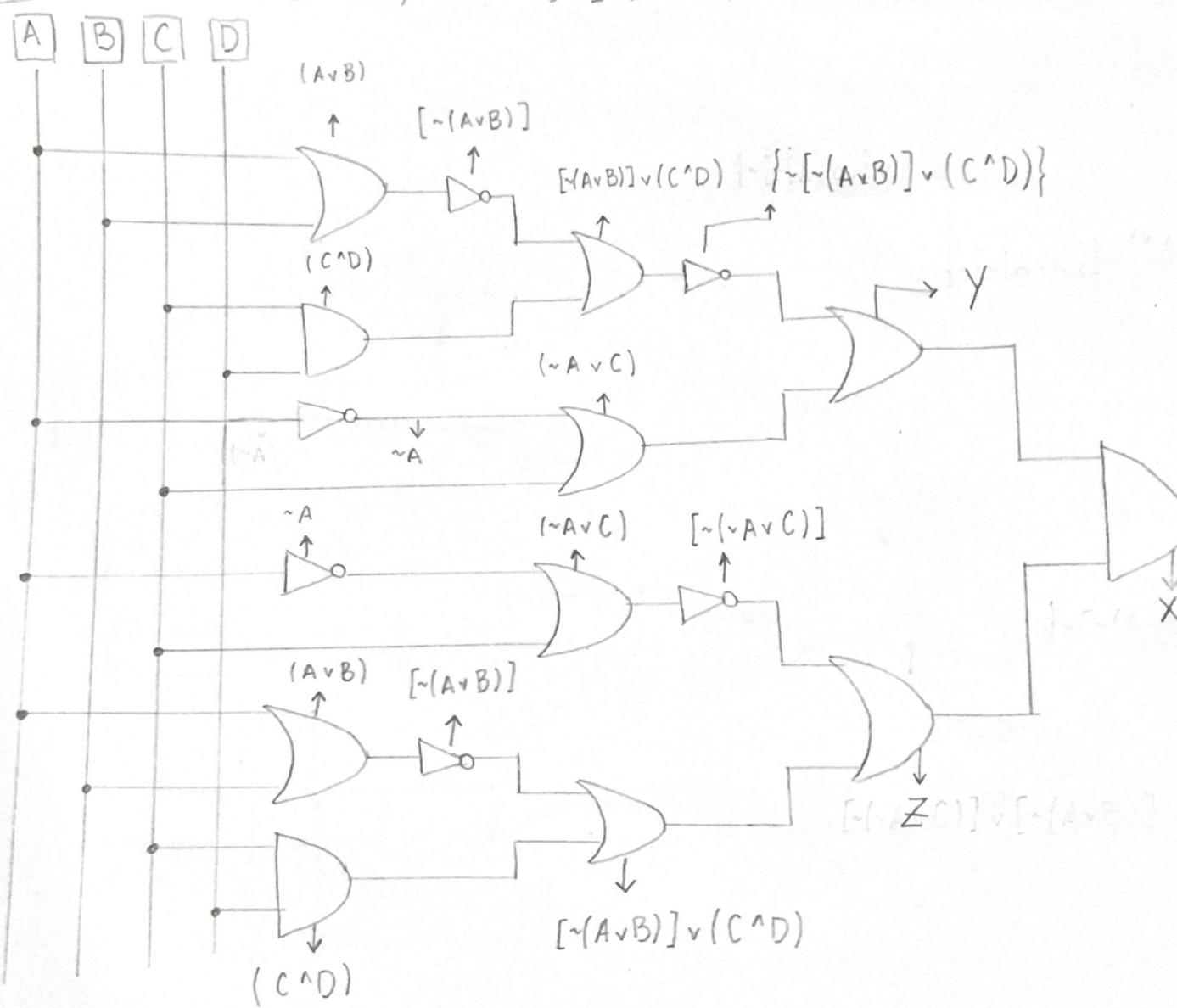


(L.1) circuito:  $[(A \vee B) \leftrightarrow (C \wedge D)] \leftrightarrow (A \rightarrow C)$



LEGENDA:

$$Z = \{ \sim [~(A \vee B)] \vee (C \wedge D) \} \vee \{ \sim A \vee C \} \wedge [~(A \wedge C)] \vee [~(A \vee B)] \vee (C \wedge D)$$

$$Y = \{ \sim [~(A \vee B)] \vee (C \wedge D) \} \vee \{ \sim A \vee C \} \wedge [~(A \wedge C)] \vee [~(A \vee B)]$$

$$X = \{ \sim [~(A \vee B)] \vee (C \wedge D) \} \vee \{ \sim A \vee C \} \wedge [~(A \wedge C)]$$

$$W = \{ \sim [~(A \vee B)] \vee (C \wedge D) \} \vee (\sim A \vee C)$$

(2.1) tabela-verdade:  $[(A \vee B) \rightarrow (C \wedge D)] \leftrightarrow (A \rightarrow C)$   
 $\{\sim[\sim(A \vee B)] \vee (C \wedge D)\} \vee (A \rightarrow C) \wedge [\sim[\sim A \vee C]] \vee [\sim(A \vee B)] \vee (C \wedge D)$

	A	B	C	D	$\sim A$	$(A \vee B)$	$(C \wedge D)$	$(\sim A \vee C)$	$[\sim(A \vee B)]$	$[\sim(\sim A \vee C)]$	$[\sim(A \vee B)] \vee (C \wedge D)$	$\{\sim[\sim(A \vee B)] \vee (C \wedge D)\}$	W	X	Y	Z
1	V	V	V	V	F	V	V	F	F	V	V	F	V	F	F	V
2	V	V	V	F	F	V	F	V	F	F	F	V	V	F	F	F
3	V	V	F	V	F	V	F	F	V	F	V	V	V	V	V	V
4	V	V	F	V	F	V	F	F	V	F	V	V	V	V	V	V
5	V	V	F	F	F	V	F	F	F	V	F	V	V	F	F	V
6	V	V	V	F	V	V	V	F	F	F	V	V	V	F	F	V
7	V	V	F	F	V	V	F	V	F	F	V	V	V	F	F	F
8	V	F	V	F	V	F	F	V	V	F	V	V	V	V	V	V
9	V	F	F	F	V	F	F	V	F	V	V	V	V	V	V	V
10	F	V	V	V	V	V	V	F	F	V	F	V	F	F	V	V
11	F	V	V	V	V	F	V	F	F	F	V	V	F	F	F	F
12	F	V	F	V	V	V	F	F	F	F	V	V	F	F	F	F
13	F	V	F	F	V	F	V	F	F	F	V	V	F	F	F	F
14	F	F	V	V	F	V	V	V	F	V	F	V	V	F	V	V
15	F	F	V	F	F	V	V	V	F	V	F	F	F	V	V	V
16	F	F	F	V	F	F	V	V	F	V	V	F	F	V	V	V

LEGENDA:

$$W = \{\sim[\sim(A \vee B)] \vee (C \wedge D)\} \vee (A \rightarrow C)$$

$$X = \{\sim[\sim(A \vee B)] \vee (C \wedge D)\} \vee (\sim A \vee C) \wedge [\sim(\sim A \vee C)]$$

$$Y = \{\sim[\sim(A \vee B)] \vee (C \wedge D)\} \vee (\sim A \vee C) \wedge [\sim(\sim A \vee C)] \vee [\sim(A \vee B)]$$

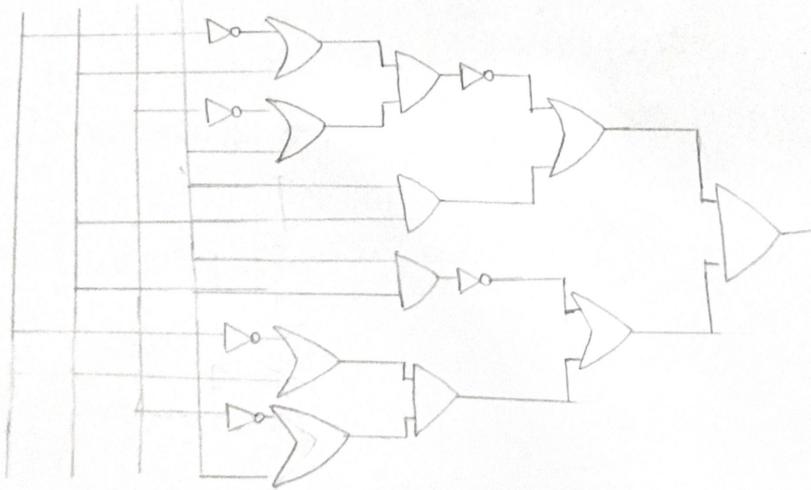
$$Z = \{\sim[\sim(A \vee B)] \vee (C \wedge D)\} \vee (\sim A \vee C) \wedge [\sim(\sim A \vee C)] \vee [\sim(A \vee B)] \vee (C \wedge D)$$

2.2  $\underbrace{[(A \rightarrow B) \wedge (C \rightarrow D)]}_{A} \leftarrow \rightarrow \underbrace{(D \wedge B)}_{B}$  (circuito)

$$[(A \rightarrow B) \wedge (C \rightarrow D)] \xrightarrow{A \rightarrow B \wedge B \rightarrow A} [D \wedge B] \wedge [D \wedge B] \rightarrow [(A \rightarrow B) \wedge (C \rightarrow D)],$$

$$\{[\neg A \vee B] \wedge [\neg C \vee D]\} \vee (D \wedge B) \wedge [(\neg D \wedge B) \vee (\neg A \vee B) \wedge (\neg C \vee D)],$$

A B C D



2.2

$$[(A \rightarrow B) \wedge (C \rightarrow D)] \leftrightarrow (D \wedge B)$$

(tabela - verdade)

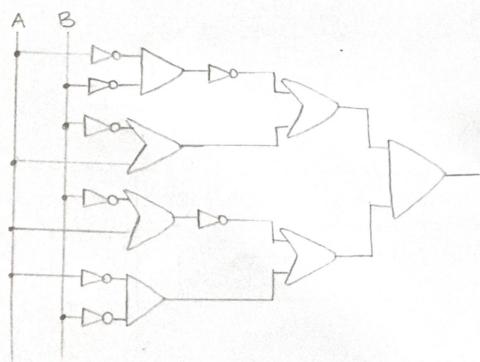
	A	B	C	D	$(D \wedge B)$	$(A \rightarrow B)$	$(C \rightarrow D)$	$[(A \rightarrow B) \wedge (C \rightarrow D)]$	$[(A \rightarrow B) \wedge (C \rightarrow D)] \leftrightarrow (D \wedge B)$
1	V	V	V	V	V	V	V	V	V
2	V	V	V	F	F	V	F	F	V
3	V	V	F	V	V	V	V	V	V
4	V	V	F	F	F	Y	V	V	F
5	V	F	Y	Y	F	F	V	F	Y
6	V	F	Y	F	F	F	F	F	V
7	V	F	F	V	F	F	V	F	V
8	V	F	F	F	F	F	V	F	V
9	F	V	V	V	V	V	V	V	V
10	F	V	V	F	F	V	F	F	V
11	F	V	F	V	V	V	V	V	V
12	F	V	F	F	F	V	V	V	F
13	F	F	V	V	F	V	V	V	F
14	F	F	V	F	F	V	F	F	V
15	F	F	F	V	F	V	V	V	F
16	F	F	F	F	F	V	V	V	F

Questaõ 2.3 (circuitos)

$$(\neg A \wedge \neg B) \leftrightarrow (\neg B \vee A)$$

$$(\neg A \wedge \neg B) \rightarrow (\neg B \vee A) \wedge (\neg B \vee A) \rightarrow (\neg A \wedge \neg B)$$

$$[(\neg A \wedge \neg B) \vee (\neg B \vee A)] \wedge [\neg(\neg B \vee A)] \vee (\neg A \wedge \neg B)$$



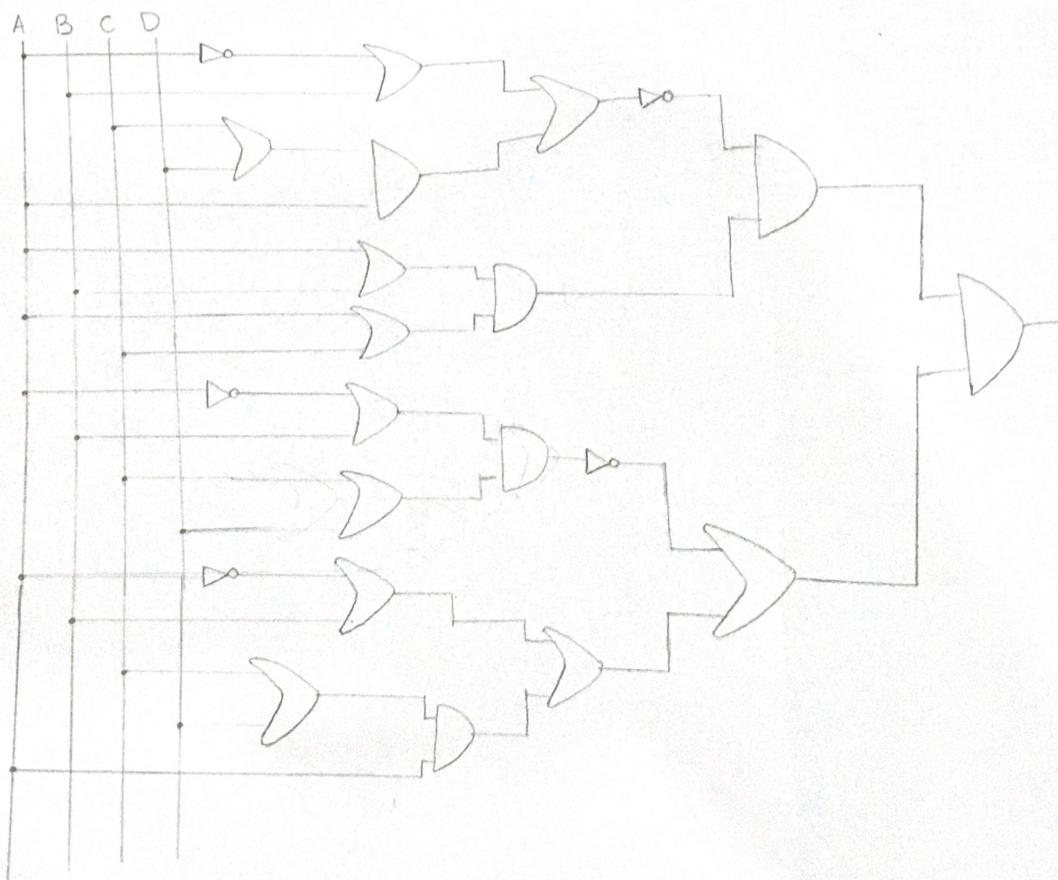
(tabela - verdade)

A	B	$\neg A$	$\neg B$	$(\neg A \wedge \neg B)$	$(\neg B \vee A)$	$(\neg A \wedge \neg B) \leftrightarrow (\neg B \vee A)$
V	V	F	F	F	V	F
V	F	F	V	F	V	F
F	V	V	F	F	F	V
F	F	V	V	V	V	V

O resultado é verdadeiro

$(A \rightarrow B) \wedge (B \rightarrow A)$

$$\begin{aligned}
 & 2.4 \text{ (circuit)} \\
 & (A \rightarrow B) \vee [(C \vee D) \wedge A] \leftrightarrow (A \vee B) \wedge (C \vee D) \\
 & (A \rightarrow B) \vee [(C \vee D) \wedge A] \rightarrow (A \vee B) \wedge (C \vee D) \quad \wedge (A \vee B) \wedge (C \vee D) \rightarrow (A \rightarrow B) \vee [(C \vee D) \wedge A] \\
 & (\neg A \vee B) \vee \{\neg[(C \vee D) \wedge A]\} \vee (A \vee B) \wedge (C \vee D) \wedge (A \vee B) \wedge [(\neg C \wedge D)] \vee (\neg A \vee B) \vee [(C \vee D) \wedge A]
 \end{aligned}$$



questão 2.4 (tabela - verdade)

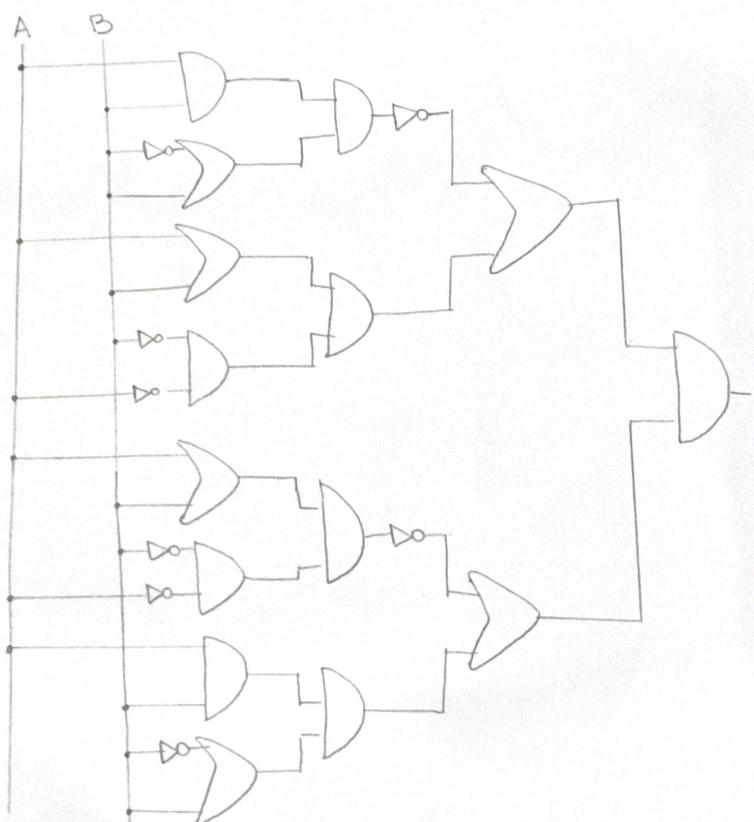
A	B	C	D	$(A \vee B)$	$(C \vee D)$	$(A \rightarrow B)$	$(A \rightarrow B) \vee (C \vee D)$	$(A \rightarrow B) \vee [(C \vee D) \wedge A]$	$(A \rightarrow B) \vee [(C \vee D) \wedge A] \leftrightarrow (A \vee B)$	X
V	V	V	V	V	V	V	V	V	V	V
V	V	V	F	V	V	V	V	V	V	V
V	V	F	V	V	V	V	V	V	V	V
V	V	F	F	V	F	V	V	V	F	F
V	F	V	Y	V	V	F	V	V	V	F
V	F	V	F	V	V	F	V	V	V	V
V	F	F	V	V	V	F	V	V	V	V
V	F	F	F	V	F	F	F	F	F	F
F	V	V	V	V	V	V	V	F	F	F
F	V	F	V	V	V	V	V	F	F	F
F	V	F	V	V	V	V	V	F	F	F
F	V	F	F	V	F	V	V	F	F	F
F	F	V	V	F	V	V	V	F	V	V
F	F	F	F	V	V	V	V	F	V	V
F	F	F	F	F	V	V	V	F	V	F

LEGENDA:

$$X = (A \rightarrow B) \vee [(C \vee D) \wedge A] \leftrightarrow (A \vee B) \wedge (C \vee D)$$

2.5) (circuito)

$$(A \wedge B) \wedge (B \rightarrow A) \leftrightarrow (A \vee B) \wedge (\neg B \wedge \neg A)$$



2.5 (tabela - verdade)

A	B	$\sim A$	$\sim B$	$(A \wedge B)$	$(A \vee B)$	$(B \rightarrow A)$	$(A \wedge B) \wedge (B \rightarrow A)$	$(A \wedge B) \wedge (B \rightarrow A) \leftrightarrow (A \vee B)$	$(A \wedge B) \wedge (B \rightarrow A) \leftrightarrow (A \vee B) \wedge (\sim B \wedge \sim A)$
V	V	F	F	V	V	V	V	V	V
V	F	F	V	F	V	V	F	V	F
F	V	V	F	F	V	F	F	V	F
F	F	V	V	F	F	V	F	V	F