

5.5

(a)

C_1	C_2	X_1	X_2	Z
0	0	0	0	0
0	0	0	1	1
0	0	1	0	1
0	0	1	1	1
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	1
1	1	0	0	1
1	1	0	1	0
1	1	1	0	0
1	1	1	1	1

(b)

$$Z = C_1'X_1'X_2 + C_1'X_1X_2' + C_1X_1X_2 + C_1C_2X_1'X_2' + \{C_1'C_2'X_2 \text{ or } C_1'C_2'X_1 \text{ or } C_2'X_1X_2\}$$

5.7

(a) $f = a'c'd' + a'cd + b'c'd' + abcd' + \{a'b'd' \text{ or } a'b'c\}$

(b) $f = a'b' + a'c'd' + abc$

(c) $f = b'c'd' + ab'c + a'bc + bc'd + ad'$

(d) $f = d + ac$

5.22

(a) Prime implicants: $AB', BC', AD', BD', AC', A'B$

$$f = AB' + BD' + AC' \text{ or}$$

$$f = AB' + BC' + BD' \text{ or}$$

$$f = AB' + BC' + AD'$$

- (b) Prime implicants: $B'CD, AC', AD', AB', BC'D, BCD', A'CD, A'BD, A'BC$
 $f = B'CD + AC' + AD'$
- (c) Prime implicants: $C'D, CD', A'B, AB'C', AB'D'$
 $f = C'D + CD' + A'B$
- (d) Prime implicants: $A'B, BCD, AB'C', AB'D'$
 $f = A'B + BCD$
- (e) Prime implicants: $CD, A'B, AB'$
 $f = CD + A'B$
- (f) Prime implicants: $A'B, BC', BD', AC', AD', AB'$
 $f = BD' \text{ or}$
 $f = BC' \text{ or}$
 $f = A'B$
- (g) Prime implicants: $BCD, A'C', A'D', A'B, B'D', B'C'$
 $f = BCD + A'B \text{ or}$
 $f = BCD + A'D' \text{ or}$
 $f = BCD + A'C'$

5.28

$$F = b'd' + a'd + c'd$$

6.4

$$f = \underline{bc'} + \underline{b'cd'} + a'd + a'b$$

$$f = \underline{bc'} + \underline{b'cd'} + c'd + a'c$$

$$f = \underline{bc'} + \underline{b'cd'} + a'c + a'd$$

6.7

(a) Prime implicants: $a'c'd', a'bc', a'cd, b'cd, a'bd, bc'd, ab'd, ac'd$

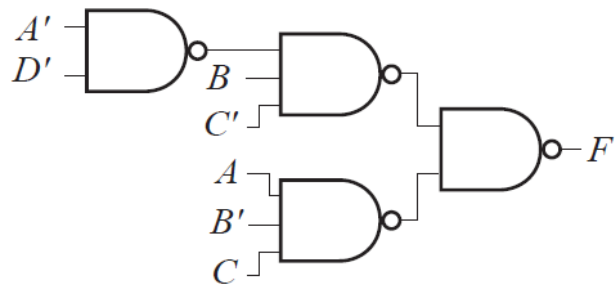
(b) Prime implicants: $ad, bc', a'cd', b'cd', a'bd', ab'c$

6.23

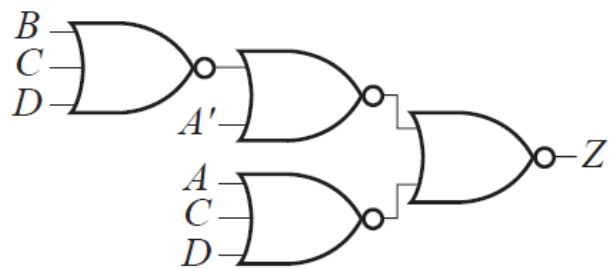
Prime implicants: $AC, AD', AB, CD, BD, A'D$

$(AD' + CD); (AD' + BD); (AB + BD); (AB + CD); (AB + A'D)$

7.4

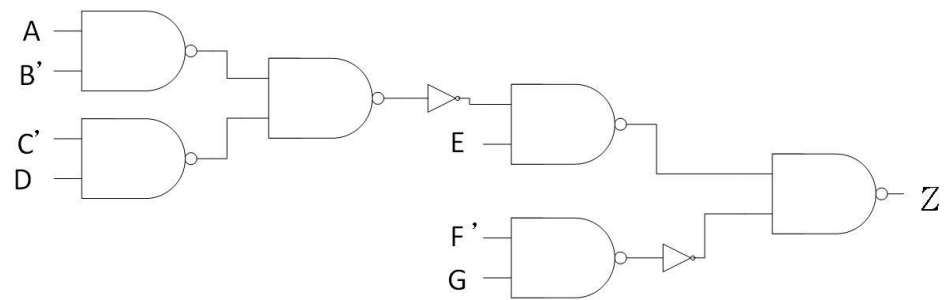


7.5

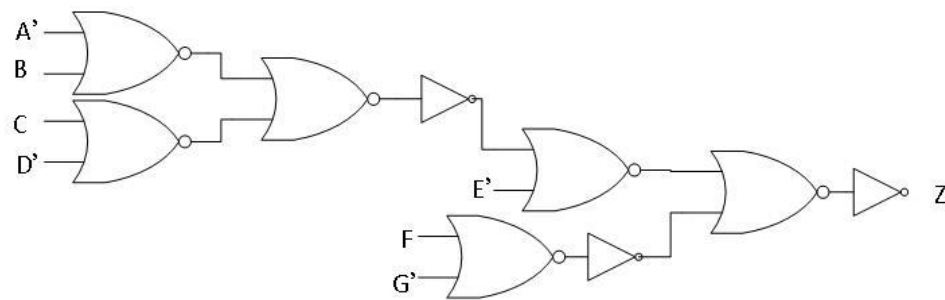


7.8

(a)



(b)



7.10

$$f_1 = ab'd + \underline{b'cd} + a'bd'$$

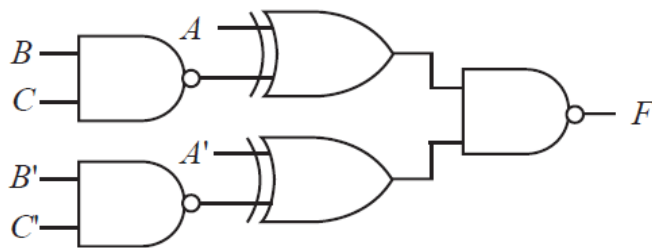
$$f_2 = \underline{ab'c} + b'cd' + bc'd' + ac'd' \quad \text{or} \quad f_2 = \underline{ab'c} + b'cd' + bc'd' + ab'd'$$

$$f_3 = \underline{ab'c} + \underline{b'cd} + a'bc$$

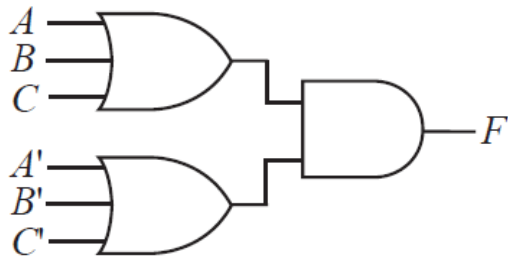
(有底線的 AND gate 可以 share，答案不唯一)

7.40

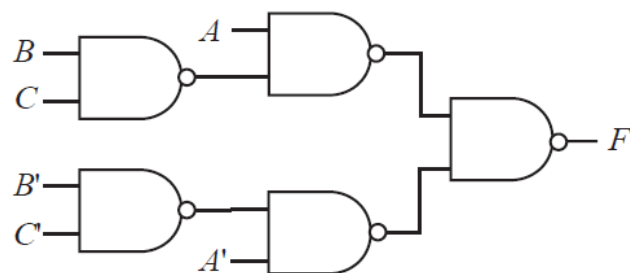
(a)



(b)



(c)



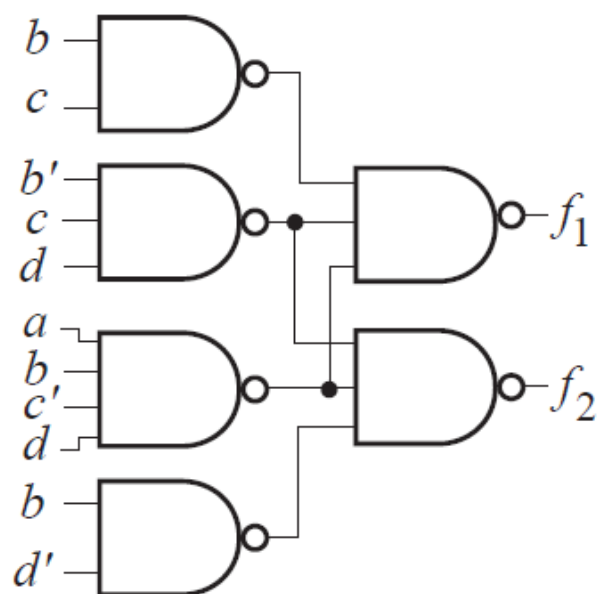
7.42

$$f_1 = \underline{b'c'd'} + ac \quad f_2 = b'c' + \underline{b'c'd'} \quad f_3 = ab + ad + \underline{b'c'd'}$$

(有底線的 AND gate 可以 share，答案不唯一)

7.47

(a)



(b)

