

6-7

$$(1) \quad (20)_{10} \quad (2) \quad (10)_{10} \quad (3) \quad (110)_8 = (72)_{10} \quad (4) \quad (17)_{10} \quad (5) \quad (91)_{10}$$

min *max*

$$1 \cdot 8 \quad (1) (45)_{10} \quad (2) (1DE,44)_{16} \quad (3) (20222311)_4 \quad \cancel{(4)} (5032,66314)_8$$

1-11 \vee \times $\times \vee \rightarrow$ 若 $A=1, B=1, C=0$ 則 $A+B=1, A+C=1$
但 $B \neq C$

若 $AB=AC$, 则 $AB-AC=A(B-C)=0$
即 $A=0$ or $B-C=0$ 即 $B=C$

$$\begin{aligned}
 1-12 \quad (1) \quad F &= A\bar{B} + \overline{AC + \bar{B}C} \\
 &= A\bar{B} + (\overline{A}\overline{C})\overline{(\bar{B}C)} \\
 &= A\bar{B} + (A + \bar{C})(B + \bar{C}) \\
 &= A\bar{B} + AB + A\bar{C} + B\bar{C} + \bar{C} \\
 &= A(\bar{B} + B + \bar{C}) + \bar{C}(B + 1) \\
 &= A + \bar{C}
 \end{aligned}$$

$$\begin{aligned}
 (3) F &= AC + B\bar{C} + \bar{A}\bar{B} \\
 &= AC + B(C\bar{A} + \bar{C}) \\
 &= AC + B\bar{A}\bar{C} \\
 &= AC + B
 \end{aligned}$$

$$\begin{aligned}
 &= A + C \\
 (5) = F &= ABC\bar{D} + ABD + B\bar{C}\bar{D} + ABC + BD + B\bar{C} \\
 &= ABC\bar{D} + BD + B\bar{C}\bar{D} + AB + B\bar{C} \\
 &= AB + BD + BC + B\bar{C} \\
 &= AB + BD + B \\
 &= AB + B = B
 \end{aligned}$$

证明：

1-13 (1) $AB \oplus \bar{AC} = (\bar{A}\bar{B})(\bar{A}C) + (AB)(\bar{A}\bar{C})$

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

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

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

$$= \bar{A}C + AB, \text{得证}$$

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

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

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

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

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

$$= A + B + \bar{C} + D, \text{得证}$$

$$1-14 \text{ 解: (1) } F = (A\bar{B} + C)D + E$$

$$\text{则 } \bar{F} = [(\bar{A} + B) \cdot \bar{C} + \bar{D}] \cdot \bar{E}$$

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

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

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

$$\text{则 } \bar{F} = (\bar{A} + \bar{B}) \cdot [\bar{A}\bar{C} + (\bar{C}(B + \bar{D}))]$$

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

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

$$1-15 \text{ 解: (1) } F = \overline{A + B} \cdot \overline{(C + D)(B + C)}$$

$$\text{则 } F' = \overline{AB} + \overline{\bar{C}D + BC} = \bar{A} + B + \overline{\bar{C}D + BC}$$

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

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

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

$$= A\bar{B}C + ACD + \bar{A}C + \bar{B}C + CD$$

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

$$1-16 \text{ 解: (1) } F = AB + BC + AC$$

$$= AB(C + \bar{C}) + (A + \bar{A})BC + AC(B + \bar{B})$$

$$= ABC + ABC + ABC + \bar{A}BC + ABC + A\bar{B}C$$

$$= ABC + AB\bar{C} + \bar{A}BC + A\bar{B}C$$

$$= \Sigma m(7, 6, 3, 5)$$

$$\begin{aligned}
 (2) F &= \overline{AB} \cdot \overline{BC} \\
 &= AB + BC \\
 &= AB(C + \bar{C}) + (A + \bar{A})BC \\
 &= ABC + ABC + ABC + \bar{A}BC \\
 &= ABC + \cancel{ABC} + \bar{A}BC \\
 &= \sum m(7, 6, 3)
 \end{aligned}$$

1-17 解：(1) $F = \bar{A}\bar{B}C + AD + \bar{D}(B+C) + A\bar{C} + \bar{A}\bar{D}$

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

由卡诺图得： $F = A + \bar{D} + \cancel{A}\bar{C} + \bar{B}C$

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

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

由卡诺图得： $F = BC + \bar{A}\bar{C}D + ABD + \bar{A}C\bar{D}$

$$1-18 \text{ 解: (1) } F(A, B, C, D) = \sum m(0, 2, 3, 6, 9, 10, 15) + \sum d(7, 8, 11)$$

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

由卡诺图得: $F(A, B, C, D) = A\bar{B} + \bar{A}C + \bar{B}\bar{D} + CD$

$$(2) F(A, B, C, D) = \sum m(2, 4, 6, 9, 13, 14) + \sum d(0, 1, 3, 8, 11, 15)$$

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

由卡诺图得: $F(A, B, C, D) = \bar{A}\bar{D} + A\bar{D} + BC\bar{D}$

$$(3) F(A, B, C, D) = BC + \bar{A}BD + ABD + ABCD, \text{ 约束条件: } \bar{A}\bar{B}D + A\bar{B}\bar{D} = 0$$

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

由卡诺图得: $F(A, B, C, D) = A\bar{C} + \bar{A}D + BC + A\bar{D}$