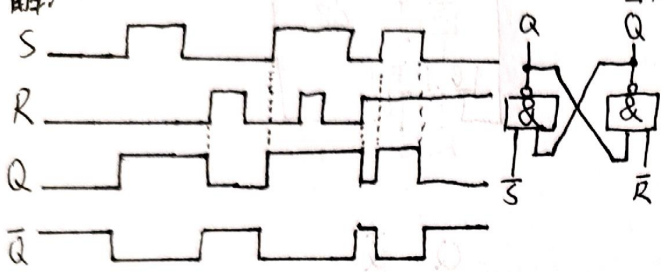
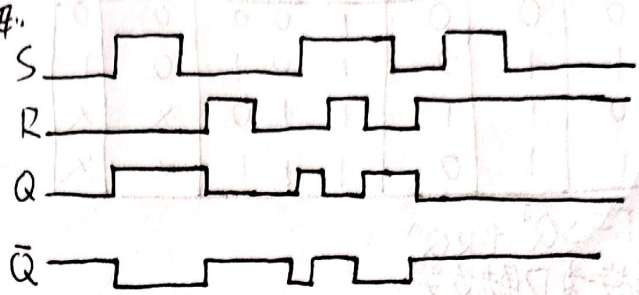
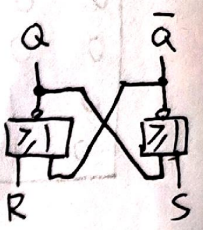
便 笺

4 4-1、解：

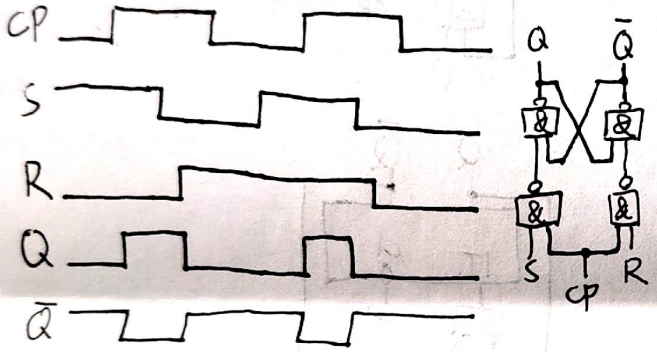


4-2、解：

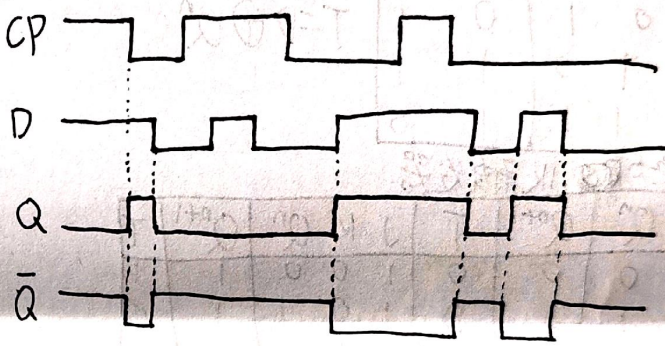


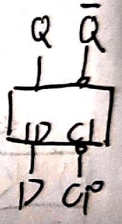


4-3 解：

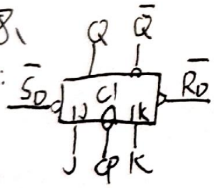


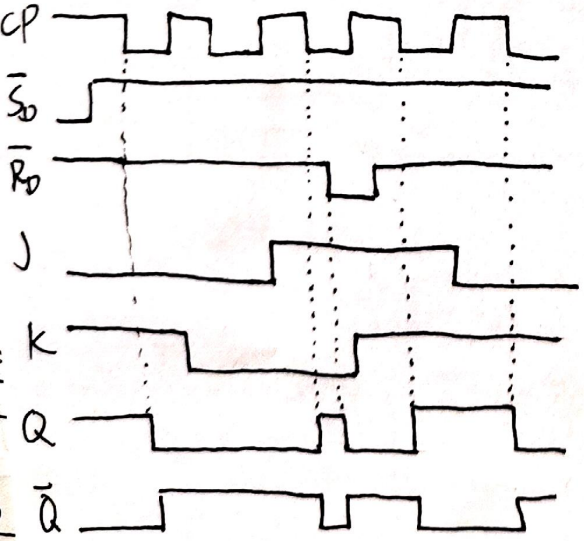
4-4、解：



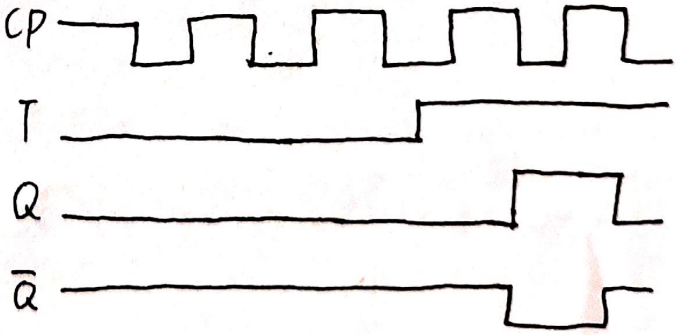


4-8、解：





4-9、解：



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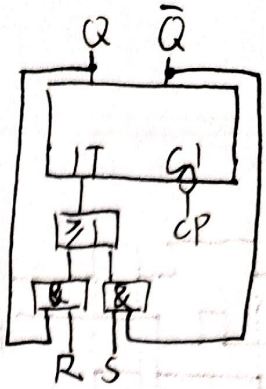
4-1)

解：$Q^{n+1}=T\bar{Q}^n+\bar{T}Q^n$

T触发器转换为RS触发器

R	S	Q^n	Q^{n+1}	T
0	0	0	0	0
0	0	1	1	0
0	1	0	1	1
0	1	1	1	0
1	0	0	0	0
1	0	1	0	1
1	1	0	x	x
1	1	1	x	x

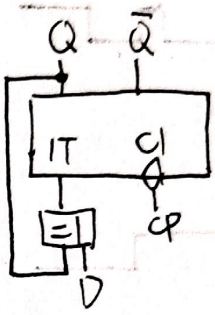
$T=S\bar{Q}^n+RQ^n$



转换为D触发器

D	Q^n	Q^{n+1}	T
0	0	0	0
0	1	0	1
1	0	1	1
1	1	1	0

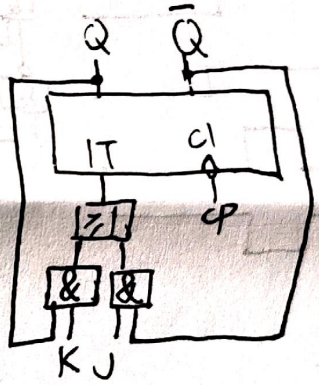
$T=D\oplus Q^n$



转换为JK触发器

J	K	Q^n	Q^{n+1}	T
0	0	0	0	0
0	0	1	1	0
0	1	0	0	0
0	1	1	0	1
1	0	0	1	1
1	0	1	1	0
1	1	0	1	1
1	1	1	0	1

$T=J\bar{Q}^n+KQ^n$



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4-12、

解：

(1) $Q_1^{n+1}=D=\bar{Q}_1^n$，CP↓

(2) $Q_2^{n+1}=J\bar{Q}_2^n+KQ_2^n=A\bar{Q}_2^n+AQ_2^n=A$，CP↓

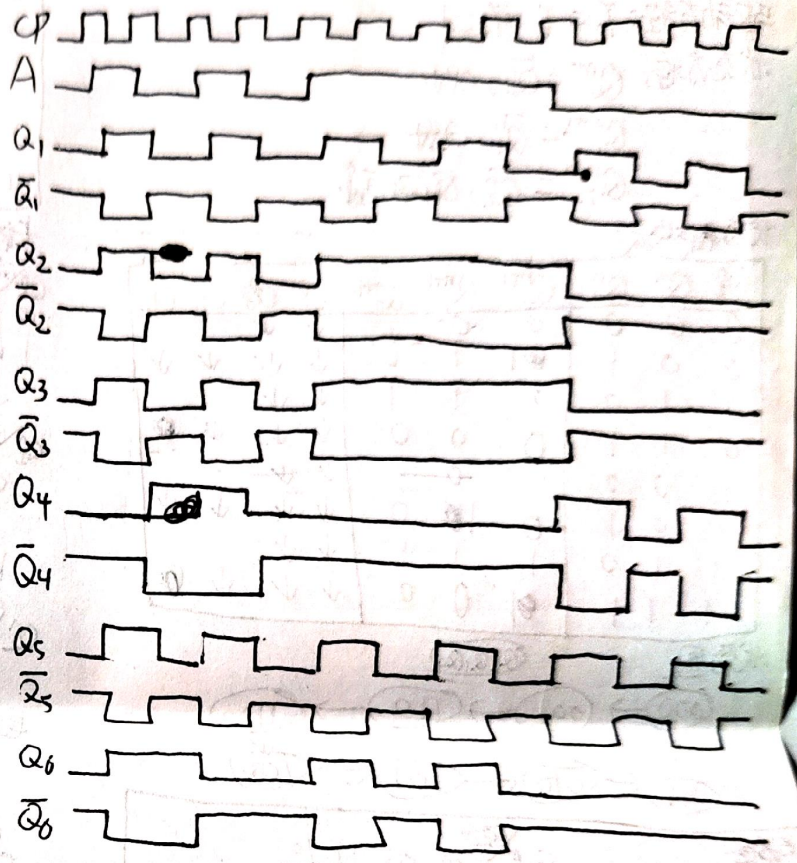
(3) $Q_3^{n+1}=T\bar{Q}^n+\bar{T}Q^n=T\oplus Q_2^n=A\oplus Q_2^n\oplus Q_2^n=A$，CP↓

(4) $Q_4^{n+1}=D=A\oplus\bar{Q}_4^n$，CP↓

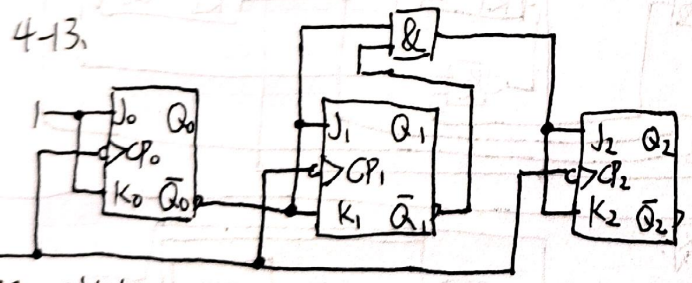
(5) $Q_5^{n+1}=J\bar{Q}_5^n+KQ_5^n=(Q_5^n+\bar{Q}_5^n)\bar{Q}_5^n+Q_5^n=\bar{Q}_5^n$，CP↓

(6) $Q_6^{n+1}=J\bar{Q}_6^n+KQ_6^n=(A+Q_6^n)\bar{Q}_6^n+\overline{(A+\bar{Q}_6^n)}Q_6^n$

$=A\bar{Q}_6^n+\bar{A}Q_6^n\bar{Q}_6^n=A\oplus Q_6^n$，CP↓



4-13、



解：时钟方程：$CP_0=CP_1=CP_2=CP$

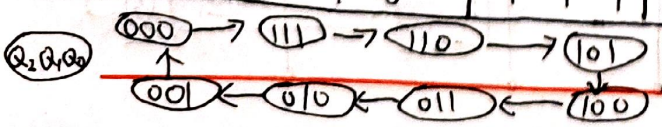
特性方程：$Q^{n+1}=J\bar{Q}^n+\bar{K}Q^n$

驱动方程：$J_0=1$，$J_1=\bar{Q}_0^n$，$J_2=\bar{Q}_0^n\bar{Q}_1^n$

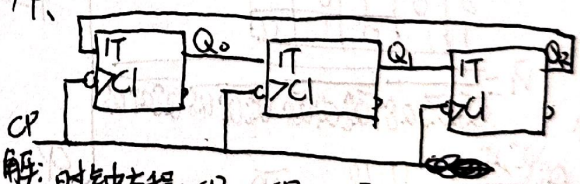
$K_0=1$，$K_1=\bar{Q}_0^n$，$K_2=\bar{Q}_0^n\bar{Q}_1^n$

状态方程：$Q_0^{n+1}=\bar{Q}_0^n$，$Q_1^{n+1}=\bar{Q}_0^nQ_1^n+Q_0^n\bar{Q}_1^n$，$Q_2^{n+1}=\bar{Q}_0^n\bar{Q}_1^n\bar{Q}_2^n+\overline{\bar{Q}_0^n\bar{Q}_1^n}Q_2^n$

Q_2^n	Q_1^n	Q_0^n	Q_2^{n+1}	Q_1^{n+1}	Q_0^{n+1}	Q_2^n	Q_1^n	Q_0^n	Q_2^{n+1}	Q_1^{n+1}	Q_0^{n+1}
0	0	0	0	0	1	1	0	0	1	0	1
0	0	1	0	1	0	1	0	1	1	1	0
0	1	0	0	1	1	1	1	0	1	1	1
0	1	1	1	0	0	1	1	1	0	0	0



4-14、



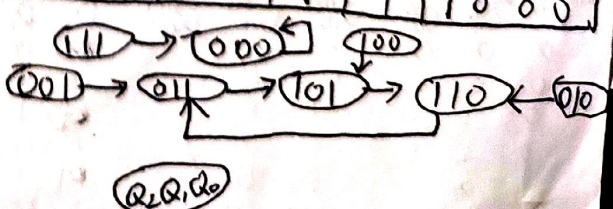
解：时钟方程：$CP_0=CP_1=CP_2=CP$

特性方程：$Q^{n+1}=T\bar{Q}^n+\bar{T}Q^n$

驱动方程：$T_0=Q_2^n$，$T_1=Q_0^n$，$T_2=Q_1^n$

状态方程：$Q_0^{n+1}=Q_2^n\oplus Q_0^n$，$Q_1^{n+1}=Q_0^n\oplus Q_1^n$，$Q_2^{n+1}=Q_1^n\oplus Q_2^n$

Q_2^n	Q_1^n	Q_0^n	Q_2^{n+1}	Q_1^{n+1}	Q_0^{n+1}	Q_2^n	Q_1^n	Q_0^n	Q_2^{n+1}	Q_1^{n+1}	Q_0^{n+1}
0	0	0	0	0	0	1	0	0	1	0	1
0	0	1	0	1	1	1	0	1	1	1	0
0	1	0	1	1	0	1	1	0	0	0	1
0	1	1	1	0	1	1	1	1	0	0	0



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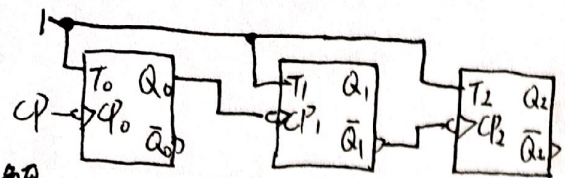


解：

时钟方程：$CP_0=CP$，$CP_1=Q_0$，$CP_2=\bar{Q}_1$

驱动方程：$T_0=T_1=T_2=1$

状态方程：$Q_0^{n+1}=\bar{Q}_0^n$，CP↓

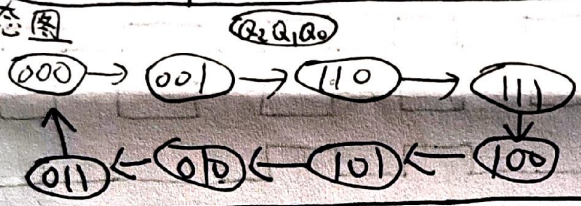
$Q_1^{n+1}=\bar{Q}_1^n$，Q_0↓

$Q_2^{n+1}=\bar{Q}_2^n$，~~$\bar{Q}_1$~~↓

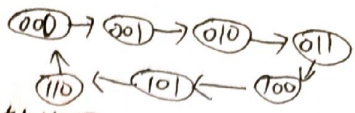
状态转换表：

Q_2^n	Q_1^n	Q_0^n	Q_2^{n+1}	Q_1^{n+1}	Q_0^{n+1}	CP	CP_0	CP_1	CP_2
0	0	0	0	0	1	↓	↓		
0	0	1	0	1	0	↓	↓	↓	↓
0	1	0	0	1	1	↓	↓		
0	1	1	1	0	0	↓	↓	↓	
1	0	0	1	0	1	↓	↓		
1	0	1	1	1	0	↓	↓	↓	↓
1	1	0	1	1	1	↓	↓		
1	1	1	0	0	0	↓	↓	↓	

状态图



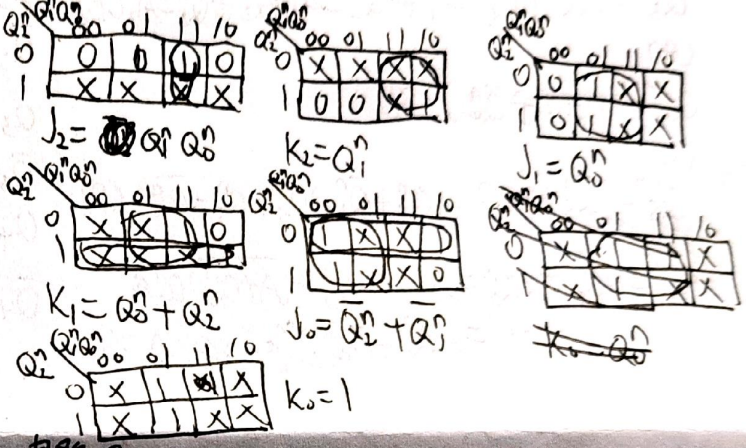
4-17、



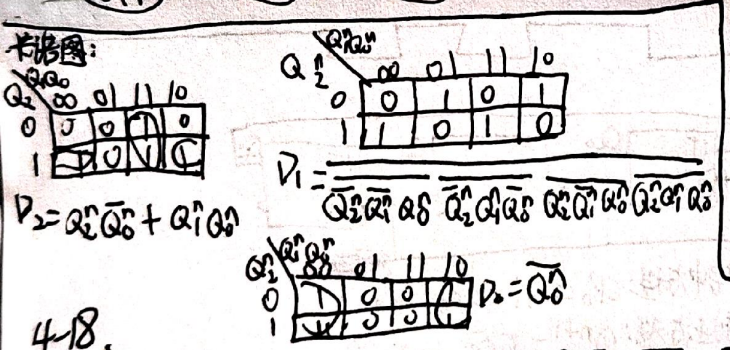
解：状态转换图：

Q_2^n	Q_1^n	Q_0^n	Q_2^{n+1}	Q_1^{n+1}	Q_0^{n+1}	J_2	K_2	J_1	K_1	J_0	K_0
0	0	0	0	0	1	0	×	0	×	1	×
0	0	1	0	1	0	0	×	1	×	×	1
0	1	0	0	1	1	0	×	×	0	1	×
0	1	1	1	0	0	1	×	×	1	×	1
1	0	0	1	0	1	×	0	0	×	1	×
1	0	1	1	1	0	×	0	1	×	×	1
1	1	0	0	0	0	×	1	×	1	0	×
1	1	1	×	×	×	×	×	×	×	×	×

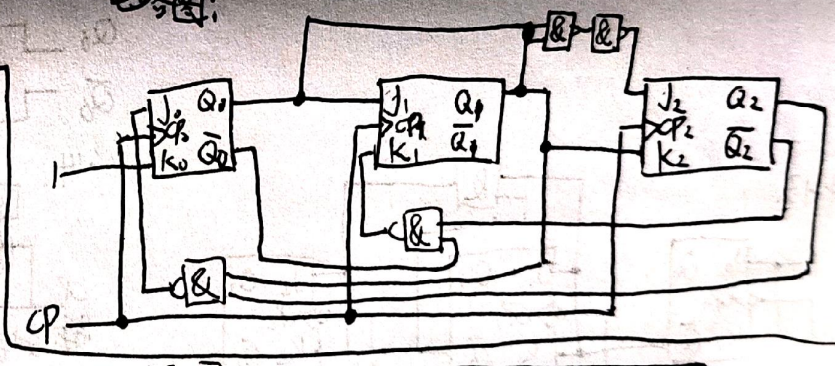
卡诺图：



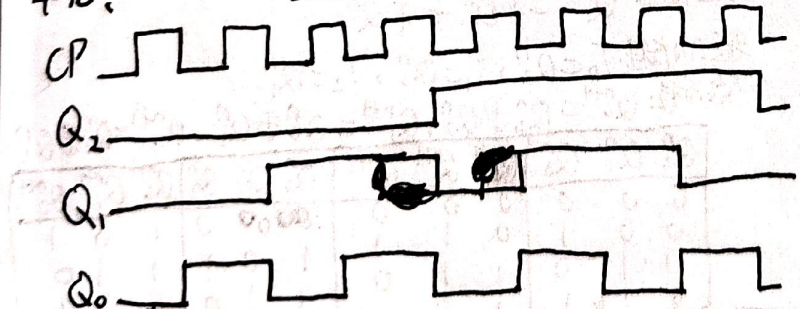
卡诺图：



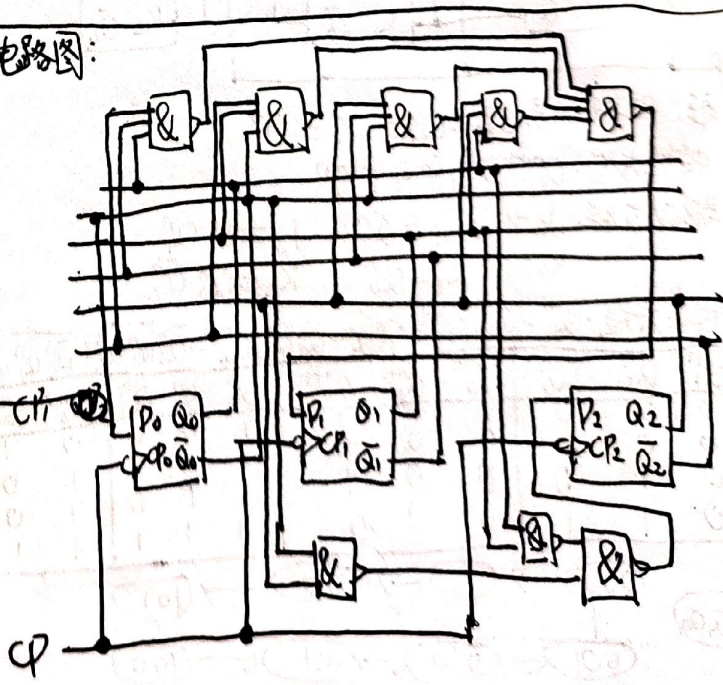
电路图：



4-18、



状态转换表：

Q_2^n	Q_1^n	Q_0^n	Q_2^{n+1}	Q_1^{n+1}	Q_0^{n+1}	D_2	D_1	D_0	CP	CP_0	CP_1	CP_2
0	0	0	0	0	1	0	0	1				
0	0	1	0	1	1	0	1	1				
0	1	0	0	1	0	0	1	0				
0	1	1	1	0	0	1	0	0				
1	0	0	1	0	1	1	0	1				
1	0	1	1	1	0	1	1	0				
1	1	0	0	0	0	0	0	0				
1	1	1	0	0	0	0	0	0				

电路图：