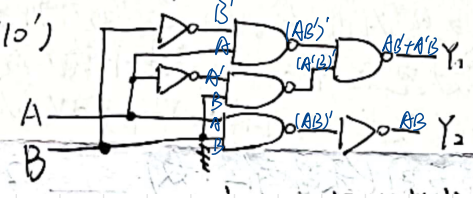
二. 计算 (50')

1. (10')



(1) Y_1, Y_2 最简与或表达式 (4')

(2) 真值表 (3')

(3) 分析, 判断逻辑功能 (3')

(1) $Y_1 = AB' + A'B$

$Y_2 = AB$

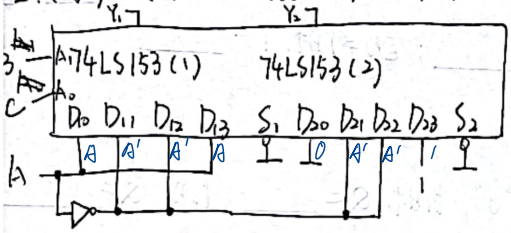
(2) 真值表

A	B	Y_1	Y_2
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

(3) Y_1 实现了异或运算

Y_2 实现了与运算

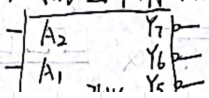
2. (15') 双四选一数据选择器构成电路



(1) 列真值表, 写出 Y_1, Y_2 逻辑函数式 (最小项之和形式) (6')

(2) 分析, 判断逻辑功能 (3')

(3) 在 74HC138 译码器图中用 74HC138 与与门重现功能 (6')



3. (15') 用负边沿触发的 JK 触发器设计电路

(1)

A	B	C	Y_1	Y_2
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

$Y_1 = A(B'C' + BC) + A'(B'C + BC') = A \oplus B \oplus C$

$Y_2 = A'B'C + A'BC' + A'BC + ABC$

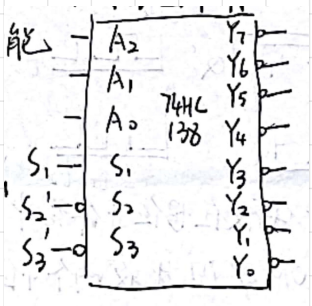
$= \sum m(1,2,3,7)$

001

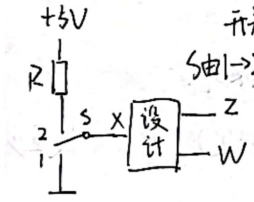
010

011

111



3. (15') 用负边沿触发的JK触发器设计电路 (16')



开关S在1时(X=0), ZW=00

S由1→2时(X=1), ZW产生完整序列输出

00→01→11→10

最后S仍在2, ZW=10

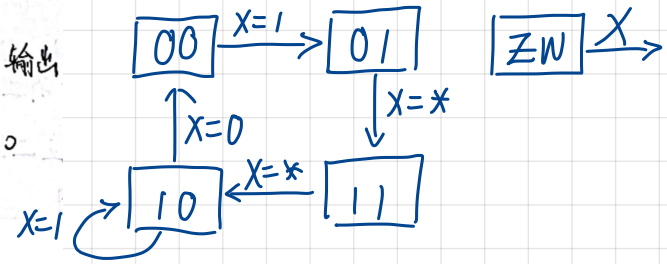
当S回到1, ZW=00

(1) 画出电路最简状态转换图 (4')

(2) 画出次态卡诺图, 化简 (4')

(3) 状态方程. 驱动方程. 输出方程 (5')

(4) 画逻辑电路图 (2')



(2)

X \ ZW	00	01	11	10
0		√	√	
1		√	√	√

Z^*

XZ

X \ ZW	00	01	11	10
0		√		
1	√	√		

W^*

(3) 状态:

$Z^* = (W + XZ) = WZ' + (W+X)Z$

$W^* = XZ' + Z'W$

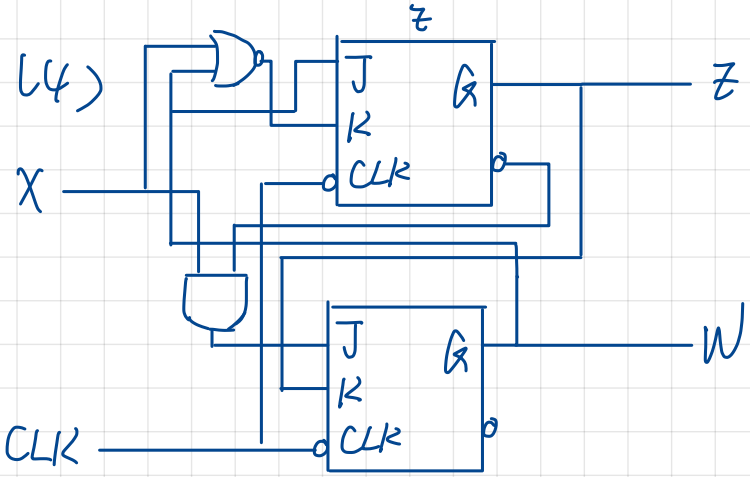
$= XZ'(W'+W) + Z'W$

$= XZ'W' + Z'W$

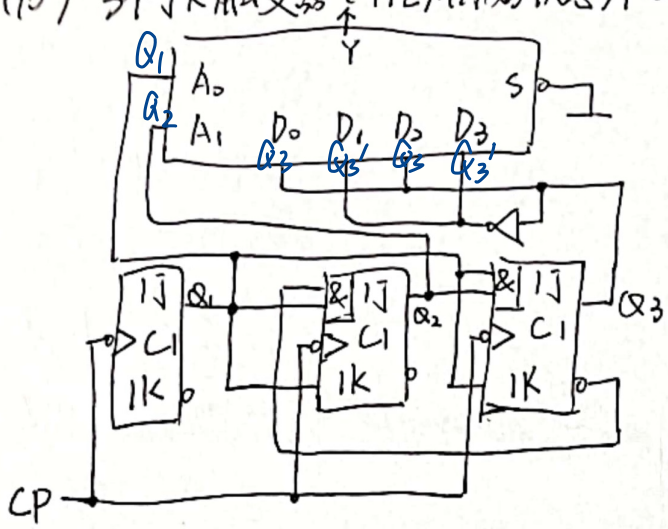
$J_1 = W$ $K_1 = (W+X)'$

$J_2 = XZ'$ $K_2 = Z$

(4)



4.(10') 3个JK触发器(TTL)初始状态为0,



(1) 驱动方程,状态方程(6')

(2) 画出状态转换图(3')

(3) 在时序电路的输出控制下,数据选择器的输出序列(1')

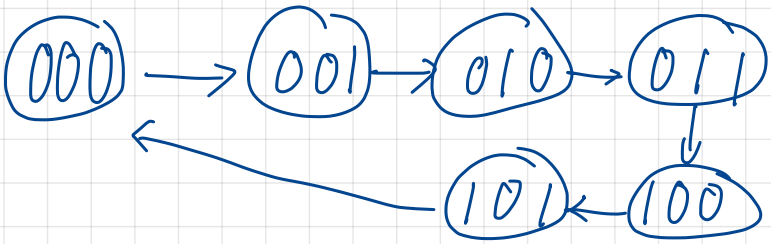
驱: $J_1=K_1=1$ 状: $Q_1^*=Q_1'$

$J_2=Q_1Q_3'$ $K_2=Q_1$ $Q_2^*=Q_1Q_3'Q_2'+Q_1'Q_2$ $=Q_3'Q_2'Q_1+Q_2Q_1'$

$J_3=Q_1Q_2$ $K_3=Q_1$ $Q_3^*=Q_1Q_2Q_3'+Q_1'Q_3$ $=Q_3'Q_2Q_1+Q_3Q_1'$

$Q_3Q_2Q_1$

(2)



(3)

	$Q_3Q_2Q_1$	Y
1	000	0
2	001	1
3	010	0
4	011	1
5	100	1
6	101	0
7	000	0