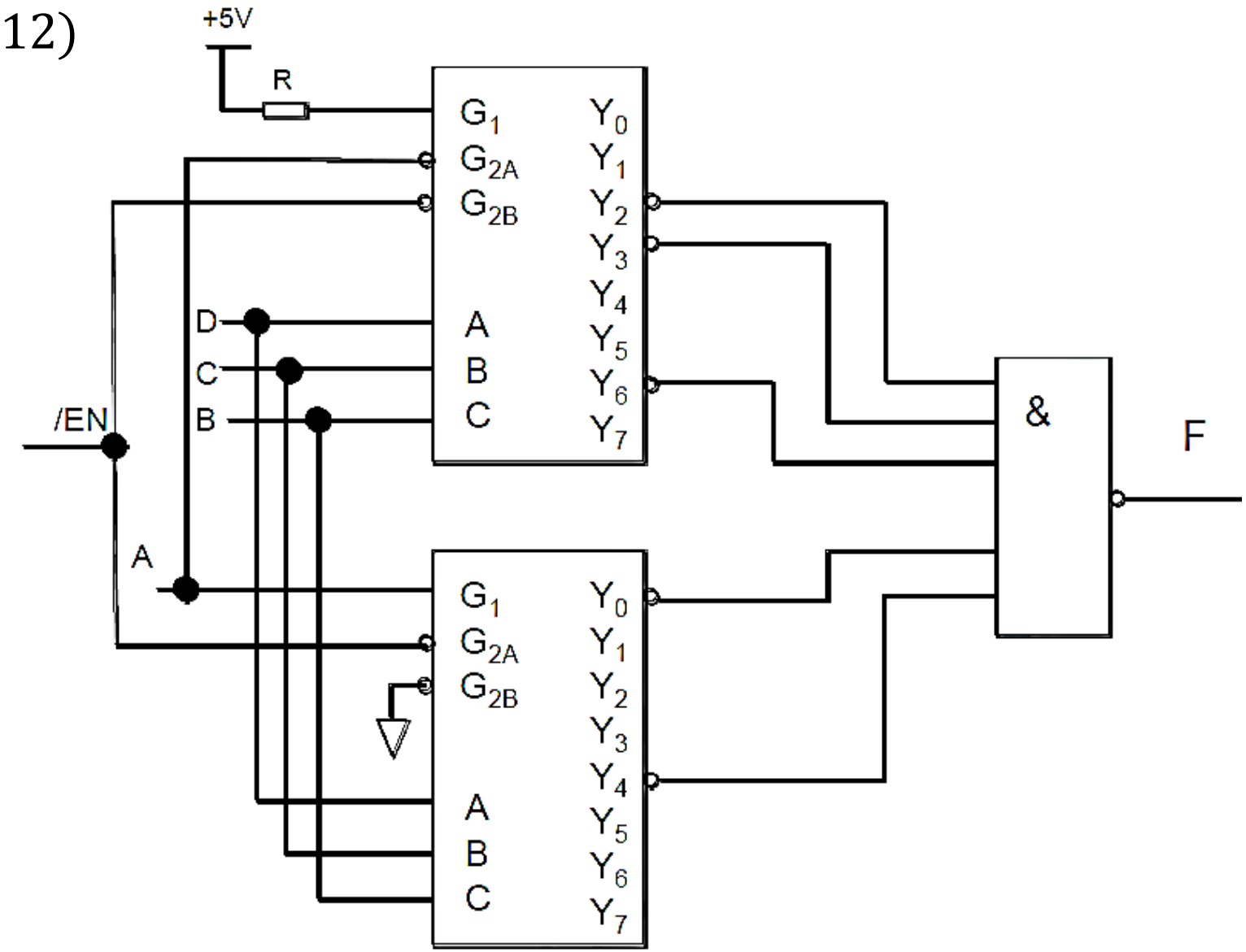
第4次作业

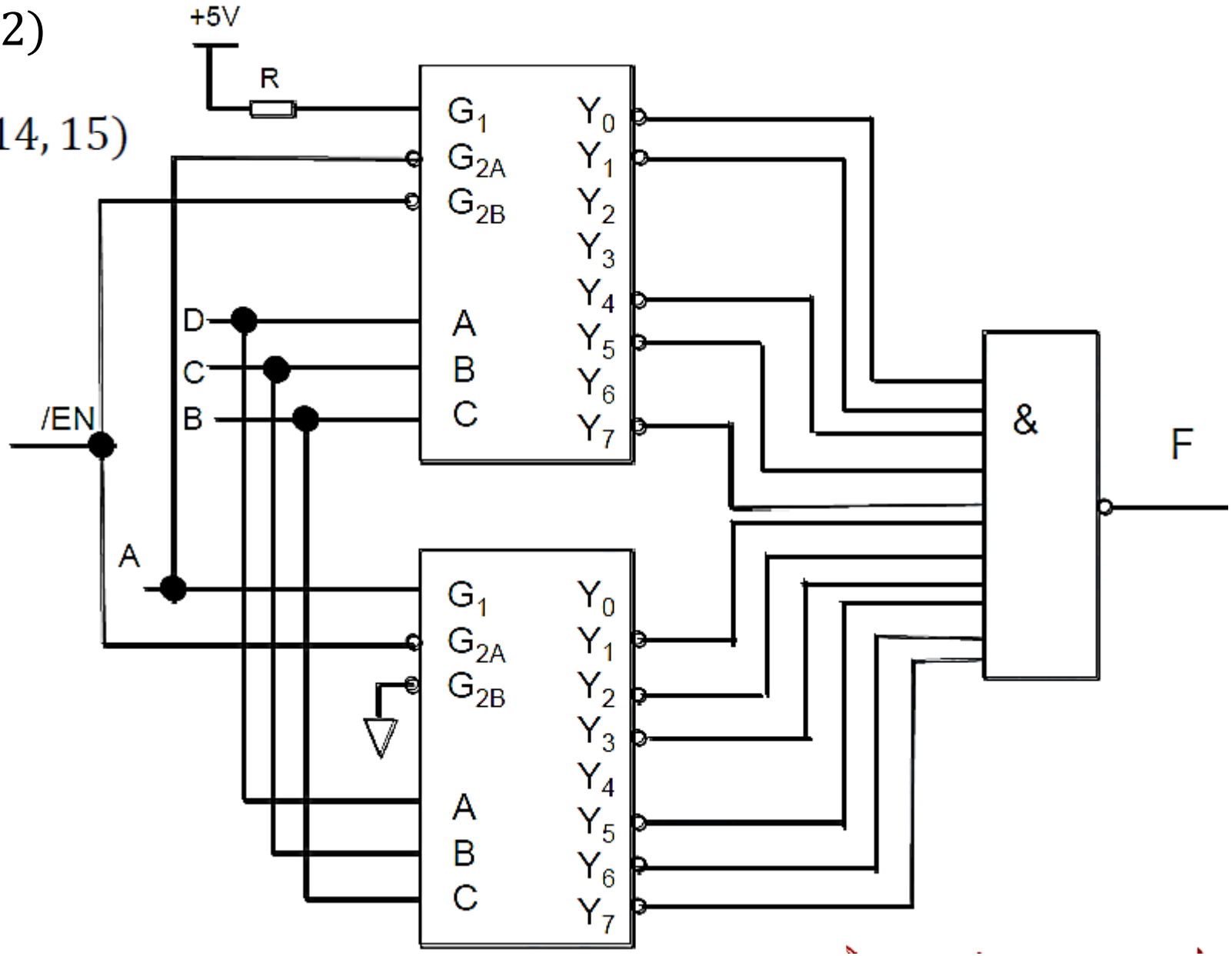
2. 13 用二进制译码器74LS138及与非门实现下列单输出及多输出函数表示的电路

（1）$F = \sum m^4(2,3,6,8,12)$

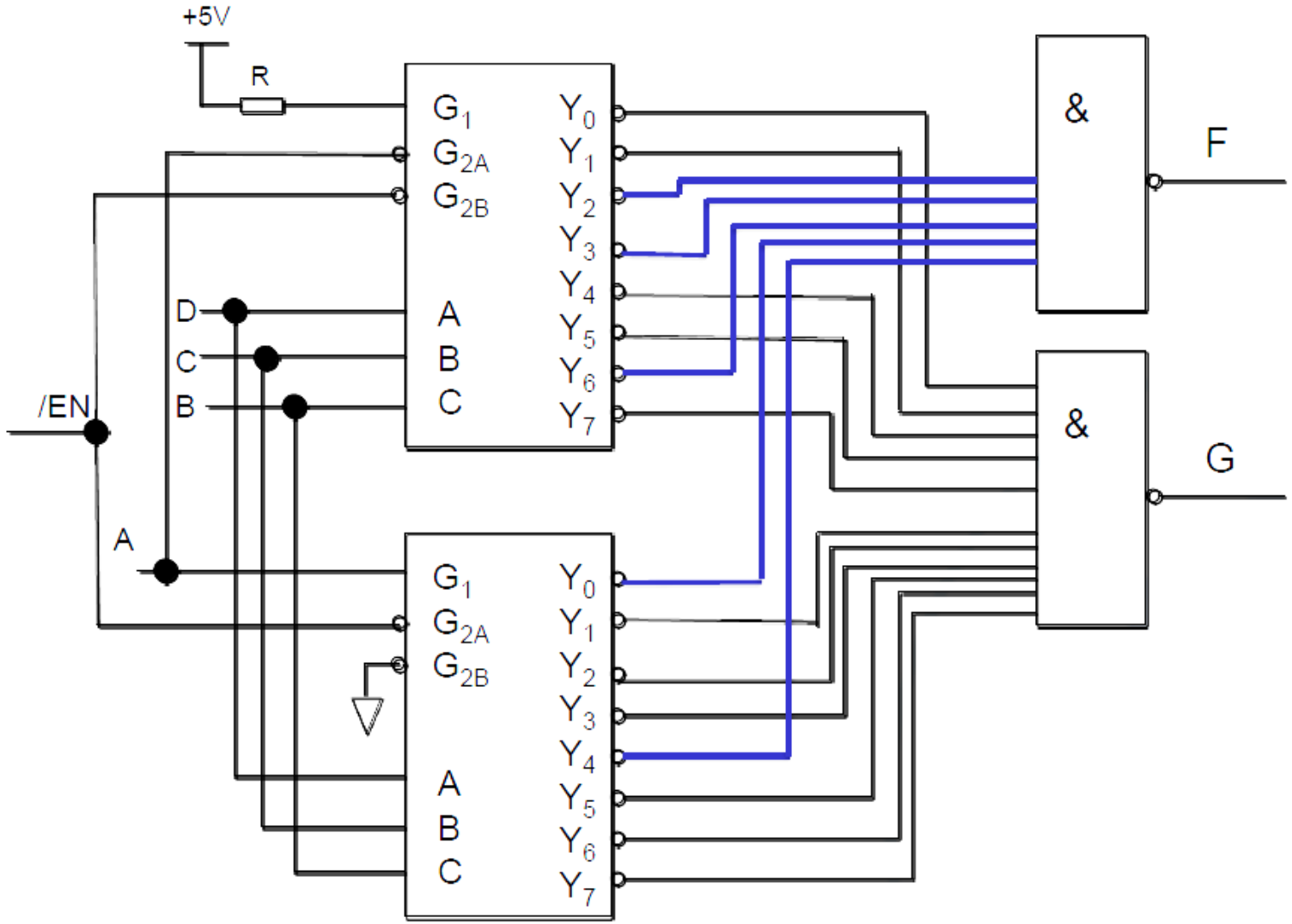


（2）$F = \prod M^4(0,2,3,6,8,12)$

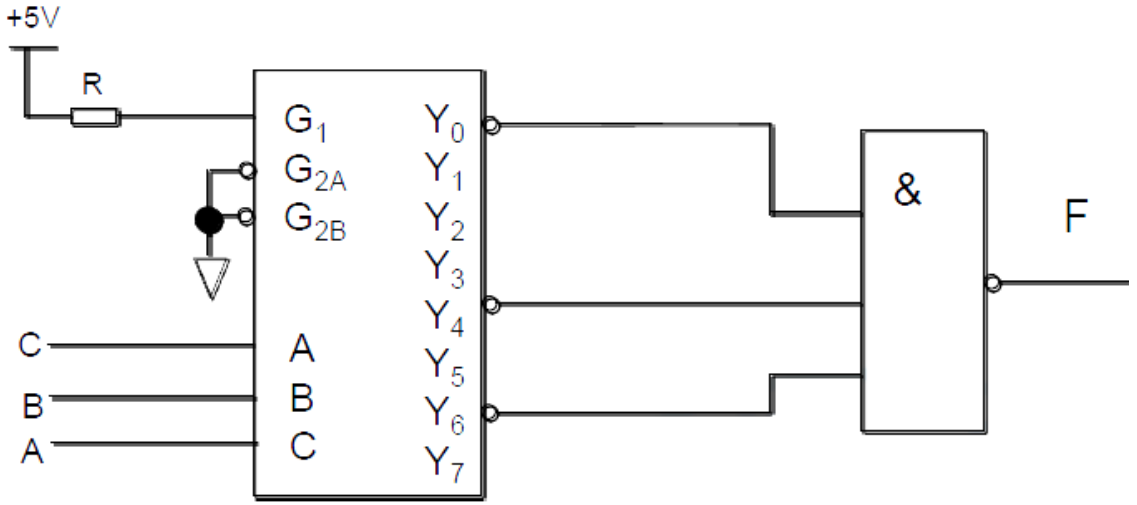
$\sum m^4(0,1,4,5,7,9,10,11,13,14,15)$

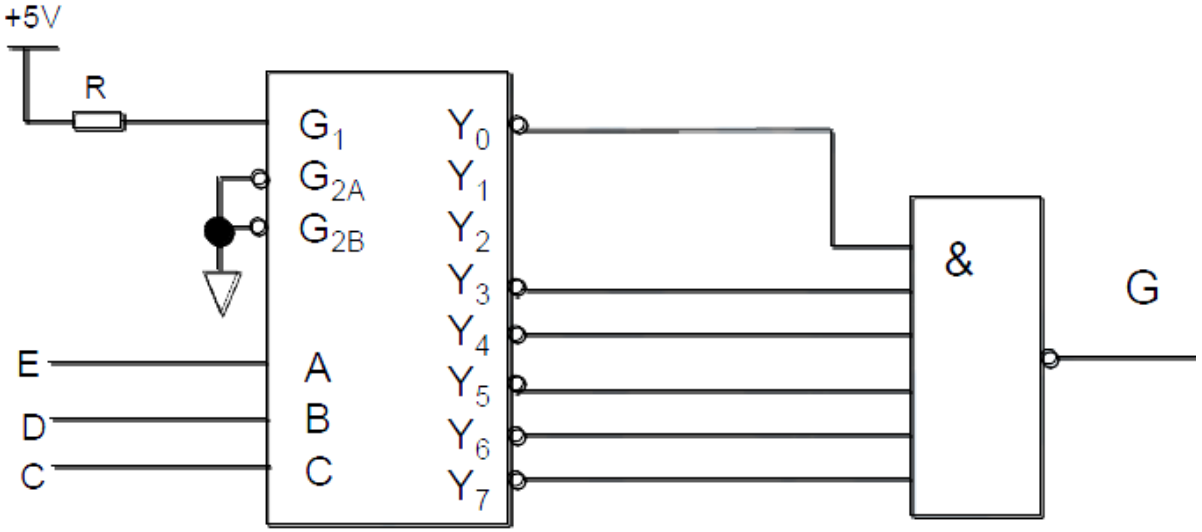


（3）
$$F(A,B,C,D)=\sum m^4(2,3,6,8,12)$$
$$G(A,B,C,D)=\prod M^4(0,2,3,6,8,12)$$



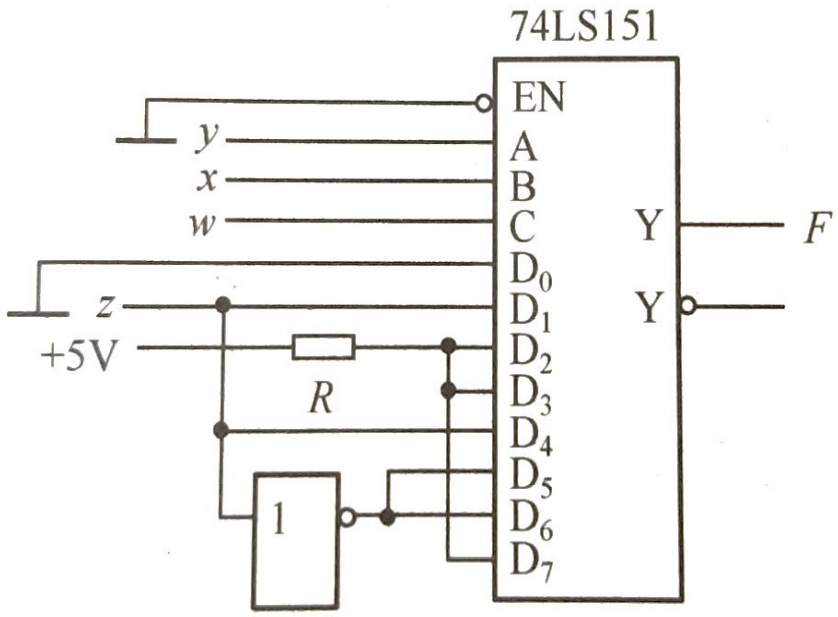
(4) $\begin{cases} F(A,B,C) = \sum m\,(0,4,6) \\ \mathrm{G(C,D,E)} = \prod M\,(1,2) \end{cases}$





2. 17 写出如图所示的多路选择器的真值表

w	x	y	F
0	0	0	0
0	0	1	Z
0	1	0	1
0	1	1	1
1	0	0	Z
1	0	1	$\bar{Z}$
1	1	0	$\bar{Z}$
1	1	1	1

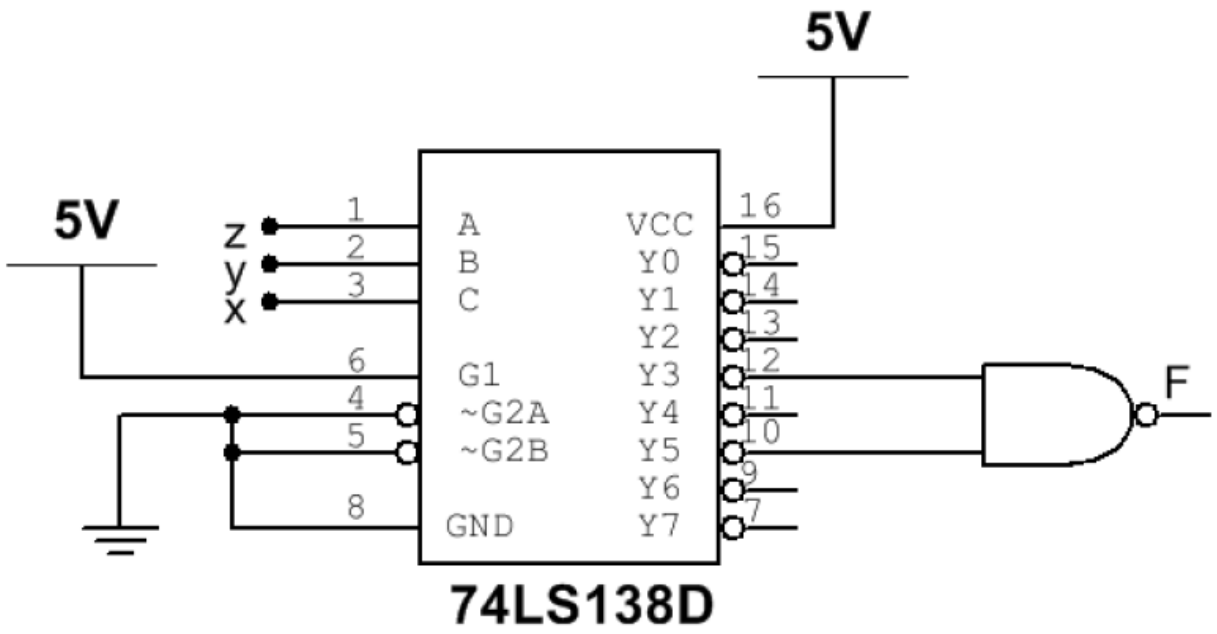


输入 wxyz	输出 F
0000	0
0001	0
0010	0
0011	1
0100	1
0101	1
0110	1
0111	1
1000	0
1001	1
1010	1
1011	0
1100	1
1101	0
1110	1
1111	1

2.18 最多用一个SSI器件和一个MSI器件（74LS138、74LS53、74LS151）实现下列功能

（1）$F = \bar{X}YZ + X\bar{Y}Z$

$$F = \sum m^3(3,5)$$

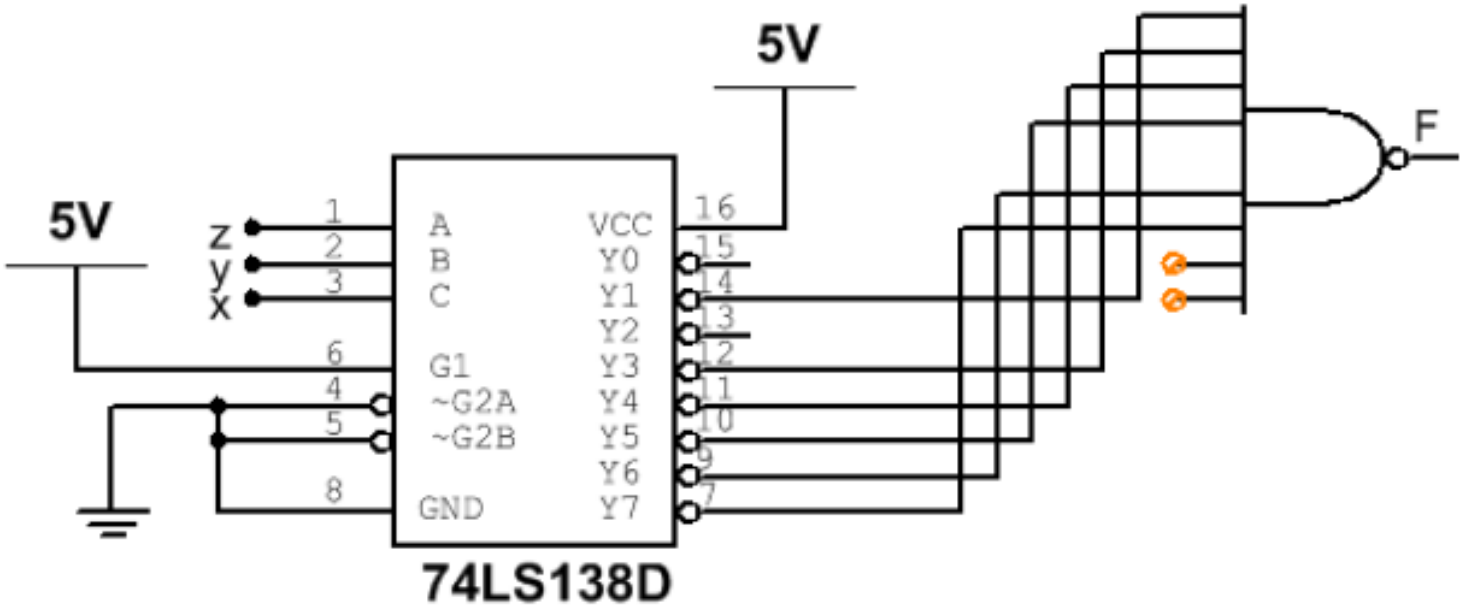


（1）$F = X\overline{YZ} + X\bar{Y} + Z$

$= X(\bar{Y} + \bar{Z}) + X\bar{Y} + Z = X\bar{Y} + X\bar{Z} + Z$

$= X\bar{Y}Z + X\bar{Y}\bar{Z} + XY\bar{Z} + XYZ + \bar{X}\bar{Y}Z + \bar{X}YZ$

$= \sum m^3(1,3,4,5,6,7)$



2. 19 使用4位加法器74LS283设计下列十进制代码转换电路

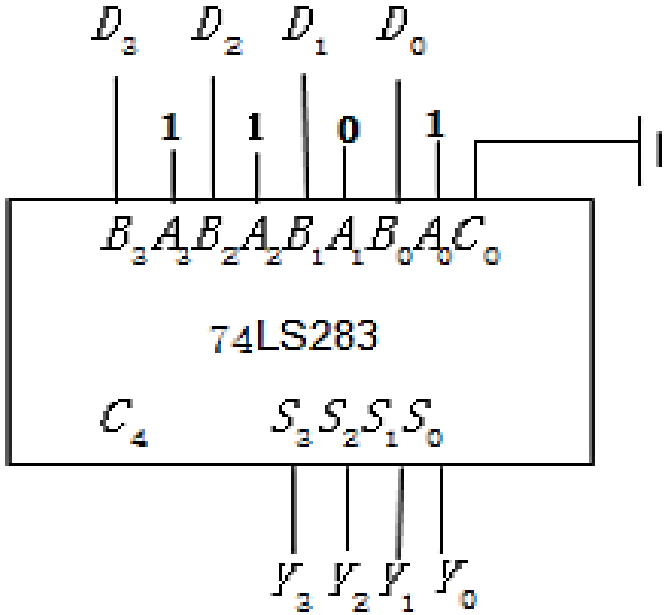
（1）余3码转换成8421码

用$D_3D_2D_1D_0$表示余3码，用$Y_3Y_2Y_1Y_0$表示8421码

$$Y_3Y_2Y_1Y_0 = D_3D_2D_1D_0 - 0011$$

$$= D_3D_2D_1D_0 + (-0011)\text{补}$$

$$= D_3D_2D_1D_0 + 1101$$



（2）2421码转换成余3码

用$A_3A_2A_1A_0$表示2421码，用$B_3B_2B_1B_0$表示加数，用$Y_3Y_2Y_1Y_0$表示余3码

对前5个余3码　$Y_3Y_2Y_1Y_0 = A_3A_2A_1A_0 + 0011$

对后5个余3码　$Y_3Y_2Y_1Y_0 = A_3A_2A_1A_0 + (-0011)$补$= A_3A_2A_1A_0 + 1101$

2421 码	余 **3** 码	加数
0000	0011	0011
0001	0100	0011
0010	0101	0011
0011	0110	0011
0100	0111	0011
1011	1000	-0011(1101)
1100	1001	-0011(1101)
1101	1010	-0011(1101)
1110	1011	-0011(1101)
1111	1100	-0011(1101)

A_3A_2 / A_1A_0	00	01	11	10
00	0	0	1	d
01	0	d	1	d
11	0	d	1	1
10	0	d	1	d

$B_3 = A_3$

A_3A_2 / A_1A_0	00	01	11	10
00	0	0	1	d
01	0	d	1	d
11	0	d	1	1
10	0	d	1	d

$B_2 = A_3$

A_3A_2 / A_1A_0	00	01	11	10
00	1	1	0	d
01	1	d	0	d
11	1	d	0	0
10	1	d	0	d

$B_1 = \overline{A_3}$

A_3A_2 / A_1A_0	00	01	11	10
00	1	1	1	d
01	1	d	1	d
11	1	d	1	1
10	1	d	1	d

$B_0 = 1$

$$Y_3Y_2Y_1Y_0 = A_3A_2A_1A_0 + A_3A_3\overline{A_3}\,1$$