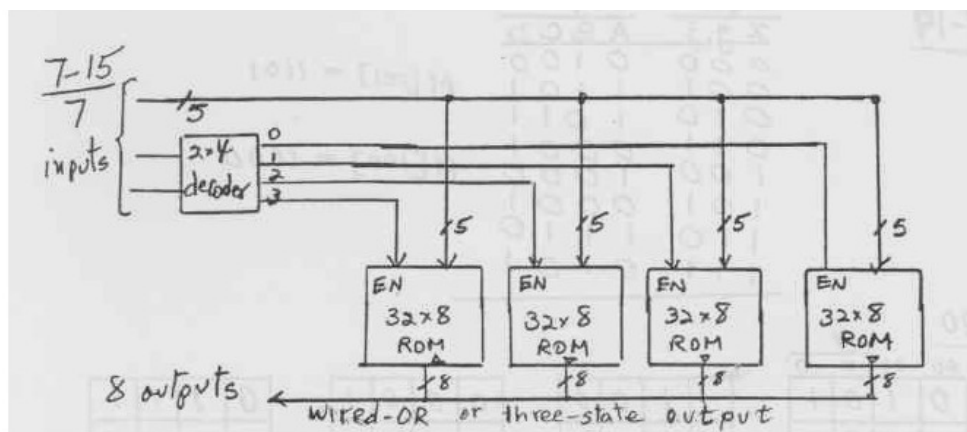


1.(30%)A  $16K \times 4$  memory uses coincident decoding by splitting the internal decoder into X-selection and Y-selection .Determine the X and Y selection lines that are enabled when the input address is the binary equivalent of 6000

7-7  $16K = 2^{14} = 2^7 \times 2^7 = 128 \times 128$   
 (a) Each decoder is  $7 \times 128$   
 Decoders require 256 AND gates, each with 7 inputs  
 (b)  $6,000 = \underbrace{0101110}_X = 46 \quad \underbrace{1110000}_Y = 112$

2.(30%)Given a  $32 \times 8$  ROM chip with an enable input ,show the external connections necessary to construct a  $128 \times 8$  ROM with four chips and a decoder



3.(40%)Design a counter with T flip-flops that goes through the following binary repeated sequence :0 , 1, 3 ,7 ,6 ,4 .Show that when binary states 010 and 101 are considered as don't care conditions ,the counter may not operate properly .find a way to correct the design.

6-24

Present state	Next state	Flip/flop inputs
ABC	ABC	TA TB TC
000	001	0 0 1
001	011	0 1 0
010	xxx	x x x
011	111	1 0 0
100	000	1 0 0
101	xxx	x x x
110	100	0 1 0
111	110	0 0 1

BC  
00 01 11 10

A	0	1	1	0
0			1	x
1	1	x		

$TA = A \oplus B$

A	0	1	1	0
0	1			x
1		x	1	

$TC = A \oplus C$

010 → 101  
 Not self correcting

BC  
00 01 11 10

B	0	1	1	0
0		1		x
1	x			1

$TB = B \oplus C$

B	0	1	1	0
0	1			x
1		x	1	

$TC = AC + A'BC'$

101 → 010 → 100  
 Self correcting

只要有寫出正確的 self correcting 的方法就給分,如果寫錯,則扣一半,剩下一半由證明 not self-correcting 的過程完整與否給分