EGN3342 - Homework 5 - Justin VanWinkle - j3338546

Tuesday, July 28, 2015 10:04 AM

11.2 a) $R = 1$ and $H = 0$ cannot occur at the same time

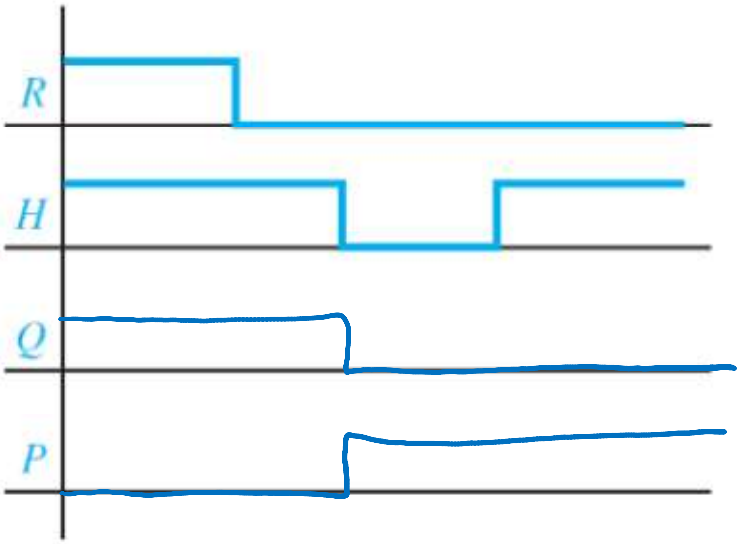
b)

R	H	Q	Q+
0	0	0	0
		1	0
0	1	0	0
		1	1
1	0	0	X
		1	X
1	1	0	1
		1	1

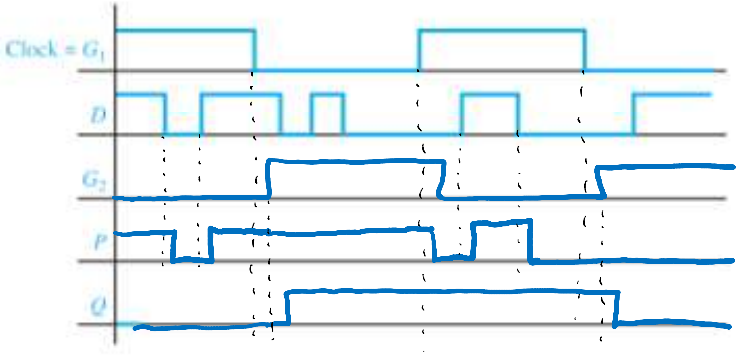
Q \ RH	00	01	11	10
0	0	0	1	X
1	0	1	1	X

$Q^+ = R + HQ$

c)



11.5 The inverter must be moved from G_1 to G_2



11.13 a)

A	B	Q	Q+
0	0	0	0
		1	0
0	1	0	1
		1	0

Q \ AB	00	01	11	10
0	0	0	1	0
1	0	1	1	1

$Q^+ = AB + BQ + AQ$

$Q^+ = AB + Q(A+B)$ – NAND

$Q^+ = (A'+B')(Q'+AB')$ – NOR

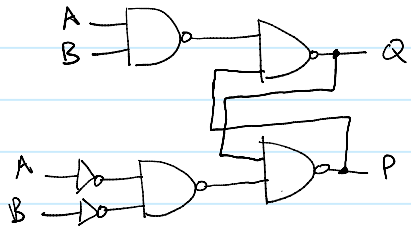
0	1	0	0
1	0	0	1
1	1	0	1

1	0	1	1	1

$Q^+ = AB + Q(A+B)$ - NAND

$Q^+ = (A'+B')(Q'+AB')$ - NOR

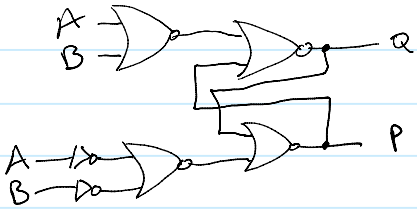
b)



c) AB = 01 to 10 could cause Q to change if the inverter delays are significant enough

d) $P = Q' + AB$ in all states, but does not strictly provide Q'

e)



c) Same as above

d) $P = Q'(A'+B')$ in all states but does not strictly provide Q'

11.15

a) $Q^+ = [P + (M+N+G)']'$

$= P'(M+N+G)$

$= [Q'(N+G+M'N'G')]'(M+N+G)$

$= [Q + (N'G'(M+N+G))](M+N+G)$

$= (Q + MN'G')(M+N+G)$

$= Q(M+N+G) + MN'G'$

$P = [Q + (N+G+(M+N+G)')']'$

$= Q'(N+G+(M+N+G)')$

$= Q'(N+G+M'N'G')$

b)

Pres. state Q	Next State (Q^+) MNG: 000	001	010	011	100	101	110	111
0	0	0	0	0	1	0	0	0
1	0	1	1	1	1	1	1	1

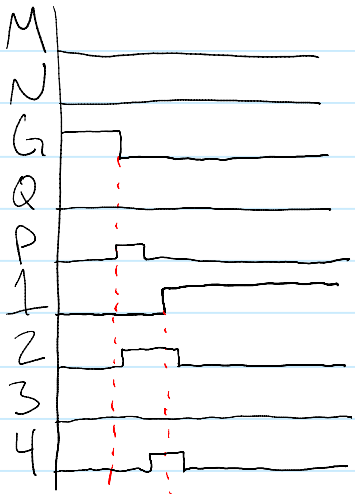
c) No restrictions

d) $P = Q[N+G+M'N'G'] = Q'[N+G+M]$

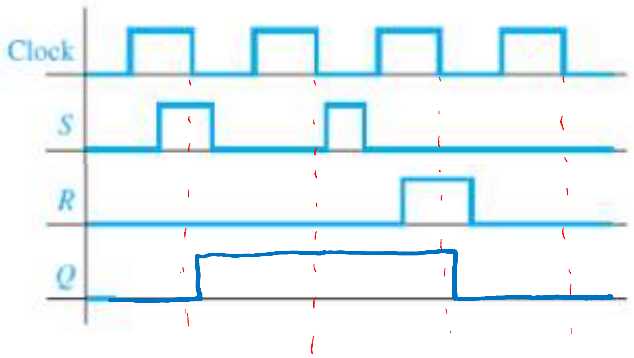
d) $P = Q[N + G + M'N'G'] = Q'[N + G + M]$

For all stable states, $P = Q'$.

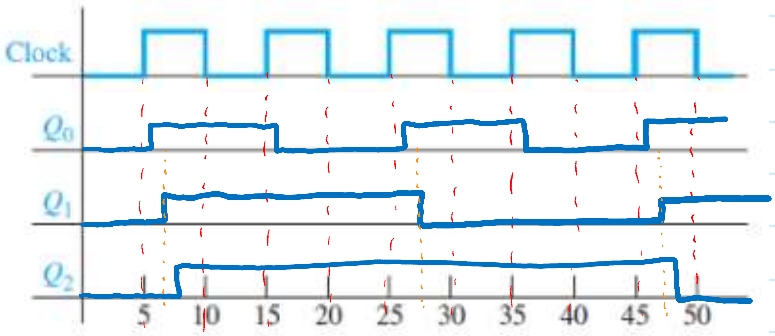
e)



11.21

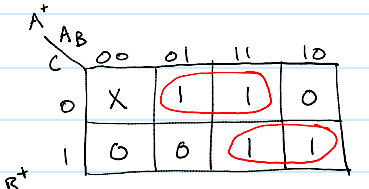


11.24

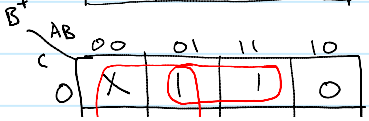


12.7 a)

A	B	C	A^+	B^+	C^+
0	0	0	X	X	X
0	0	1	0	1	1
0	1	0	1	1	0
0	1	1	0	1	0

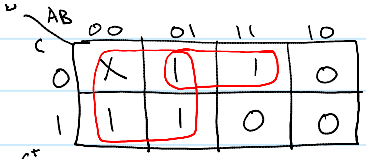


$A^+ = BC' + AC$

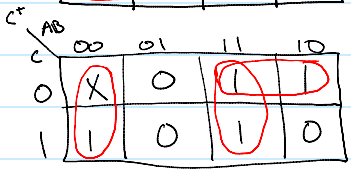


$B^+ = A' + BC'$

0	1	0	1	1	0
0	1	1	0	1	0
1	0	0	0	0	1
1	0	1	1	0	0
1	1	0	1	1	1
1	1	1	1	0	1



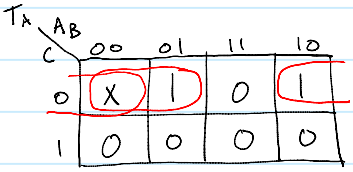
$B^+ = A' + BC'$



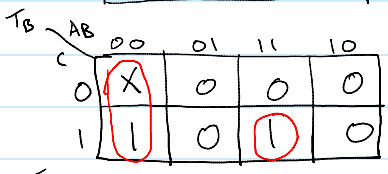
$C^+ = A'B' + AC' + AB$

— 000 will go to 011

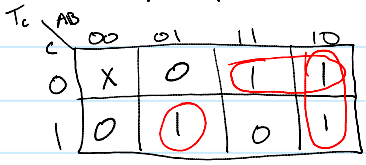
b)



$T_A = B'C' + A'C'$



$T_B = A'B' + ABC$

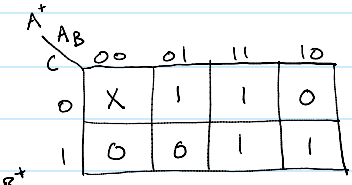


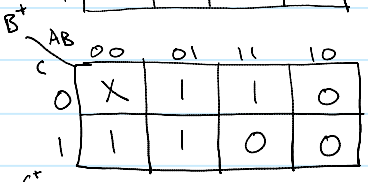
$T_C = AB' + AC' + A'BC$

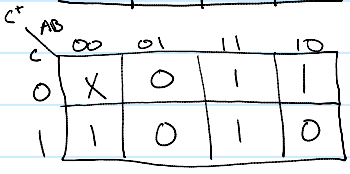
— 000 will go to 110

12.8

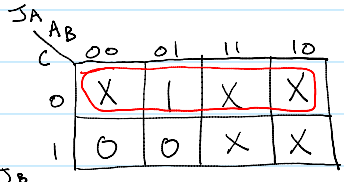
A	B	C	A^+	B^+	C^+
0	0	0	X	X	X
0	0	1	0	1	1
0	1	0	1	1	0
0	1	1	0	1	0
1	0	0	0	0	1
1	0	1	1	0	0
1	1	0	1	1	1
1	1	1	1	0	1

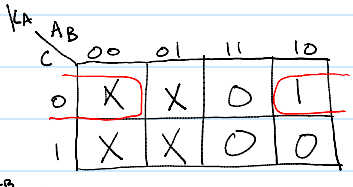






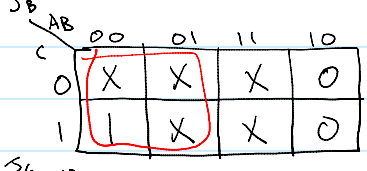
a)

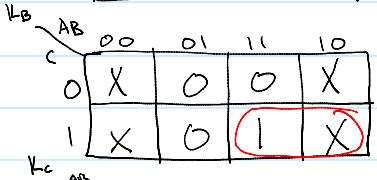




$J_A = C'$

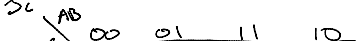
$K_A = B'C'$

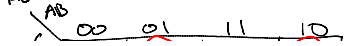


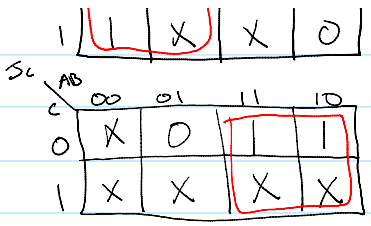


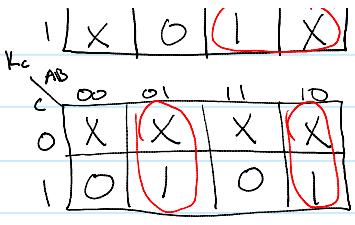
$J_B = A'$

$K_B = AC$









$K_B = AC$

$J_C = A$

$K_C = A'B + AB'$

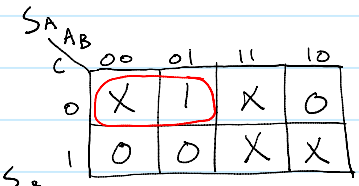
At 000: $J_A = 1$ $K_A = 1$

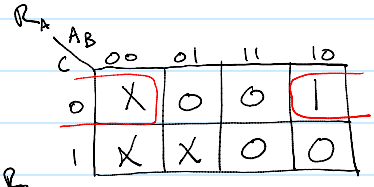
$J_B = 1$ $K_B = 0$

$J_C = 0$ $K_C = 0$

→ 000 goes to 110

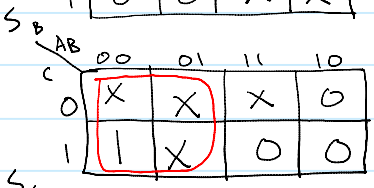
b)

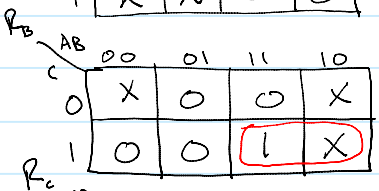




$S_A = A'C'$

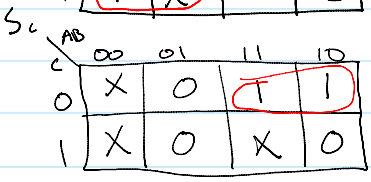
$R_A = B'C'$

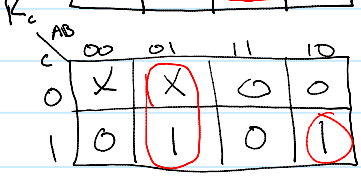




$S_B = A'$

$R_B = AC$





$S_C = AC'$

$R_C = A'B + AB'C$

At 000: $S_A = 1$ $R_A = 1$

$S_B = 1$ $R_B = 0$

$S_C = 0$ $R_C = 0$

→ 000 goes to 010