

1. RS 触发器: $Q^{(n+1)} = S + \bar{R}Q$

JK 触发器: $Q^{(n+1)} = J\bar{Q} + KQ$

T 触发器: $Q^{(n+1)} = T\bar{Q} + \bar{T}Q$

D 触发器: $Q^{(n+1)} = D$

2. ① 输出函数和激励函数表达式:

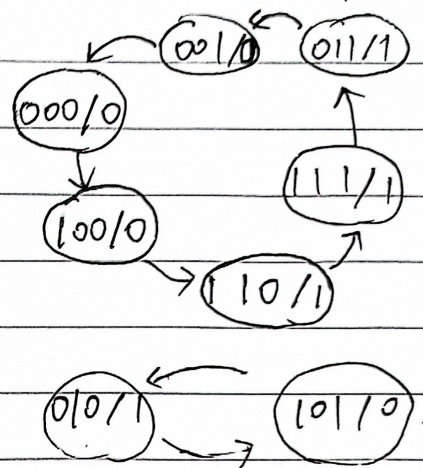
$$D_1 = \bar{Q}_3^{(n)}, D_2 = Q_1^{(n)}, D_3 = Q_2^{(n)}$$

则由触发器的次态方程: $Q_1^{(n+1)} = D_1 = \bar{Q}_3^{(n)}, Q_2^{(n+1)} = D_2 = Q_1^{(n)}, Q_3^{(n+1)} = D_3 = Q_2^{(n)}$

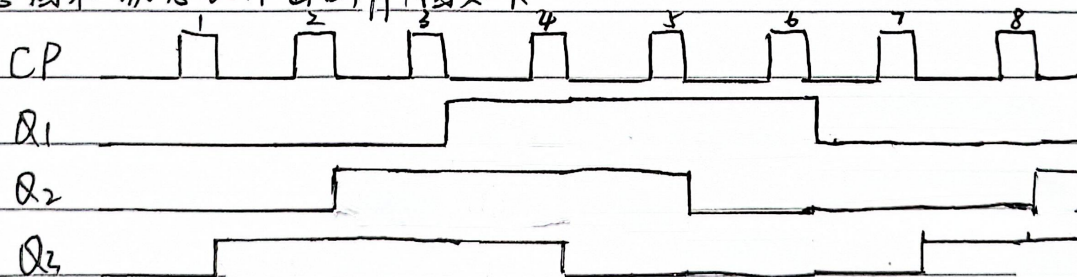
② 根据状态方程可得出状态转移表, 如表所示:

Q_1^n	Q_2^n	Q_3^n	Q_1^{n+1}	Q_2^{n+1}	Q_3^{n+1}	输出 Z
0	0	0	1	0	0	0
0	0	1	0	0	0	0
0	1	0	1	0	1	1
0	1	1	0	0	1	1
1	0	0	1	1	0	0
1	0	1	0	1	0	0
1	1	0	1	1	1	1
1	1	1	0	1	1	1

由状态表作出状态图如下:



③ 由状态图和状态表作出时序图如下:



④ 功能分析: 由状态图和时序图得, 该电路为六分频电路.