

1-7

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

1-8 (1) $(45)_{10}$ (2) $(1DE.44)_{16}$ (3) $(20222311)_4$ ~~(4)~~ $(5032.66314)_8$

1-11 $\begin{matrix} & V & & X & & X & & V \end{matrix}$ \rightarrow 若 $A=1, B=1, C=0$ 则 $A+B=1, A+C=1$
 但 $B \neq C$

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

1-12 (1) $F = A\bar{B} + \overline{AC} + \bar{B}C$
 $= A\bar{B} + (\bar{A}C)(\bar{B}C)$
 $= A\bar{B} + (A+\bar{C})(B+\bar{C})$
 $= A\bar{B} + AB + A\bar{C} + B\bar{C} + \bar{C}$
 $= A(\bar{B}+B+\bar{C}) + \bar{C}(B+1)$
 $= A+\bar{C}$

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

(5) $F = ABC\bar{D} + ABD + BC\bar{D} + ABC + BD + B\bar{C}$
 $= ABC\bar{D} + BD + BC\bar{D} + AB + B\bar{C}$
 $= AB + BD + BC + B\bar{C}$
 $= AB + BD + B$
 $= AB + B = B$

证明:

1-13 ~~解~~: (1) $AB \oplus \bar{A}C = (\bar{A}B)(\bar{A}C) + (AB)(\bar{A}C)$
 $= (\bar{A} + B)(\bar{A}C) + (AB)(A + \bar{C})$
 $= \bar{A}C + \bar{A}BC + AB + AB\bar{C}$
 $= \bar{A}C(1 + B) + AB(1 + \bar{C})$
 $= \bar{A}C + AB$, 得证

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

1-14 解: (1) $F = (A\bar{B} + C)D + E$

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

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

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

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

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

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

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

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

则 $F' = \overline{AB} + \overline{CD + BC} = \bar{A} + \bar{B} + \overline{CD + BC}$

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

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

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

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

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

1-16 解: (1) $F = AB + BC + AC$

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

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

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

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

$$(2) F = \overline{AB} \cdot \overline{BC}$$

$$= AB + BC$$

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

$$= ABC + AB\overline{C} + ABC + \overline{A}BC$$

$$= ABC + AB\overline{C} + \overline{A}BC$$

$$= \sum m(7, 6, 3)$$

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

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

| AB \ CD | 00 | 01 | 11 | 10 |
|---------|----|----|----|----|
| 00 | 1 | | 1 | 1 |
| 01 | 1 | | | 1 |
| 11 | 1 | 1 | 1 | 1 |
| 10 | 1 | 1 | 1 | 1 |

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

由卡诺图得: $F = B\overline{C} + \overline{A}CD + ABD + \overline{A}C\overline{D}$

| AB \ CD | 00 | 01 | 11 | 10 |
|---------|----|----|----|----|
| 00 | | 1 | | 1 |
| 01 | 1 | 1 | | 1 |
| 11 | 1 | 1 | 1 | |
| 10 | | | | |

1-18 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: $F(A, B, C, D) = A\bar{B} + \bar{A}C + B\bar{D} + CD$

(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: $F(A, B, C, D) = \bar{A}\bar{D} + AD + BC\bar{D}$

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

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