第四章作业答案

4.6 (a) $F = 0$ (b) $F = A \cdot B + A' C' E$

(c) $F = MRP + QO'R' + MN$

4.8

(c)

A	B	C	F
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

(e)

X	Y	Z	F
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	0

(a) $F = X'Y'Z' + XYZ + XY'Z = \sum_{W,X,Y}(0,5,7)$

(g) $F = (A + A')B + BAC' + C(A + B')(A' + B) = \sum_{A,B,C}(1,2,3,6,7)$

4.9

(b) $F = \Pi_{A,B}(0,1,2) = (A + B) \cdot (A + B') \cdot (A' + B) = \sum_{A,B}(3) = A \cdot B$

(d) $F = \Pi_{W,X,Y}(0,2,3,6,7) = \sum_{W,X,Y}(1,4,5)$

(e) $F = X' + YZ = \Pi_{X,Y,Z}(4,5,6) = \sum_{X,Y,Z}(0,1,2,3,7)$

4.10 (a) $F = \sum_{X,Y,Z}(0,3) = \Pi_{X,Y,Z}(1,2,4,5,6,7)$

(d) $F = \Pi_{M,N,P}(0,1,3,6,7) = \sum_{M,N,P}(2,4,5)$

(e)

$$
\begin{aligned}
F &= X' + Y\square Z' + Y\square Z' \\
&= X'(Y + Y')(Z + Z') + (X + X')YZ' \\
&= X'YZ + X'YZ' + X'Y'Z + X'Y'Z' + XYZ' = \sum_{(X,Y,Z)}(0,1,2,3,6) \\
&= \prod_{(X,Y,Z)}(4,5,7) = (X' + Y + Z)(X' + Y + Z')(X' + Y' + Z')
\end{aligned}
$$

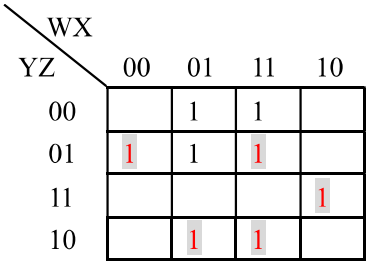
4.14

(c) $F = \prod_{W,X,Y}(1,4,5,6,7) = W'Y' + W'X$

(f) $F=\sum_{A,B,C,D}(4,5,6,11,13,14,15)=A'BC'+BCD'+ACD+ABD$,结果不唯一。

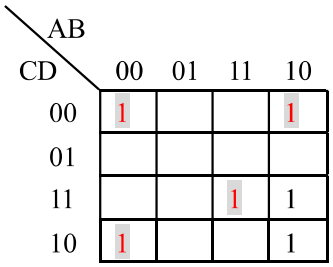
4.15 （求最小积之和表达式）红色的 1 是奇异 1 单元

(b)



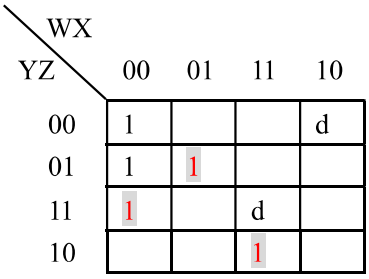
$$F=W'\cdot Y'\cdot Z+X\cdot Y'+X\cdot Z'+W\cdot X'\cdot Y\cdot Z$$

(f)



$$F=A\cdot C\cdot D+B'\cdot D'$$

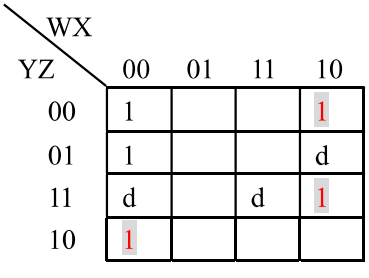
4.18 (a)



$$F=W'\cdot Y'\cdot Z+W'\cdot X'\cdot Z+W\cdot X\cdot Y+W'\cdot X'\cdot Y'$$

或 $F=W'\cdot Y'\cdot Z+W'\cdot X'\cdot Z+W\cdot X\cdot Y+X'\cdot Y'\cdot Z'$

(b)



$$F=W'\cdot X'+X'\cdot Y'+X'\cdot Z$$

4.19（a）static-1 hazard: X=1，Y=0，W 变化

hazard free logic expression: $F = W \cdot X + W' \cdot Y' + X \cdot Y'$

（b）static-1 hazards: W=1,Y=0,Z=1,X 变化；X=1,Z=1,Y 变化。hazard free logic expression:

$$F = W \cdot X' \cdot Y' + X \cdot Y' \cdot Z + X \cdot Y + W \cdot Y' \cdot Z + X \cdot Z$$
$$= W \cdot X' \cdot Y' + X \cdot Y + W \cdot Y' \cdot Z + X \cdot Z$$

。

（f）static-0 hazard: W,X,Y,Z=1100↔1101, 0111↔ 1111。

hazard free logic expression:

$$F = (W + Y' + Z')(W' + X' + Z')(X' + Y + Z)(X' + Y' + Z')(W' + X' + Y)$$

4.55（要求 P<Q）

P2Q2=00

P1P0 / Q1Q0	00	01	11	10
00				
01	1			
11	1	1		1
10	1	1		

P2Q2=10

P1P0 / Q1Q0	00	01	11	10
00				
01				
11				
10				

P2Q2=01

P1P0 / Q1Q0	00	01	11	10
00	1	1	1	1
01	1	1	1	1
11	1	1	1	1
10	1	1	1	1

P2Q2=11

P1P0 / Q1Q0	00	01	11	10
00				
01	1			
11	1	1		1
10	1	1		

$$F = P_2'Q_2 + P_2'P_1'Q_1 + Q_2P_1'Q_1 + P_2'P_1'P_0'Q_0 + P_2'P_0'Q_1Q_0 + Q_2P_1'P_0'Q_0 + Q_2P_0'Q_1Q_0$$

4.59

(b)

YZ \ WX	00	01	11	10
00	1		1	1
01			1	1
11		1	1	
10				

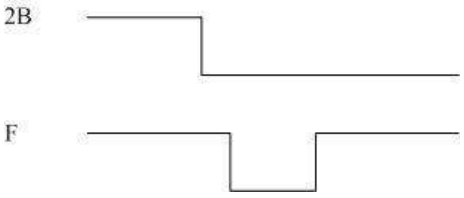
V=0

YZ \ WX	00	01	11	10
00	1			
01				
11		1	1	
10		1	1	

V=1

$$F = W'X'Y'Z' + V'WY' + XYZ + VXY$$

4.61



2B or not 2B (to be or not to be)