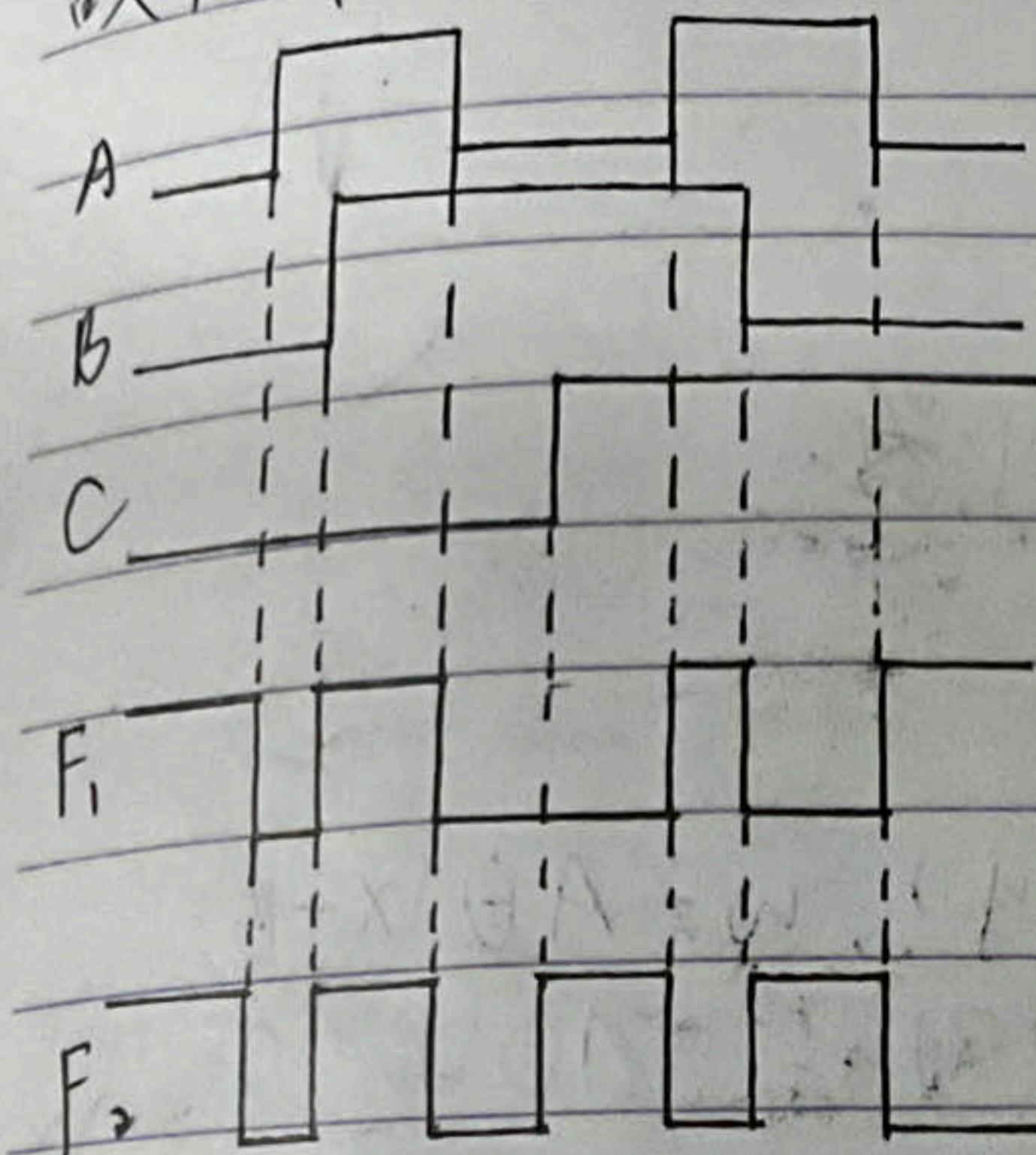


2.1

$$P_1 = \bar{A}B, P_2 = A\bar{B}$$

$$\text{而 } F_1 = \overline{\bar{A}B + A\bar{B}} = \overline{A \oplus B}, F_2 = F_1 \oplus C$$

故 F_1, F_2 波形图：



即为所求

2019.1

H

2.2

$$A_1 = \bar{B}_1, A_2 = B_2, \quad A_4 = B_2 \oplus B_4, A_8 = \overline{B_8 + B_4 + B_2}$$

真值表：

B_8	B_4	B_2	B_1	A_8	A_4	A_2	A_1
0	0	0	0	1	0	0	1
0	0	0	1	1	0	0	0
0	0	1	0	0	1	1	1

$B_8 \ B_7 \ B_6 \ B_5 \ A_8 \ A_4 \ A_2 \ A_1$

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

知电路为BCD码379的变形器

2.3

$$Z = D, Y = C \oplus D, X = B \oplus (C + Y), W = A \oplus (X + B)$$

$$\text{真值表:} \quad = B \oplus (C + D) \quad = A \oplus (B + C + D)$$

A	B	C	D	W	X	Y	Z
0	0	0	0	0	0	0	0
0	0	0	1	1	1	1	1
0	0	1	0	1	1	1	0
0	0	1	1	1	1	0	1
0	1	0	0	1	1	0	0
0	1	0	1	1	0	1	1
0	1	1	0	1	0	1	0
0	1	1	1	1	0	0	1
1	0	0	0	1	0	0	0

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

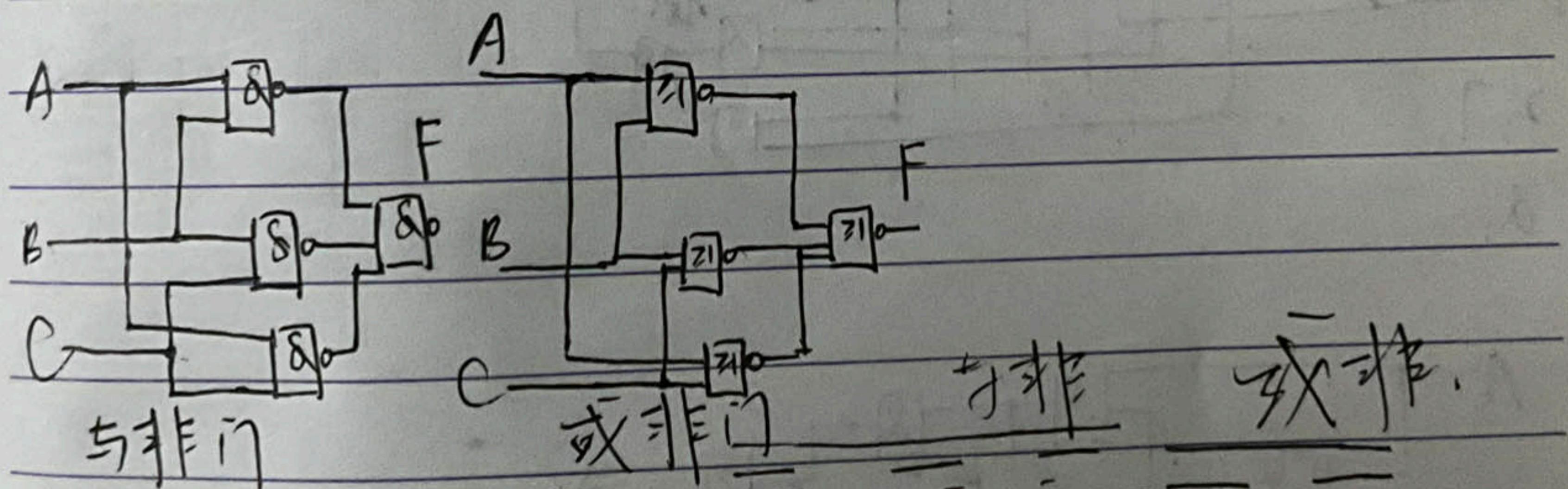
即得电路为
16 变制器

2.4

$$(1) F = AB + AC + BC = \overline{\overline{AB} \cdot \overline{AC} \cdot \overline{BC}} = \overline{\overline{A+B} + \overline{B+C} + \overline{A+C}} = \overline{\overline{AB} + \overline{AC} + \overline{BC}}$$

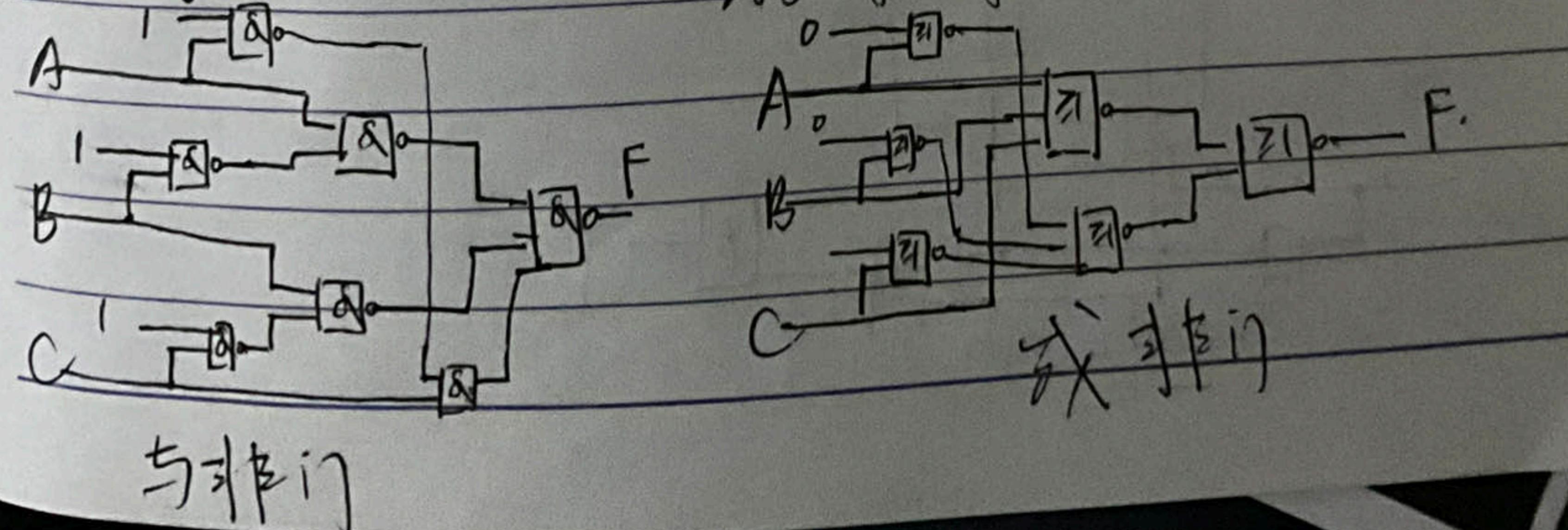
与非 或非 与或非.

电路图:



$$(2) F = A\bar{B} + B\bar{C} + \bar{A}C = \overline{\overline{A}\bar{B} \cdot B\bar{C} \cdot \bar{A}C} = \overline{\overline{A+B+C} + \overline{\bar{A}+\bar{B}+\bar{C}}} \\ = \overline{AB + AC + \bar{A}B + \bar{A}C} \text{ 与或非.}$$

电路图:

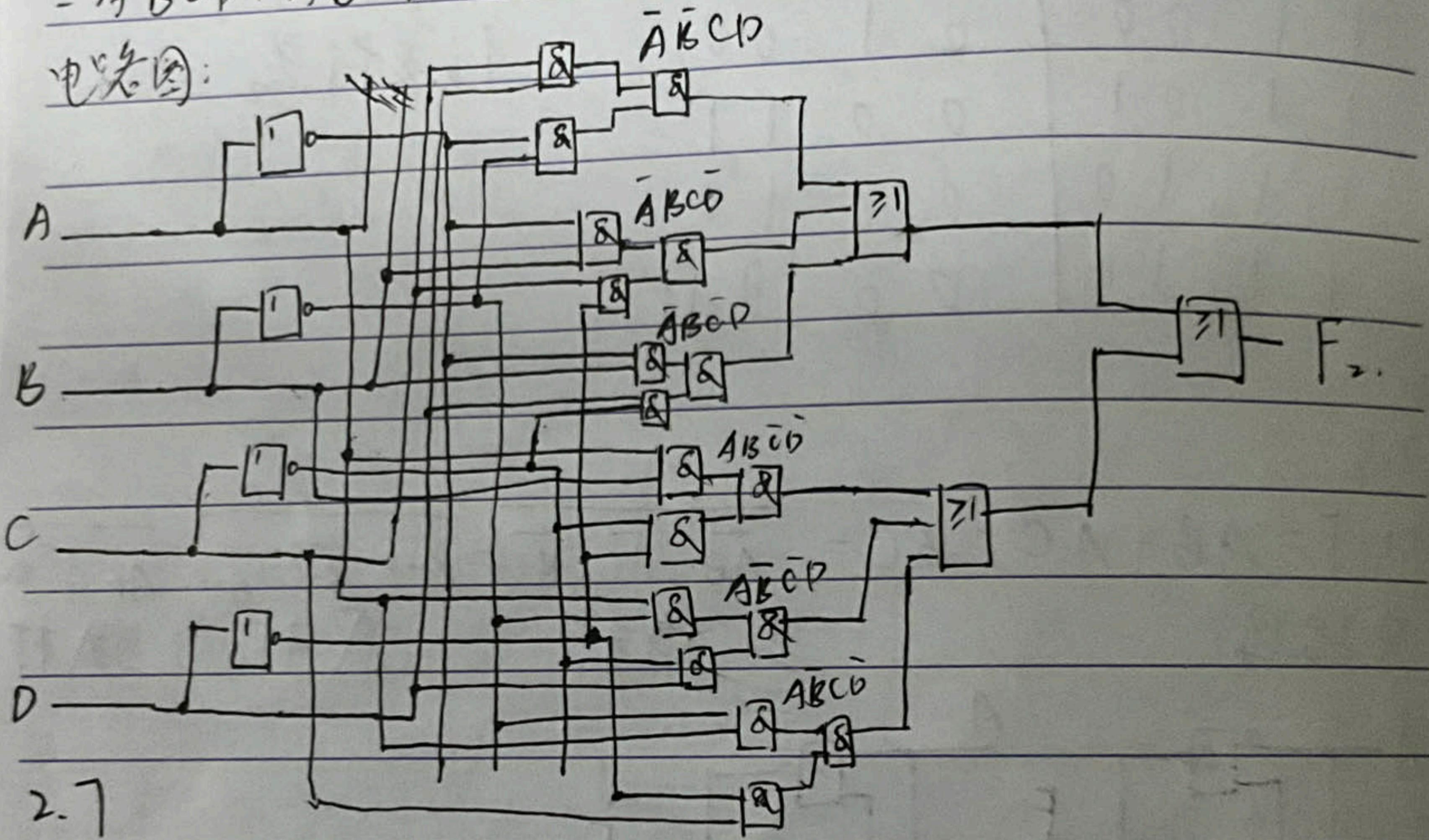


2.5

(2) 由卡诺图知 $F = \sum m^4(3, 5, 6, 9, 10, 12)$

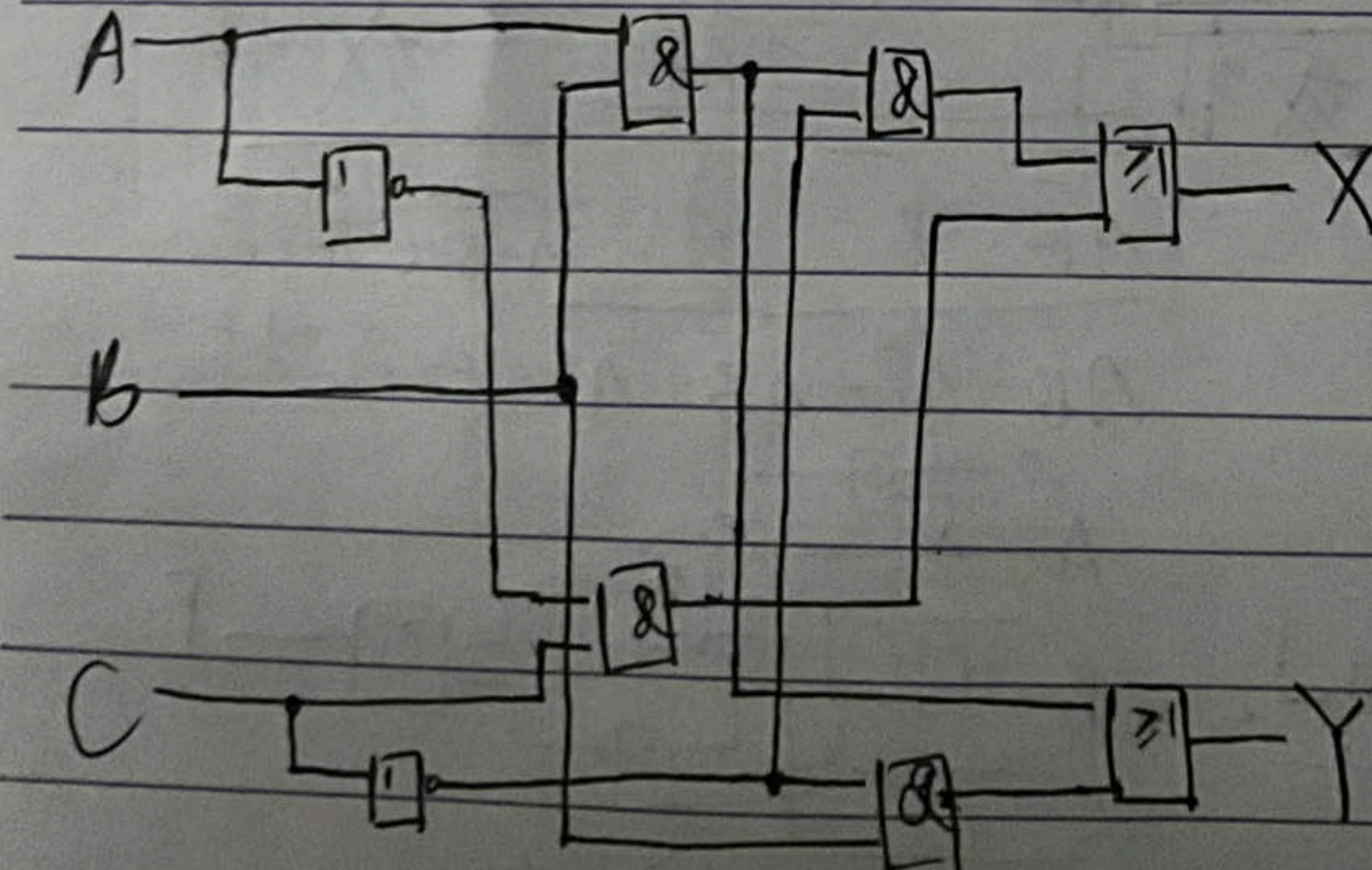
$$= \bar{A}\bar{B}CD + \bar{A}BC\bar{D} + \bar{A}B\bar{C}D + A\bar{B}\bar{C}\bar{D} + A\bar{B}\bar{C}D + A\bar{B}C\bar{D}$$

电路图:



2.7

a.



b.

A

B

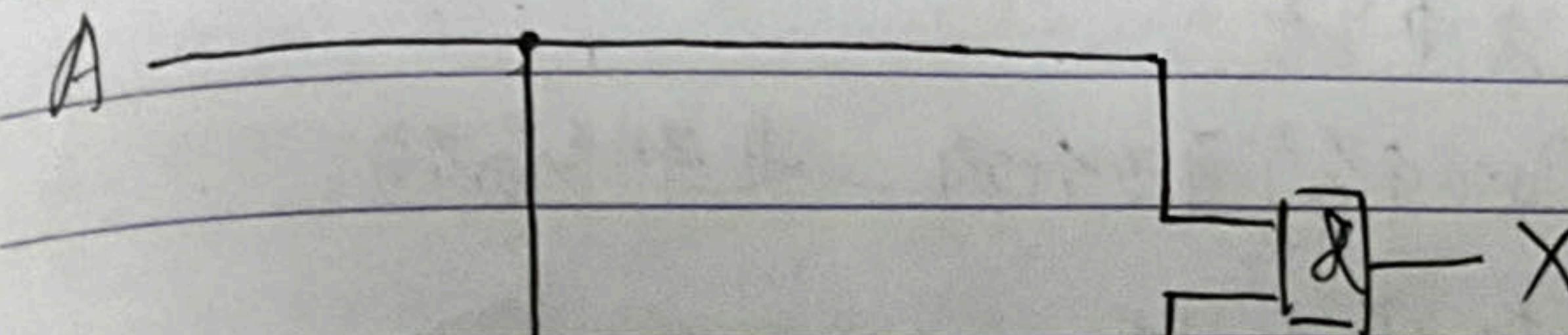
C

2.9

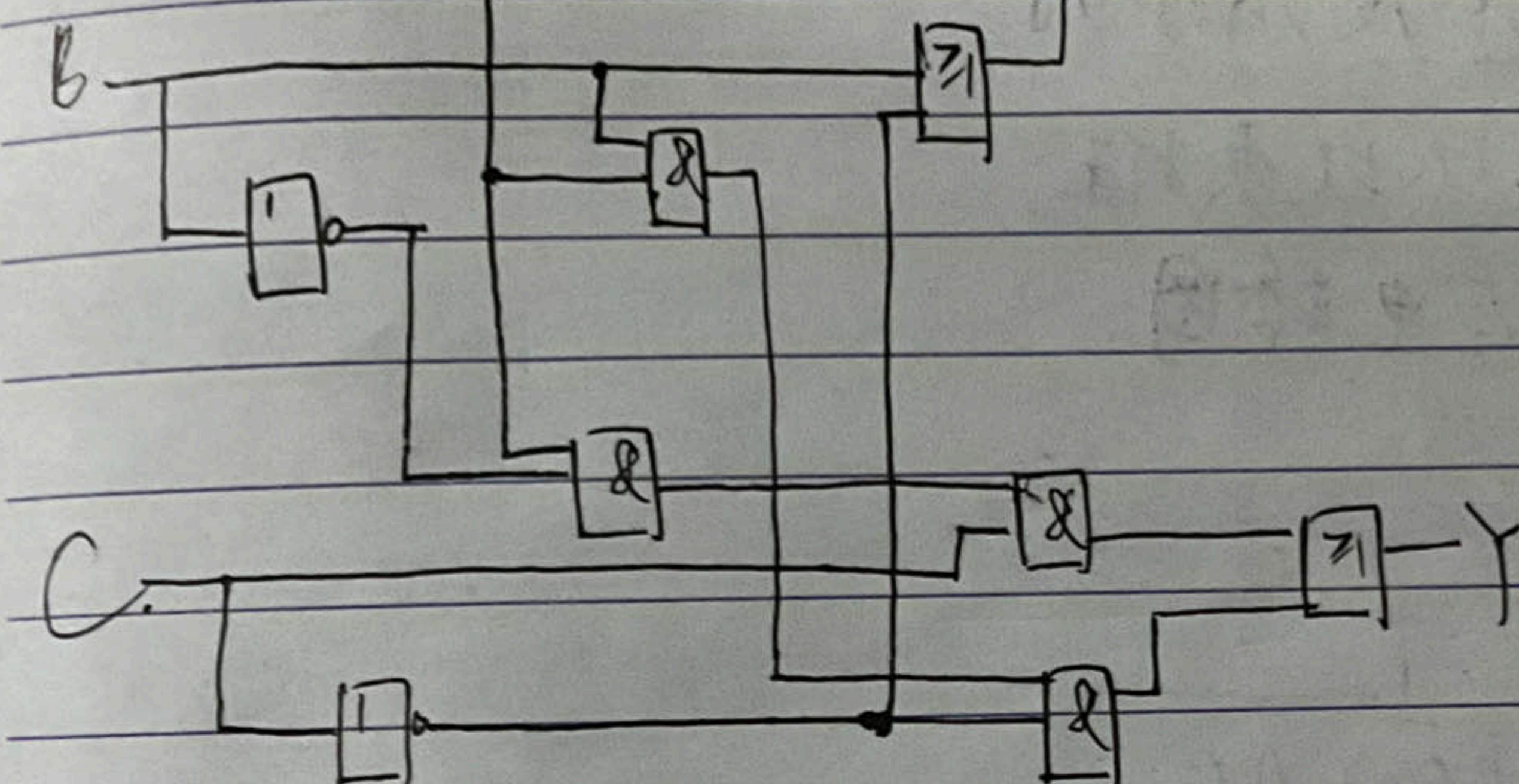
习题

应

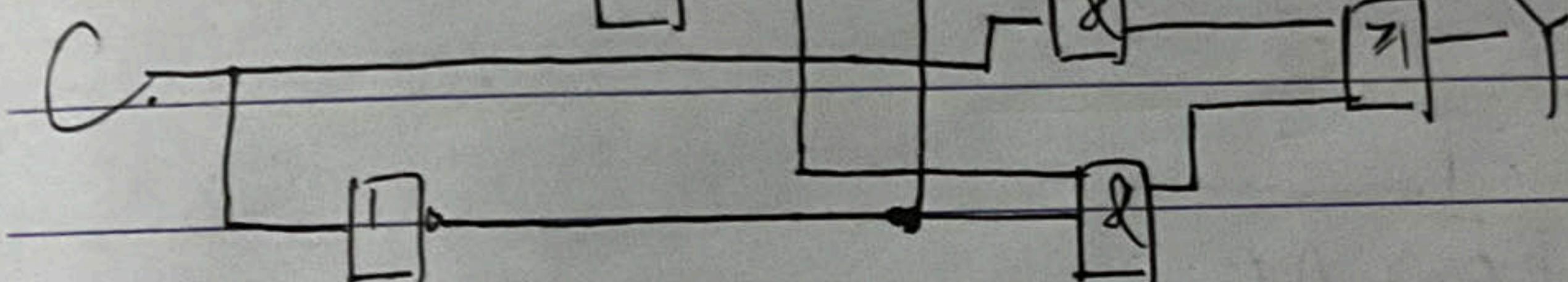
b.



b.

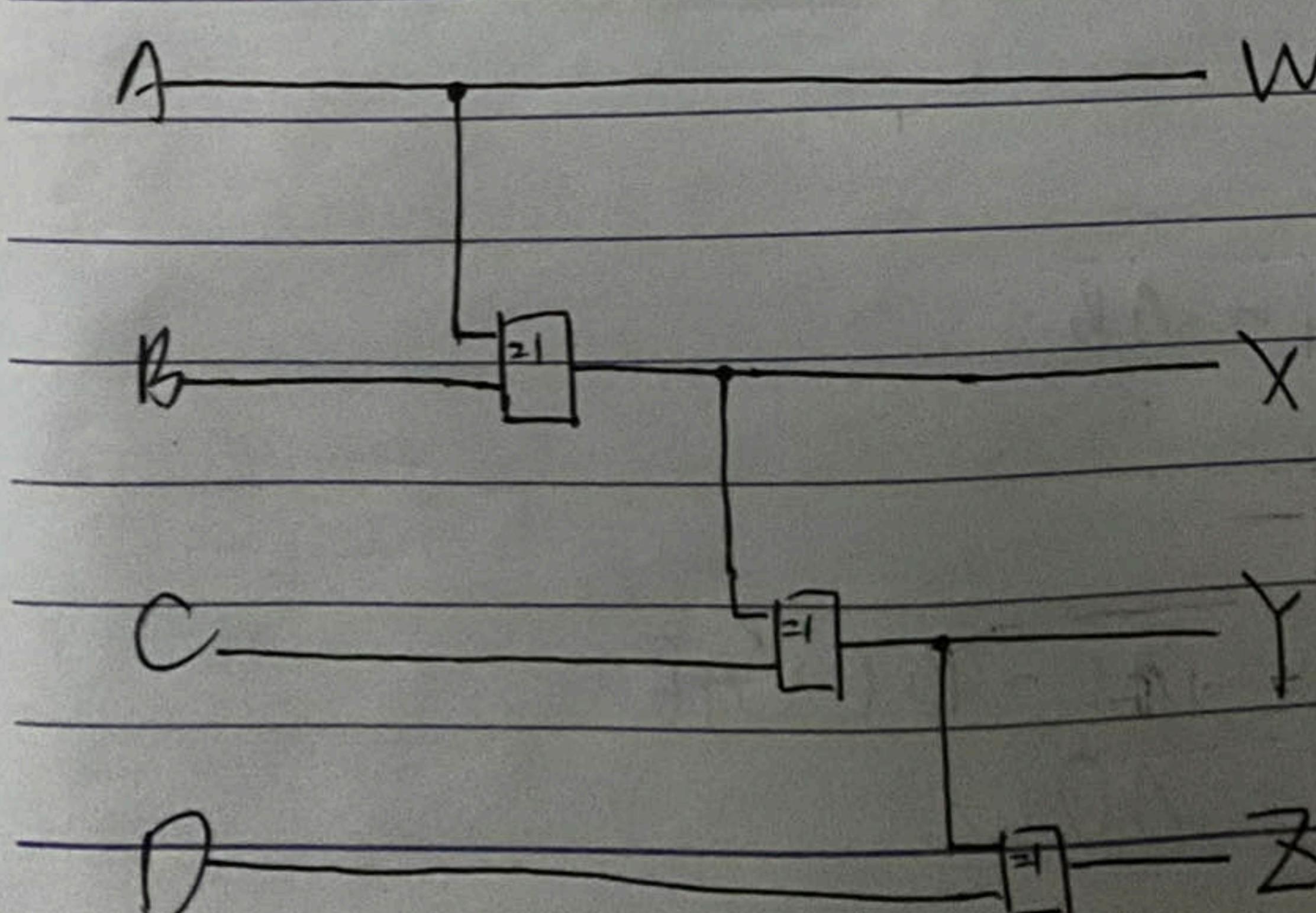


c.



2.9

对于格雷码 ABCD，设二进制编码为 WXYZ
应有 $W = A$, $X = A \oplus B$, $Y = A \oplus B \oplus C$, $Z = A \oplus B \oplus C \oplus D$.



即上图为所求电路.

可将典型Gray码平化为二进制编码.

当编码长度增加时.

同理以此类推.

画出对应电路图.

2.11

$$(1) F = \bar{A}B + \bar{B}\bar{C} + AC$$

当 $A=1, B=0$ 使 $F = C + \bar{C}$ 存在静态“1”险象.

$B=1, C=1$ 时, $F=A+\bar{A}$, 存在静态“1”险象.

卡诺图: $A=C=0, F = B+\bar{B}$, 存在静态“1”险象

		AB	C
		00	01
0	0	1	1
	1	1	1

增加项 $\bar{A}\bar{C} + BC + A\bar{B}$

即可消除险象.

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

$$= A \oplus B + B \oplus C + A \oplus C$$

$$(2) F = (A + C + \bar{D}) (\bar{B} + C + D) (\bar{B} + \bar{C}) (\bar{B} + D)$$

$A = C = D = 0, F = B \cdot \bar{B}$ 存在静态“0”险象

$A = 0, B = 1, C = 0, F = D \cdot \bar{D}$ 存在静态“0”险象

$A = 0, B = 1, D = 0, F = C \cdot \bar{C}$ 存在静态“0”险象

$A = 0, B = 1, D = 1, F = C \cdot \bar{C}$ 存在静态“0”险象

卡诺图：

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

增加项、 $\bar{B}\bar{D}$

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

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

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

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

2.12

$$(1) F = \sum m^4 (0, 1, 5, 7, 10, 11, 14, 15)$$

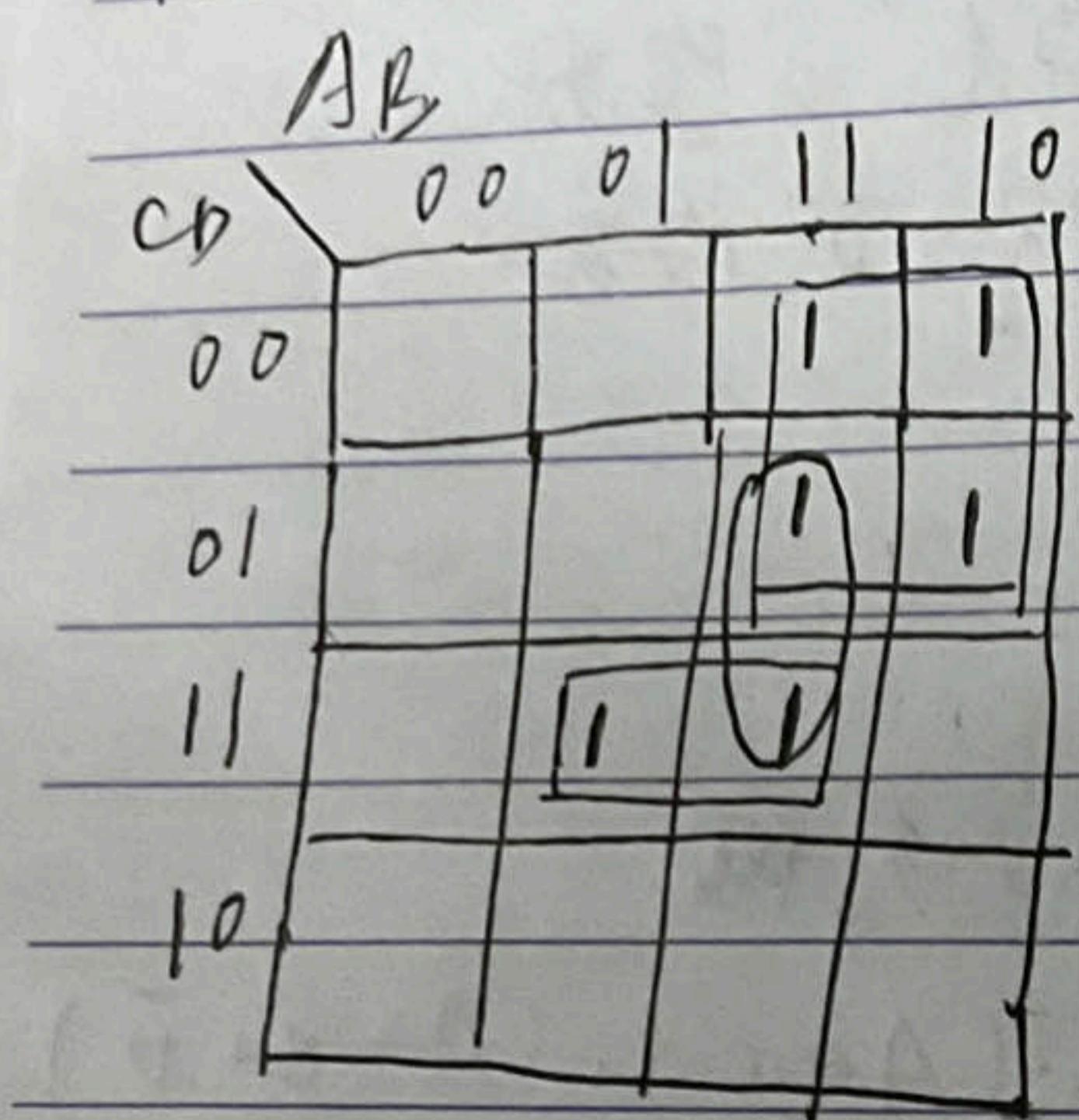
		AB	00	01	11	10
		CD	00	01	11	10
CD	AB	00	1	1	1	1
		01	1	1	1	1
CD	AB	11	1	1	1	1
		10	1	1	1	1

增加项、 $\bar{A}\bar{C}D, BCD$

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

$$(2) F = \prod M^4(0, 1, 2, 3, 4, 5, 6, 10, 11, 14)$$
$$= \Sigma m^4(7, 8, 9, 12, 13, 15)$$

卡诺图:



增加项 ABD

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