Legenda:

- Porta: 0 fechada    1 aberta
- Motor:            0 desligado    1 ligado
- Farol:            0 desligado    1 ligado
- Cinto:            0 sem cinto    1 com cinto

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

$AB + BC + BD'$