5. (a) $A=1, B=1$ (b) $A=1, B=0, C=1$ (c) $A=0, B=0$

(d) $A=1, B=0, C=1$ (e) $A=1, B=1, C=0$ (f) $A=1, B=0$

(g) $A=1, B=0, C=0$

6. (a) $B=1$ 时 $X=1$，$B=0$ 时：

A	C	$(A+B)\cdot C+B$
1	0	0
0	1	0
0	0	0
1	1	1

(b) $X=\overline{A}\cdot\overline{B}\cdot C$，只有 $A=0, B=0, C=1$ 时 $X=1$ 其余为0

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

$A=0$ 时 X 为0，$A=1$ 时只有 B, C 全为0时 $X=0$ 其余为1

(d) $X=B+A\overline{A}=B$，$B=1$ 时 $X=1$，$B=0$ 时 $X=0$

(e) $X=\overline{BC}(BC+A)=A\overline{BC}=A(\overline{B}+\overline{C})$

$A=0$ 时 $X=0$，$A=1$ 时

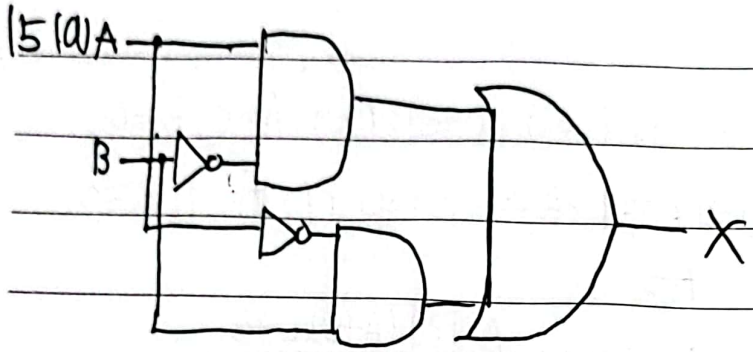
B	C	X
1	0	1
0	1	1
0	0	0

(8) (a) Involution (b) Distributive, Demorgan's Theorems, Compleme
(c) Idempotency (d) Complement (e) Absorption (f)

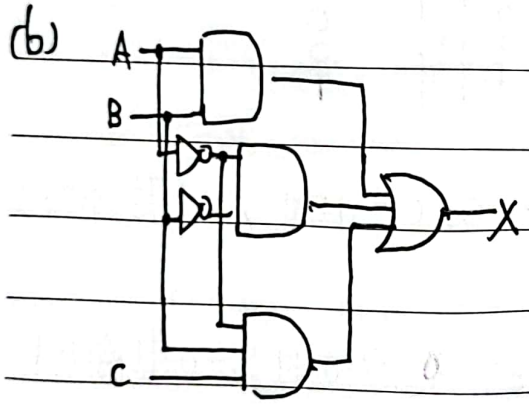
12. (a) $X = A \cdot B$ (b) $X = \overline{A}$ (c) $X = A + B$ (d) $X = A+B+$

13. (a) $X = ABCD$ (b) $X = AB+C$ (c) $X = \overline{\overline{A}B}$ (d) $(A+B)C = X$

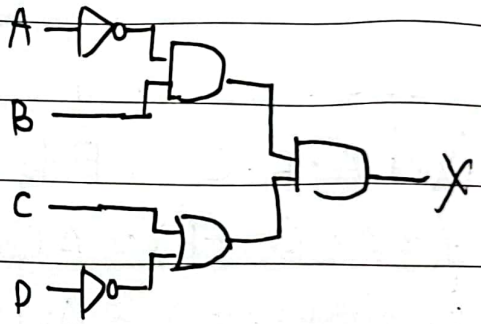
15 (a)



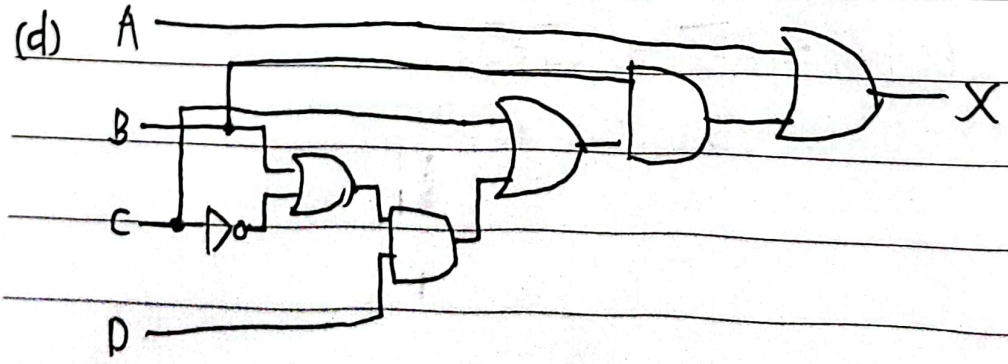
(b)



(c)



(d)



18 (a)

A	B	A + B
1	0	1
0	1	1
1	1	1
0	0	0

(b)

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

(c)

A	B	C	AB+BC	(A+B)C	(A+B)(B̄+C)
1	0	0	0	0	1
0	0	0	0	0	0
1	1	0	1	0	0
0	1	0	0	0	0
0	0	1	0	0	0
1	0	1	0	1	1
0	1	1	1	1	1
1	1	1	1	1	1

2. (a) $BD+B(D+E)+\bar{D}(D+F)$

$= BD+BD+BE+\bar{D}D+\bar{D}F$

$= BD+BE+\bar{D}F$

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

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

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

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

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

(c) $(B+BC)(B+\bar{B}C)(B+D)$

$= B(B+C)(B+D)$

$= B(B+CD)$

$= B+BCD$

$= B$

(d) $ABCD+AB(\bar{C}\bar{D})+(\overline{AB})CD$

~~$= ABCD+AB(\bar{C}+\bar{D})+$~~

$= AB(CD+\bar{C}\bar{D})+(\overline{AB})CD+ABCD$

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

$= AB+CD$

(e) $ABC[AB+\bar{C}(BC+AC)]$

$=ABC[AB+\bar{C}\cdot C\cdot(B+A)]$

$=ABC[AB+0]$

$=(AB)\cdot(AB)\cdot C$

$=ABC$

$A+BD$

24. (a) $AB+A\bar{B}CD+CD$ (b) ABD (c) $A+ABC+BD+B\bar{C}D$

26. (a) $AB(C+\bar{C})(D+\bar{D})+A\bar{B}CD+(A+\bar{A})(B+\bar{B})CD$

$=ABCD+AB\bar{C}\bar{D}+ABC\bar{D}+AB\bar{C}D+A\bar{B}CD+\bar{A}BCD+\bar{A}\bar{B}CD$

(b) $ABD=AB(C+\bar{C})D=ABCD+AB\bar{C}D$

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

$=ABD+AB\bar{D}+A\bar{B}D+A\bar{B}\bar{D}+\bar{A}BD$

33. (a)

A	B	C	X
0	0	0	1
1	0	0	0
0	1	0	1
1	1	0	0
0	0	1	0
1	0	1	1
0	1	1	0
1	1	1	0

(b)

X	Y	Z	W	X
0	0	0	0	1
1	0	0	0	0
0	1	0	0	1
1	1	0	0	0
0	0	1	0	1
1	0	1	0	0
0	1	1	0	1
1	1	1	0	0
0	0	0	1	1
1	0	0	1	0
0	1	0	1	1
1	1	0	1	0
0	0	1	1	1
1	0	1	1	0
0	1	1	1	1
1	1	1	1	0

38.

AB \ CD	00	01	11	10
00	$\bar{A}\bar{B}\bar{C}\bar{D}$	$\bar{A}\bar{B}\bar{C}D$	$\bar{A}\bar{B}CD$	$\bar{A}\bar{B}C\bar{D}$
01	$\bar{A}B\bar{C}\bar{D}$	$\bar{A}B\bar{C}D$	$\bar{A}BCD$	$\bar{A}BC\bar{D}$
11	$AB\bar{C}\bar{D}$	$AB\bar{C}D$	$ABCD$	$ABC\bar{D}$
10	$A\bar{B}\bar{C}\bar{D}$	$A\bar{B}\bar{C}D$	$A\bar{B}CD$	$A\bar{B}C\bar{D}$

36. (a) $\bar{A}\bar{B}C + A\bar{B}\bar{C} + A\bar{B}C + ABC$

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

(b) $A\bar{B}C + AB\bar{C} + ABC$

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

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

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

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

(d) $\bar{A}\bar{B}C\bar{D}+\bar{A}B\bar{C}\bar{D}+\bar{A}B\bar{C}D+\bar{A}BCD+A\bar{B}CD+AB\bar{C}\bar{D}+ABCD$

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

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

~~(c) $\bar{A}\bar{B}CD+\bar{A}B\bar{C}\bar{D}+\bar{A}B\bar{C}D+\bar{A}BCD+AB\bar{C}\bar{D}+AB\bar{C}D+ABCD$~~

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

(b) $\bar{A}\bar{B}C\bar{D}+\bar{A}BCD+ABCD+AB\bar{C}\bar{D}$

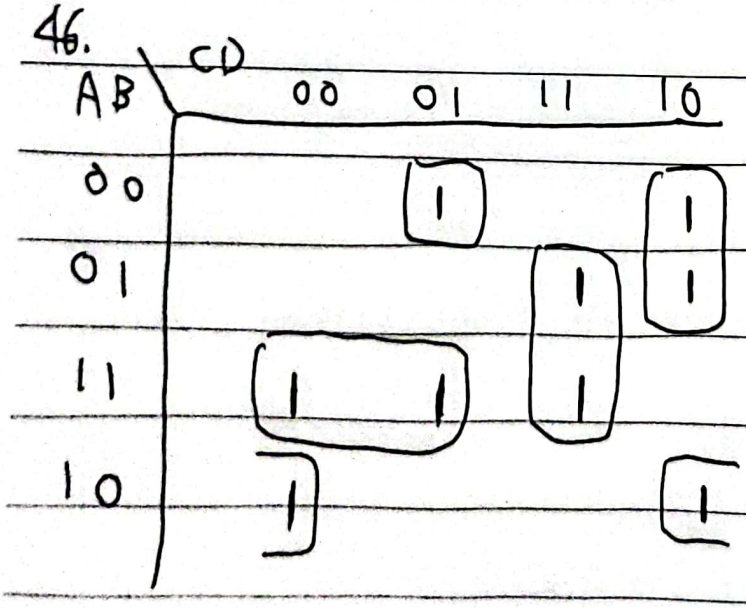
(c) $\bar{A}B\bar{C}\bar{D}+\bar{A}B\bar{C}D+AB\bar{C}\bar{D}+AB\bar{C}D+A\bar{B}\bar{C}D$

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

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

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

46.



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

44. (a) $A + B\bar{C} + CD$

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

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

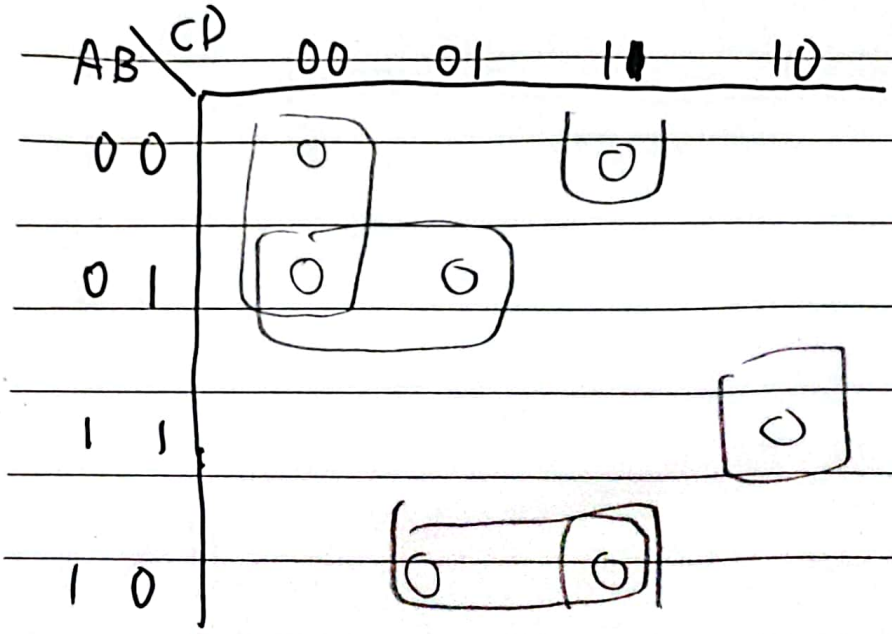
(d) $\bar{B}C$

(e) $\bar{B} + \bar{D}$

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

(b) ~~$(A+W)(A+\bar{B})(\bar{B}+\bar{C})(\bar{C}+D)$~~
$(X+W)(X+\bar{Y})(\bar{Y}+\bar{Z})(\bar{Z}+W)$

51.



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