

09-10 找冬 参考答案 (第一版)

仅供参考, 仅供参考

VxVVx VxxxV

= 1. ① 真值表

$$F = m_7 + m_{11} + m_{13} + m_{14} + m_{15} + m_9 + m_{10} + m_{12}$$

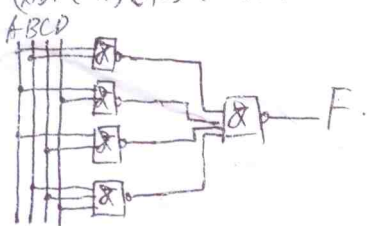
$$= A'BCD + AB'C'D + AB'CD + AB'CD + ABC'D + ABC'D + ABCD' + ABCD$$

② 化简

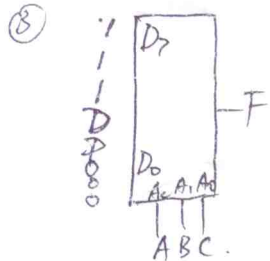
F	00	01	11	10
AB	00	01	11	10
00	0	0	0	0
01	0	0	1	0
11	1	1	1	1
10	0	1	1	1

$$F = AB + AD + AC + BCD$$

$$= (AB)'(AD)'(AC)'(BCD)'$$



女有BC排布不一致, 可再化简于真值表

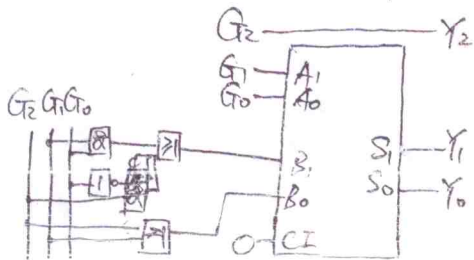


2. ① 输入 G_2, G_1, G_0 输出 Y_2, Y_1, Y_0 低三位为 B, B, B

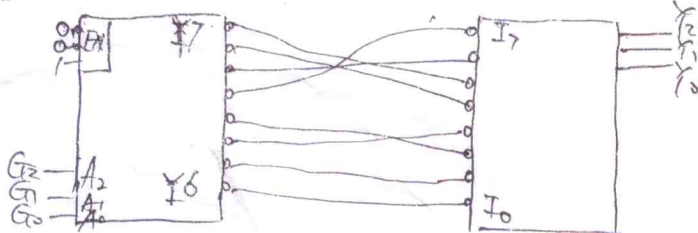
000	000	00
001	001	00
011	010	11
010	011	01
110	100	10
111	101	10
101	110	01
100	111	11

$$B_1 = G_1 G_0 + G_2 G_0$$

$$B_0 = G_2 \oplus G_1$$

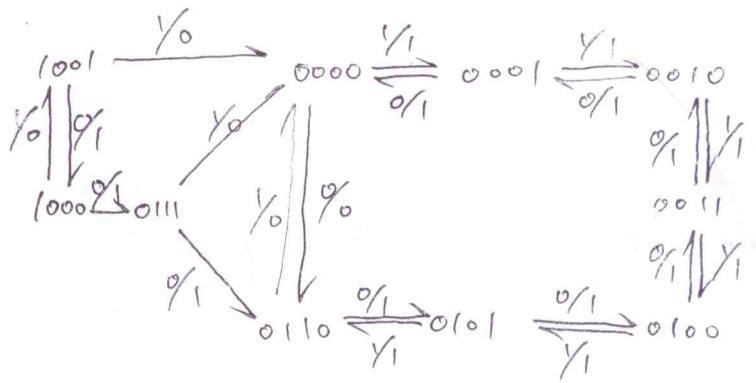


②



输入 138: 7 6 5 4 3 2 1 0
输出 148: 7 6 5 4 3 2 1 0

三.



四.

A	Q	Q'	S, S ₀	Z ₁	Z ₂
0	0000	0001		1	1
	0001	0011		0	1
	0011	0111	01	1	1
	0111	1111		0	1
	1111	1100		1	1
	1100	1000		1	1
	1000	0000		1	1
1	1000	1000		1	1
	1000	0000		1	1
	0000	0001	01	1	1
	0001	0011		1	0
	0011	0111		1	0
	0111	1111		1	0
	1111	1100	11	1	0

① 先把 124 设计为扭环型计数器

$$D_{SR} = Q_3' + Q_2' Q_0$$

② 列功能方程 $S_1 = A Q_3 Q_2 Q_1 Q_0$
 $S_0 = 1$

③ 列真值表

$Z_1, Q_3 Q_2 (A=0 \text{ 时})$

$Q_3 Q_2$	00	01	11	10
00	1	1	0	X
01	X	X	1	X
11	1	X	1	0
10	1	X	X	X

$$Z_1 = A'(Q_3' + Q_2 Q_0)$$

$Z_2, Q_3 Q_2 (A=1 \text{ 时})$

$Q_3 Q_2$	00	01	11	10
00	1	1	1	X
01	X	X	0	X
11	0	X	0	X
10	1	X	X	X

$$Z_2 = A Q_2'$$

(3) 限不 124, 仅供参考

参考答案 (第=题)

五. 计数器

$$\text{Count} = S_0 + S_1 \cdot m + S_2 + S_3 + S_4 \\ + S_5 + S_6 \cdot m' + S_7$$

注: S_1 也考虑为置数条件
如使用三位二进制, S_2 为计数条件
如使用四位二进制, S_2 为置数条件。

置数条件:

$$\text{Load} = S_1 \cdot m' + S_6 \cdot m$$

输出:

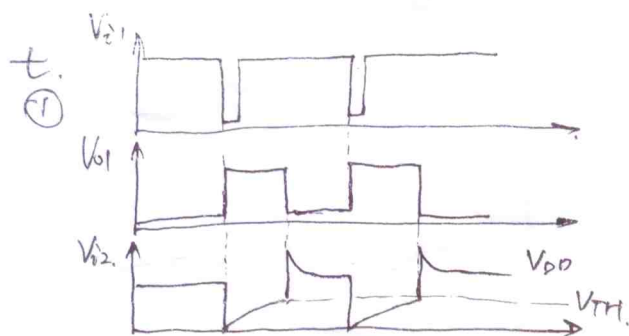
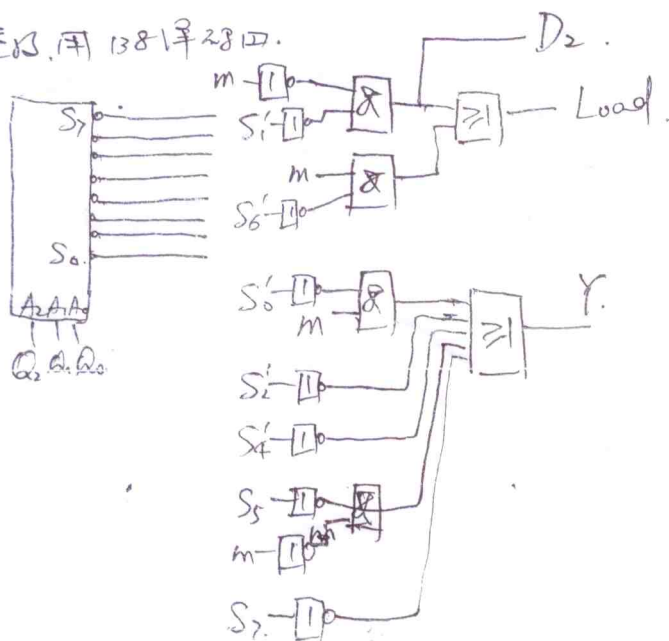
$$Y = S_0 \cdot m + S_2 + S_4 \\ + S_5 \cdot m' + S_7$$

$$\text{置数初值 } D_2 = S_1 \cdot m' \quad D_1 = D_0 = 0$$

计数器用数据选择器



置数, 用 138 译 28 四.



$$f_w = RC \ln \frac{V_{DD} - V_0}{V_0 - V_T} = RC \ln \frac{V_{DD} - 0}{V_{DD} - \frac{1}{2}V_{DD}} = 350 \mu s$$

module Count60BCD(gout, count, data, LD, EN, CLR, CLK)

parameter M = 8'B 0101 1001;

output [7:0] gout;

input [7:0] data;

reg [7:0] gout;

assign count = (gout == M) & EN;

always @ (posedge CLK or negedge CLR)

begin

if (!CLR)

gout = 0;

else if (LD)

gout = data;

else if (EN)

begin

if (gout == M) gout = 0;

else if (gout [3:0] == 9)

begin

gout [3:0] = 0;

gout [7:4] = gout [7:4] + 1;

end

end

end

end module

②

$$T = (2R_2 + R_1) C \ln 2$$

$$① = 12 \times 10^{-3} \ln 2$$

$$= 8.31 \text{ ms}$$

$$\text{②} = 14.56 \text{ ms}$$

$$\delta = \frac{R_1 + R_2}{R_1 + 2R_2} = \frac{11}{12} = 83\%$$

$$\delta' = \frac{11}{21} = 52\%$$

