8. 下列各等式分別是依據哪一項布林法則推導出來的

(a) $\overline{\overline{AB}+\overline{CD}}+\overline{EF}=AB+CD+\overline{EF}\rightarrow \overline{\overline{A}}=A$ (九)

(b) $A\overline{A}B+AB\overline{C}+AB\overline{B}=AB\overline{C}\rightarrow A\cdot\overline{A}=0$ (八)

(c) $A(BC+\overline{B}C)+AC=A(B+\overline{B})+AC\rightarrow A+A=A$ (五)

(d) $ABC(+\overline{C})+A\overline{C}=AB+AC\rightarrow A+\overline{A}=1$ (六)

(e) $A\overline{B}+A\overline{B}C=A\overline{B}\rightarrow A+AB=A$ (十)

(f) $ABC+\overline{A}\overline{B}+\overline{A}\overline{B}CD=ABC+\overline{A}\overline{B}+D\rightarrow A+\overline{A}B=A+B$ ($\frac{+}{-}$)

9. 在下列各表示式中應用狄摩根定理

(a) $\overline{A+\overline{B}}=\overline{A}B$

(b) $\overline{A}\overline{B}=\overline{A}+\overline{\overline{B}}=A+\overline{B}$

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

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

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

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

(g) $\overline{AB+CD}=\overline{AB}\cdot\overline{CD}=(\overline{A}+\overline{B})(\overline{C}+\overline{D})$

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

10. 在下列各表示式中應用狄摩根定理

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

(b) $\overline{AB(CD+EF)}=\overline{AB}+\overline{(CD+EF)}=\overline{A}\overline{B}+\overline{CD}\cdot\overline{EF}$

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

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

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

(d) $\overline{\overline{(\overline{A}+B+(+D)}\,\overline{(A\overline{B}\overline{C}D)}}=(\overline{A}+B+(+D)+(ABCD)$

38. 利用卡諾圖找出各表示式的最小SOP形式

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

(b) $AC(\overline{B}+C)=AC\overline{B}+AC=AC$

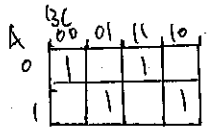
(c) $\overline{A}(BC+\overline{B}\overline{C})+A(BC+\overline{B}\overline{C})=\overline{A}B+AB=B$

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

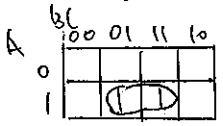
$=\overline{C}$

39. 利用卡諾圖將下列各表示式化簡成最小SOP形式

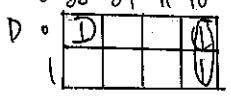
(a) $\overline{A}B\overline{C}+A\overline{B}C+\overline{A}BC+AB\overline{C}$



(b) $A\overline{C}[\overline{B}+B(B+\overline{C})]=A\overline{C}\overline{B}+A\overline{C}B=A\overline{C}$

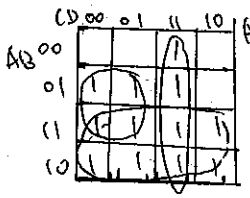


(c) $D\overline{E}\overline{F}+\overline{D}\overline{E}\overline{F}+\overline{D}\overline{E}\overline{F}=\overline{D}\overline{F}+\overline{E}\overline{F}$



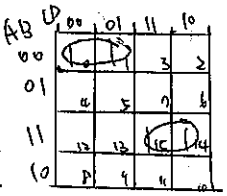
42. 利用卡諾圖將下列各表示式簡化成最小SOP形式

(a) $A+B\overline{C}+CD$



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

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



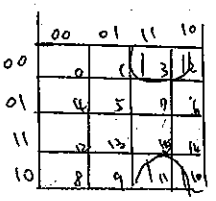
(c) $\overline{A}B(\overline{C}\overline{D}+CD)+AB(\overline{C}D+\overline{C}\overline{D})+A\overline{B}\overline{C}D$

$=\overline{A}B\overline{C}\overline{D}+\overline{A}B\overline{C}D+AB\overline{C}\overline{D}+AB\overline{C}D$

$+A\overline{B}\overline{C}D$

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

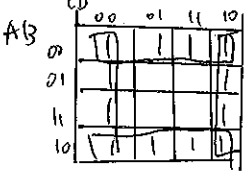
(d) $(\overline{A}\overline{B}+A\overline{B})(CD+C\overline{D})=$



$\overline{A}\overline{B}CD+\overline{A}\overline{B}C\overline{D}+A\overline{B}CD+A\overline{B}C\overline{D}$

$=\overline{B}C$

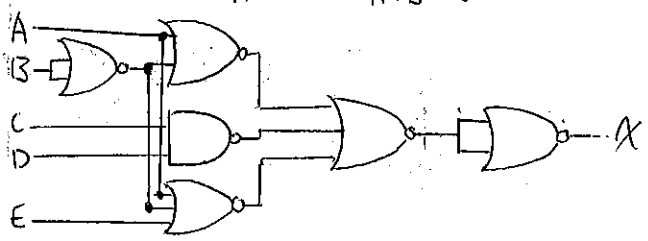
(e) $\overline{A}\overline{B}+A\overline{B}+\overline{C}\overline{D}+C\overline{D}=\overline{B}+\overline{D}$



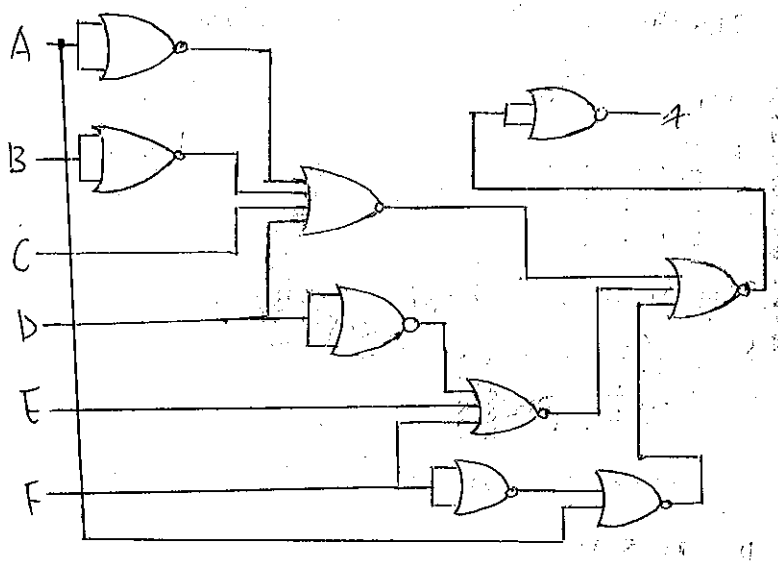
10 使用 NAND 閘、NOR 閘，或兩者的組合來實現下列邏輯表示式

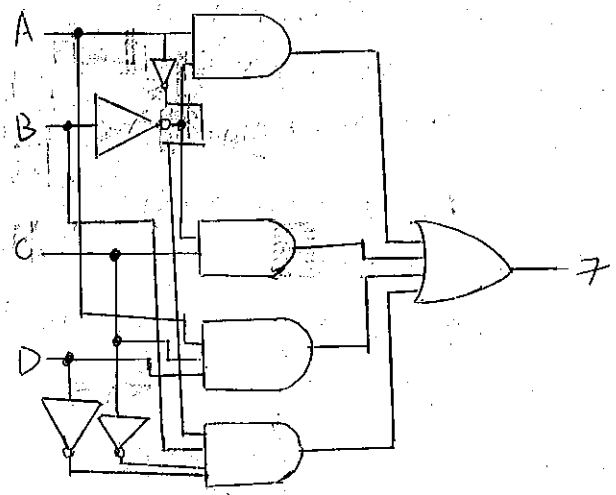
(a) $X=\overline{A}B+CD+(\overline{A+B})(ACD+\overline{B}E)=\overline{A}B+CD+(A\overline{B})(ACD+\overline{B}E)$

$=\overline{A}B+CD+\overline{A}\overline{B}E=\overline{\overline{A+\overline{B}}}+CD+\overline{\overline{A+B+E}}$



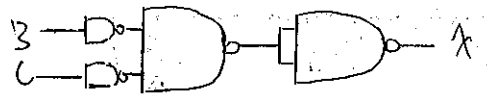
(b) $X = A\bar{B}C\bar{D} + D\bar{E}F + A\bar{F} = \overline{\bar{A}+\bar{B}+CD} + \overline{\bar{D}+E+\bar{F}} + \overline{\bar{A}+F}$





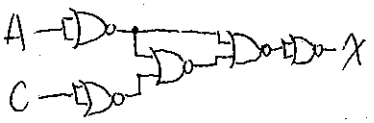
19. 只用NAND閘，實現出圖5-42的邏輯電路

$\overline{AB+B+C+C} = \overline{AB}\cdot B\cdot\bar{C} = \bar{A}B\bar{C}+B\bar{C} = B\bar{C} = \overline{B+C}$

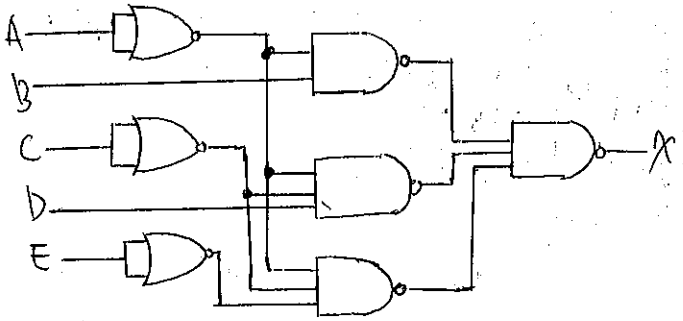


20 只用NOR，重做問題18

(a) $\bar{A}+\bar{A}B+AC = \bar{A}+AC$

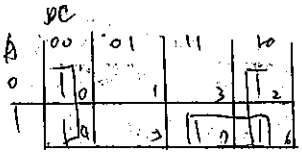


(c) $X = \bar{A}[B+\bar{C}(D+E)] = \bar{A}(B+\bar{C}D+\bar{C}E) = \bar{A}B+\bar{A}\bar{C}D+\bar{A}\bar{C}E$

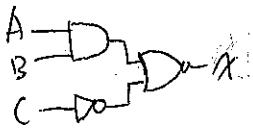


11. 根據表5-6的真值表來實現其邏輯電路

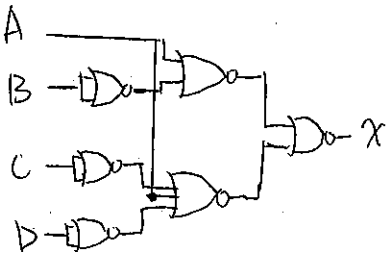
輸入端			輸出端
A	B	C	X
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1



$\bar{C}+AB$

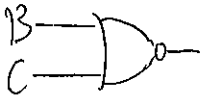


(b) $\overline{\bar{A}B+\bar{A}CD+DB\bar{D}} = \overline{\bar{A}B}\cdot\overline{\bar{A}CD} = (A+\bar{B})(A+\bar{C}+\bar{D})$



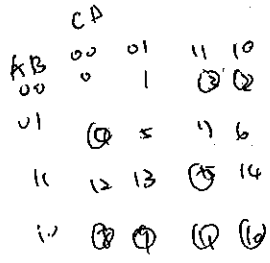
21 只用NOR閘，重做問題19

$\overline{AB+B+C+C} = \overline{AB}\cdot\bar{B}\cdot\bar{C} = A\bar{B}\bar{C}+B\bar{C} = \bar{B}\bar{C} = \overline{B+C}$



12. 依據表5-7的真值表，將邏輯電路實現出來

輸入端				輸出端
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	0
0	1	1	1	0
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	0
1	1	0	1	0
1	1	1	0	0
1	1	1	1	1



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