

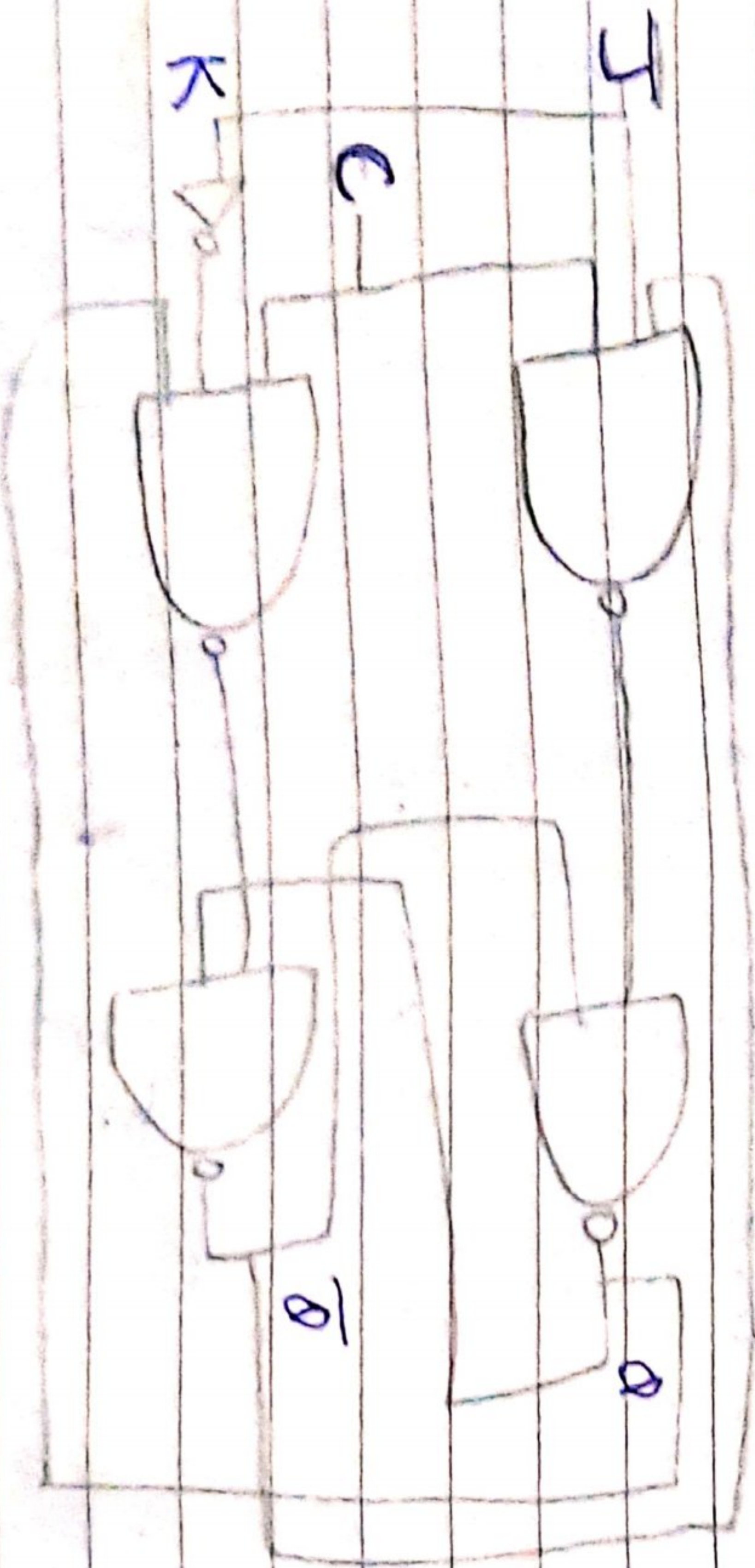
(1)

$a_n$	$D$	$a_{n+1}$	$I$	$K$
0	0	0	0	x
0	1	1	1	x
1	0	0	x	1
1	1	1	x	0

Date:

--	--	--	--	--	--	--	--	--	--





(ii)

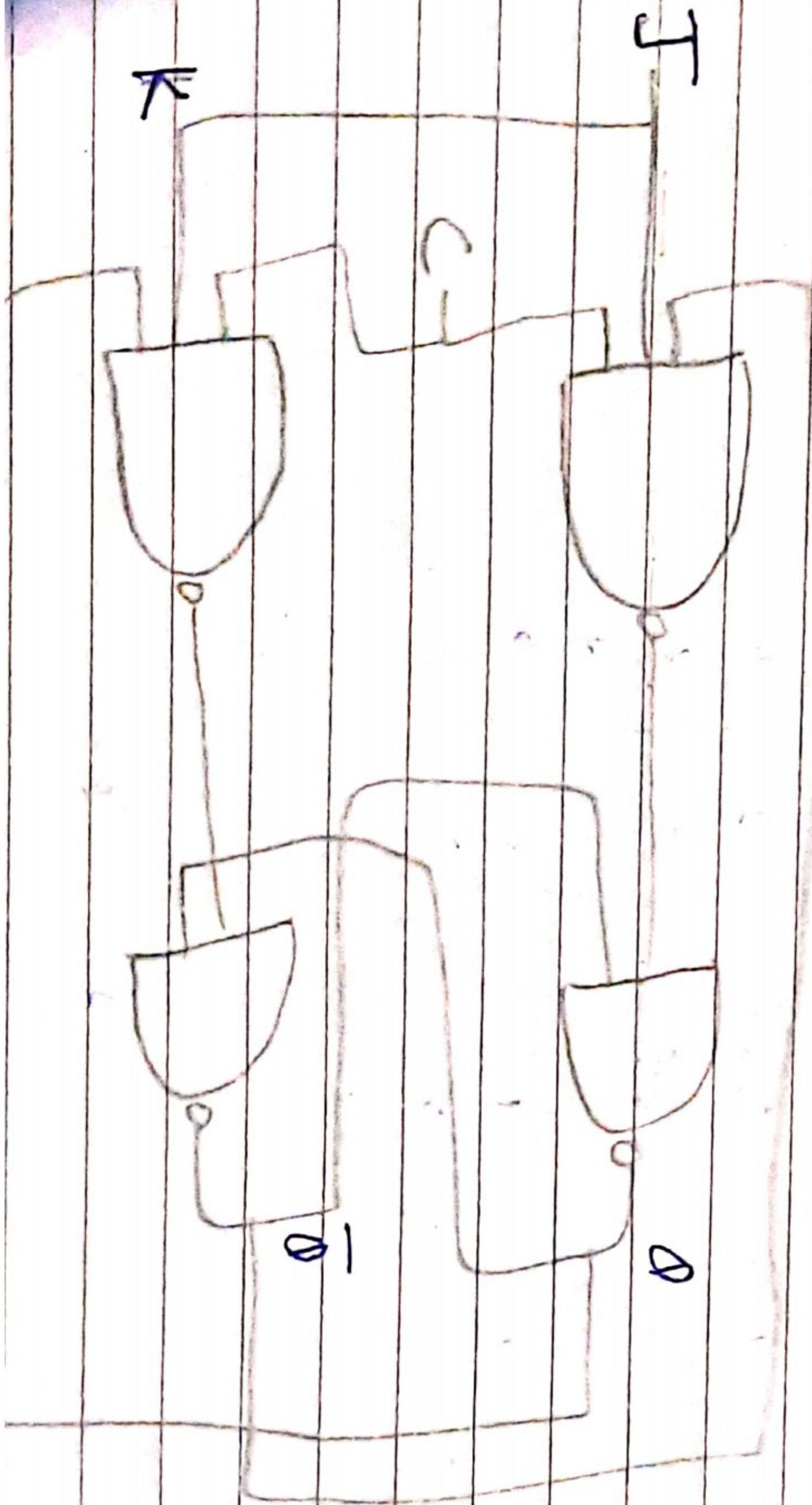
Date:

--	--	--	--	--	--



$a_n$	$T$	$a_{n+1}$	$J$	$K$
0	0	0	0	x
0	1	1	1	x
1	0	1	x	0
1	1	0	x	1



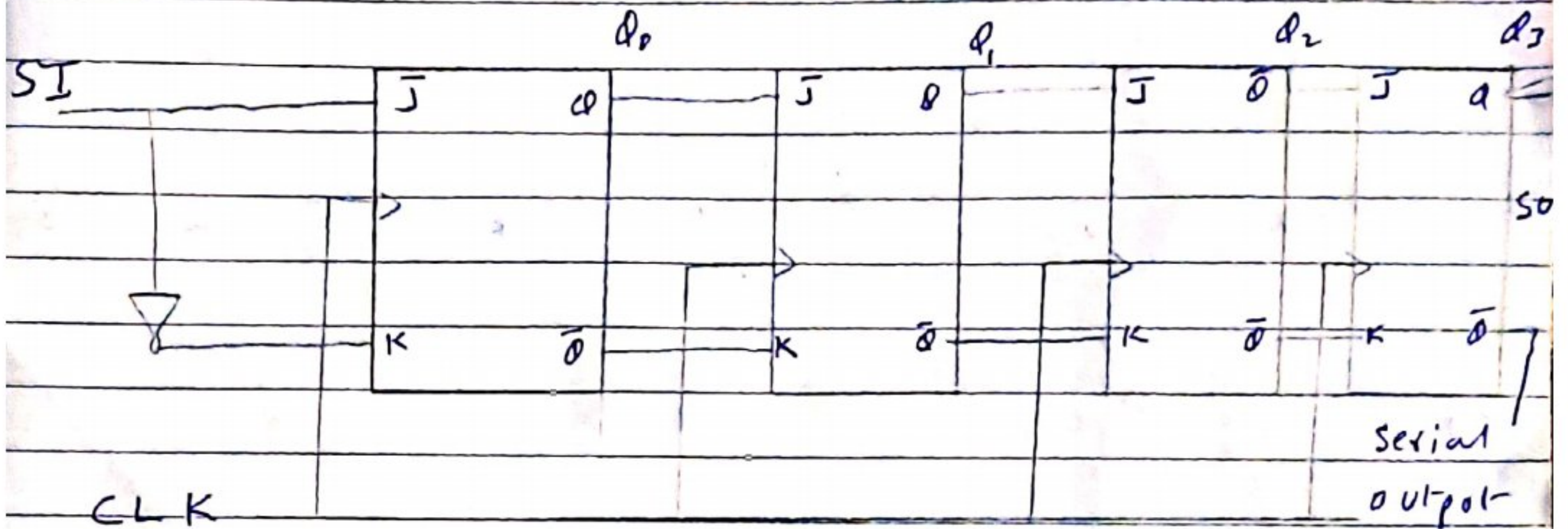


(ii)

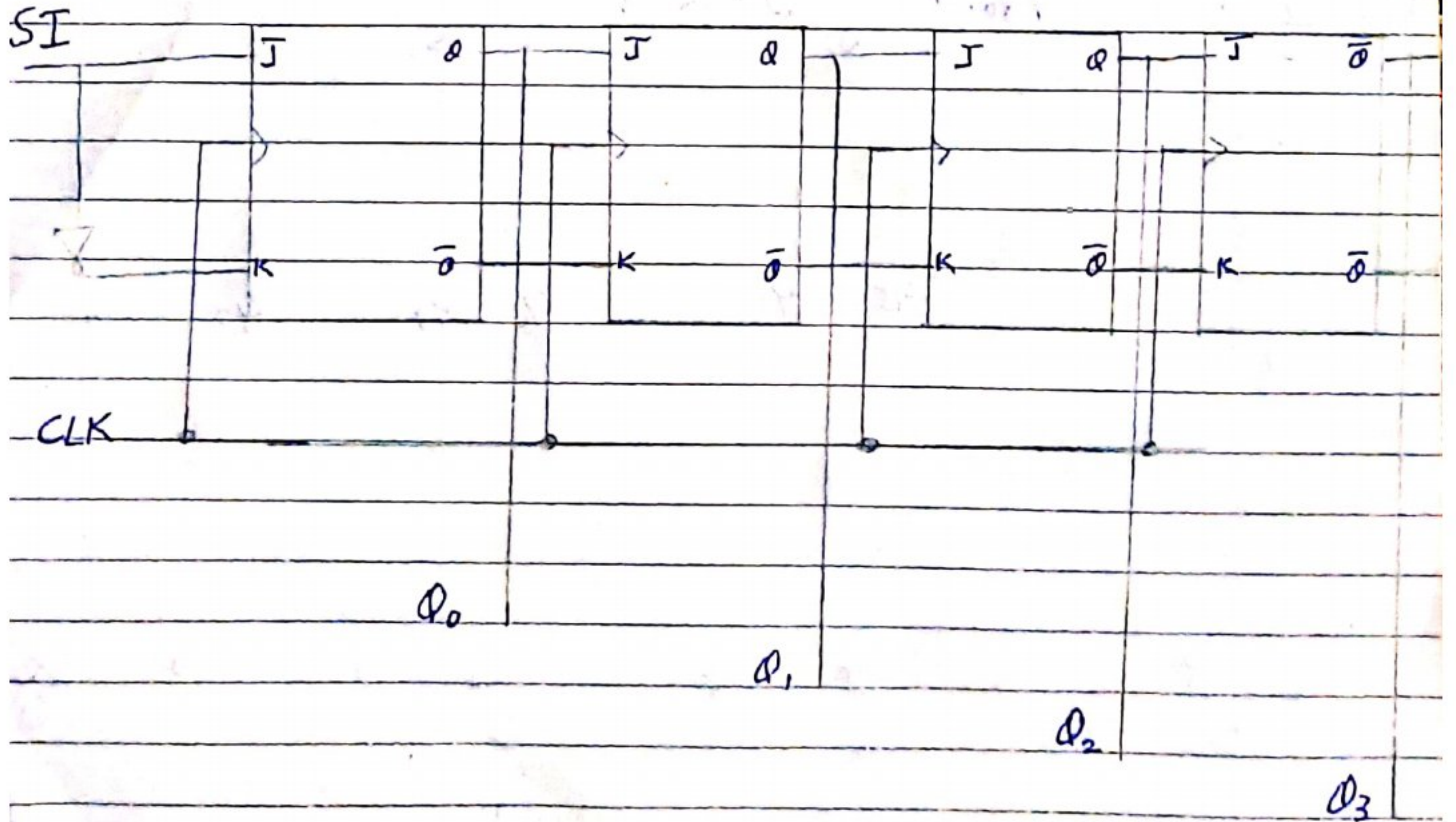


$Q_2$ )

1) SISO From JK :



2) SIPO From JK :

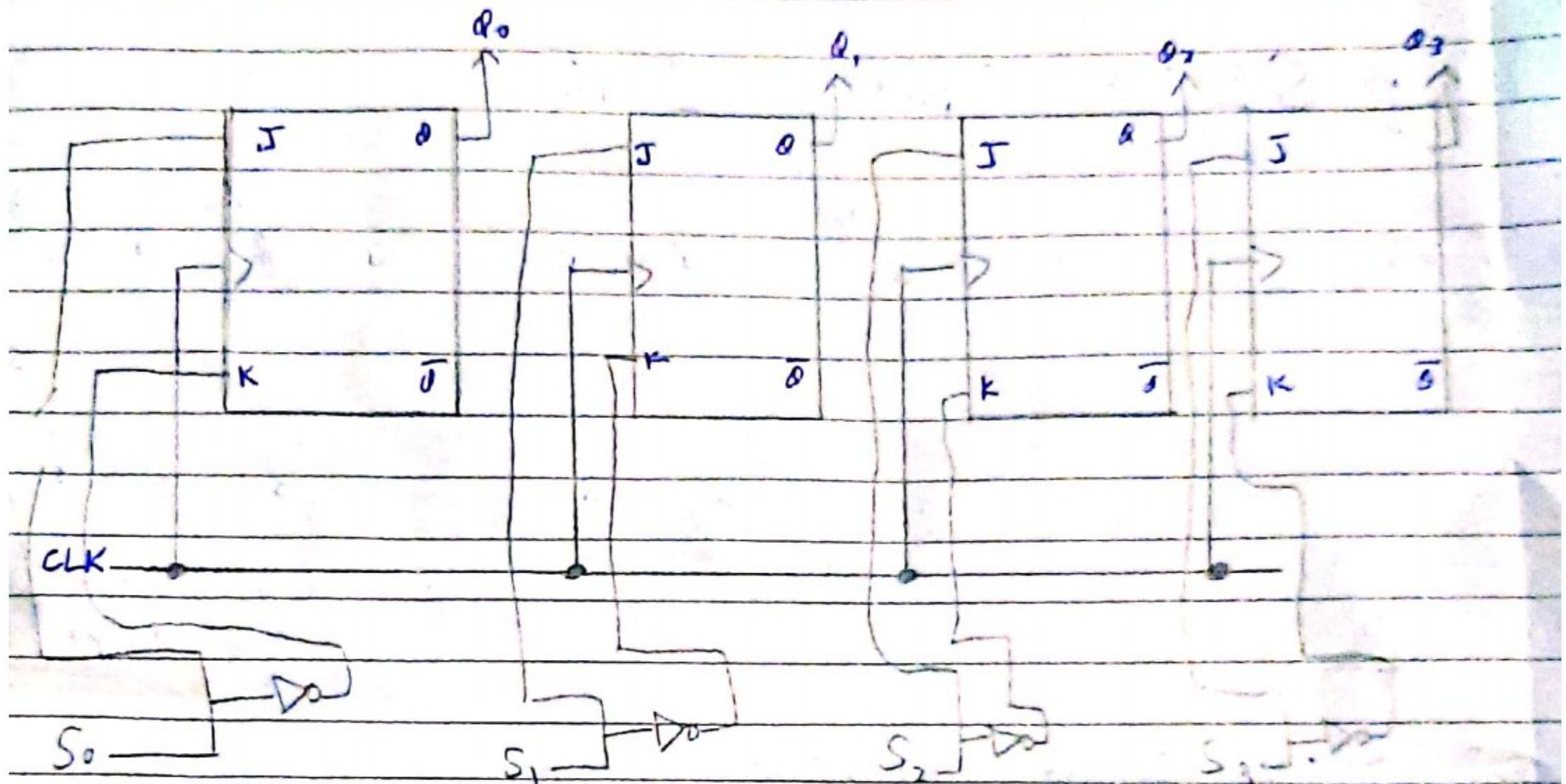


Serial input / Parallel out put

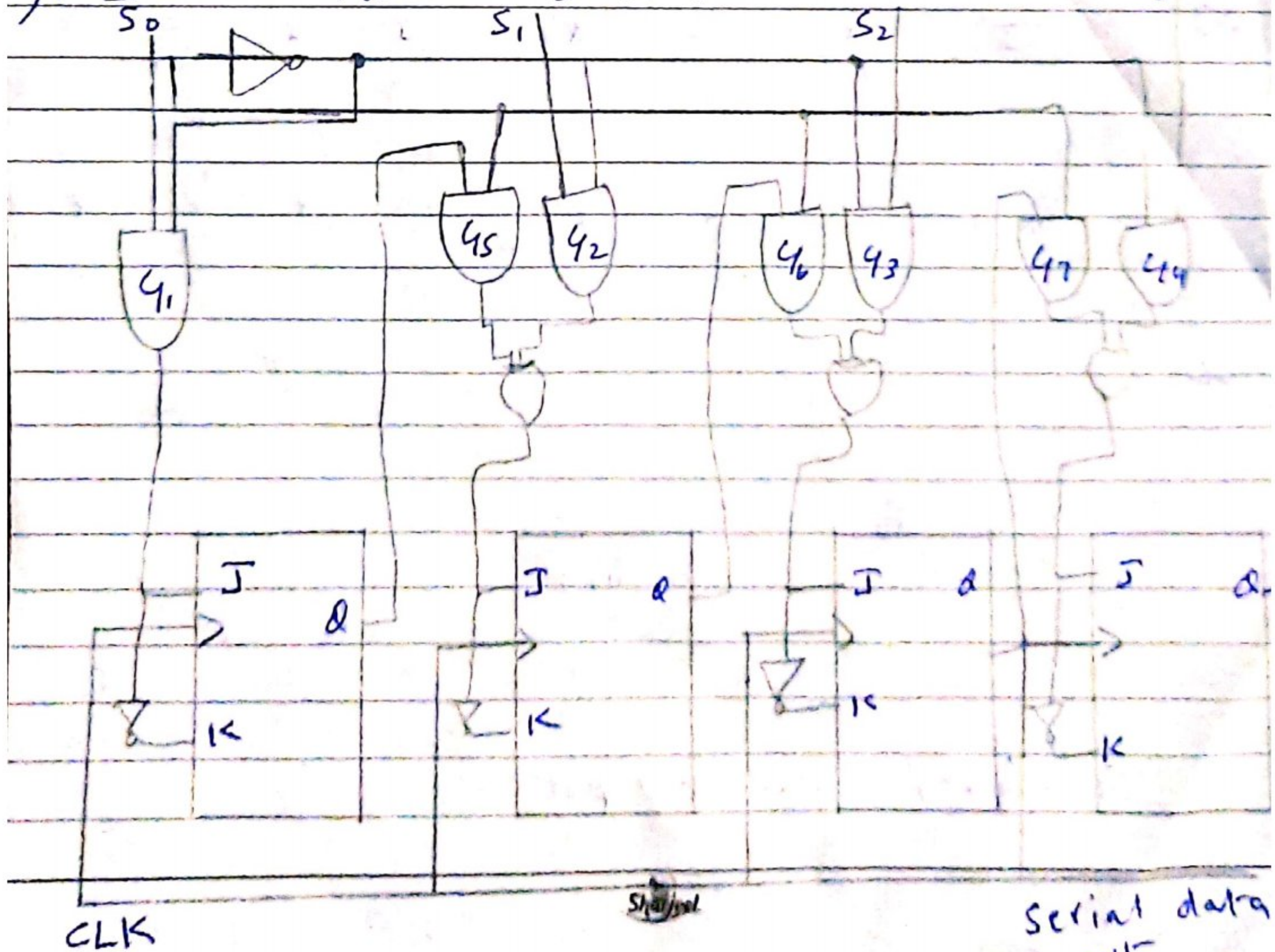


PIPO From JK:

Date:

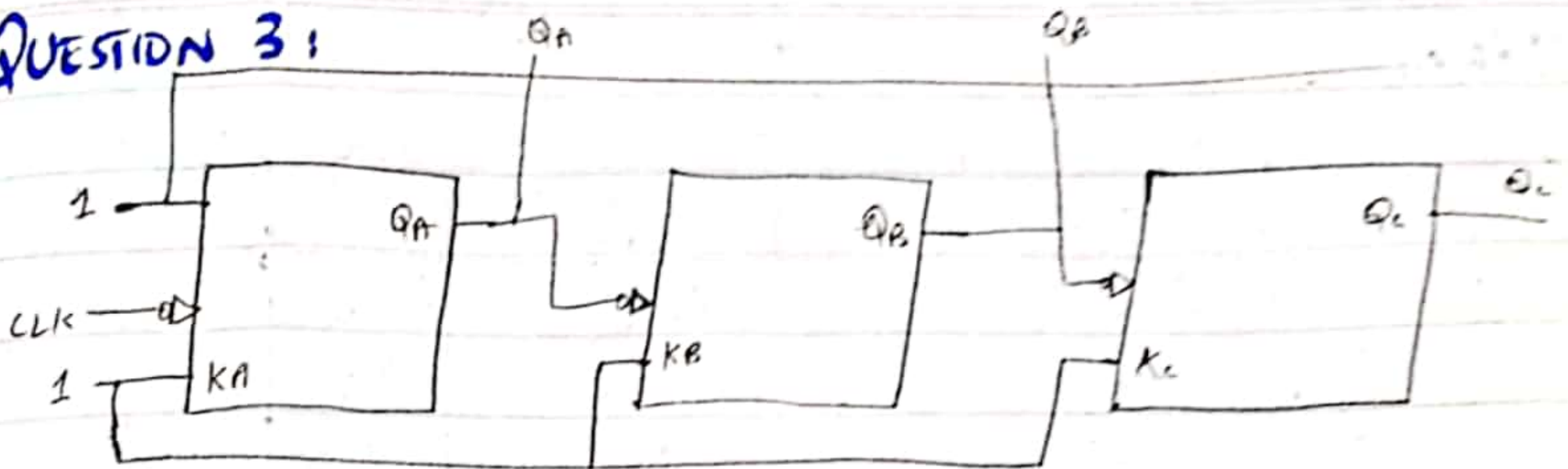


1) PISO From JK:

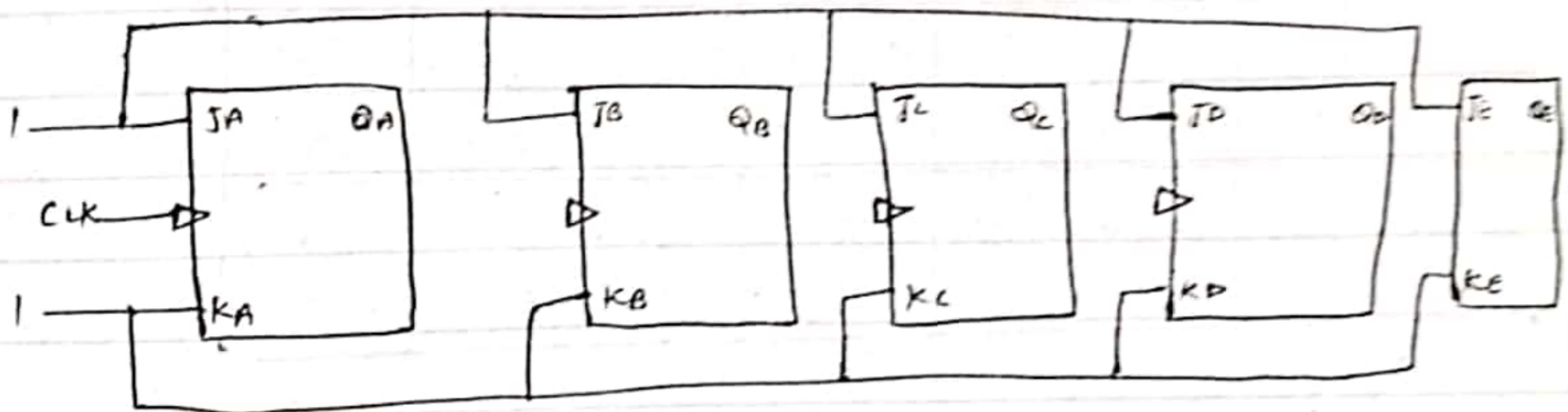




### QUESTION 3:



### QUESTION 4:



### QUESTION 5:

1111

$S_0 = 0 \rightarrow \text{reset}$

$S_1 = 1$

$S_2 = 11$

$S_3 = 111$

$S_4 = 1111$

Sequence Diagram:

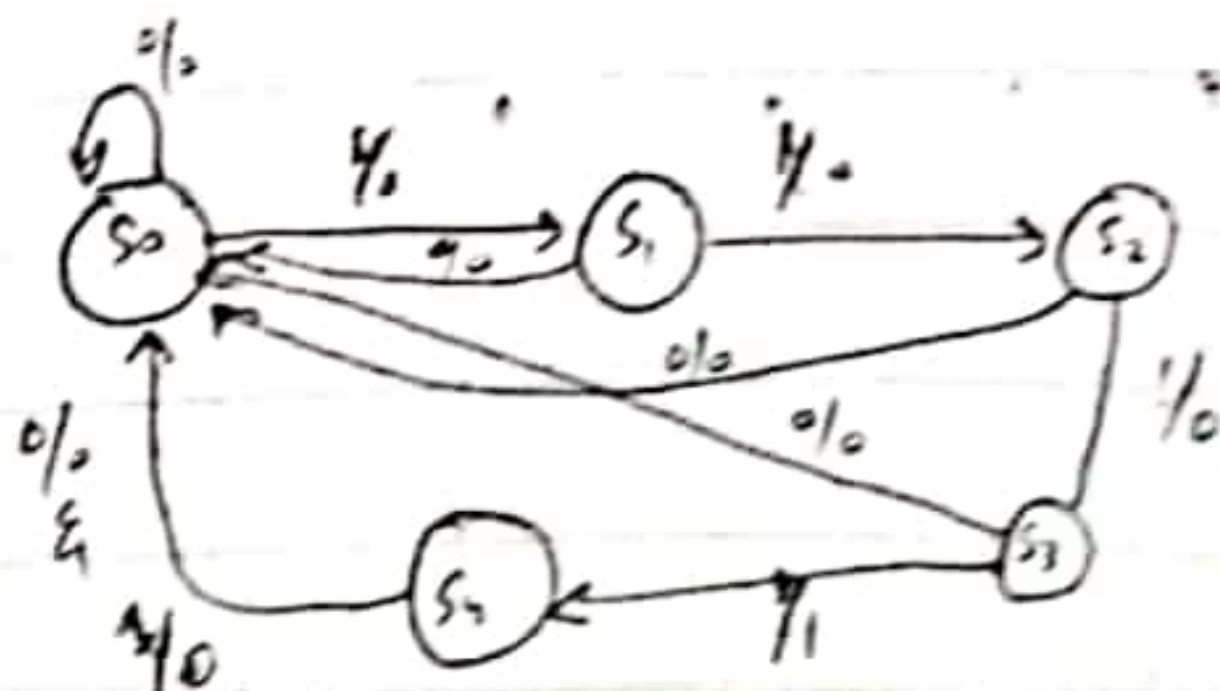




Table:

Symbol	Present state $Q_A \quad Q_B \quad Q_C$	input (x)	New state $Q_A^+ \quad Q_B^+ \quad Q_C^+$	output 'Z'
$S_0$	0 0 0	0	0 0 0	0
$S_0$	0 0 0	1	0 0 1	0
$S_1$	0 0 1	0	0 0 0	0
$S_1$	0 0 1	1	0 1 0	0
$S_2$	0 1 0	0	0 0 0	0
$S_2$	0 1 0	1	0 1 1	0
$S_3$	0 1 1	0	0 0 0	0
$S_3$	0 1 1	1	1 0 0	1
$S_4$	1 0 0	0	0 0 0	0
$S_4$	1 0 0	1	0 0 0	0

$$\rightarrow DA = Q_A^+$$

$$\rightarrow DB = Q_B^+$$

$$\rightarrow DC = Q_C^+$$

K-Maps in

for DA:

$Q_C \backslash Q_A Q_B$	00	01	11	10
00				
01			1	
11				
10				

$$DA = Q_A Q_B Q_C x$$

for DB:

$Q_C \backslash Q_A Q_B$	00	01	11	10
00			1	
01		1		
11				
10				

$$DB = \bar{Q}_A Q_B \bar{Q}_C x + Q_A \bar{Q}_B Q_C x$$



For Z,

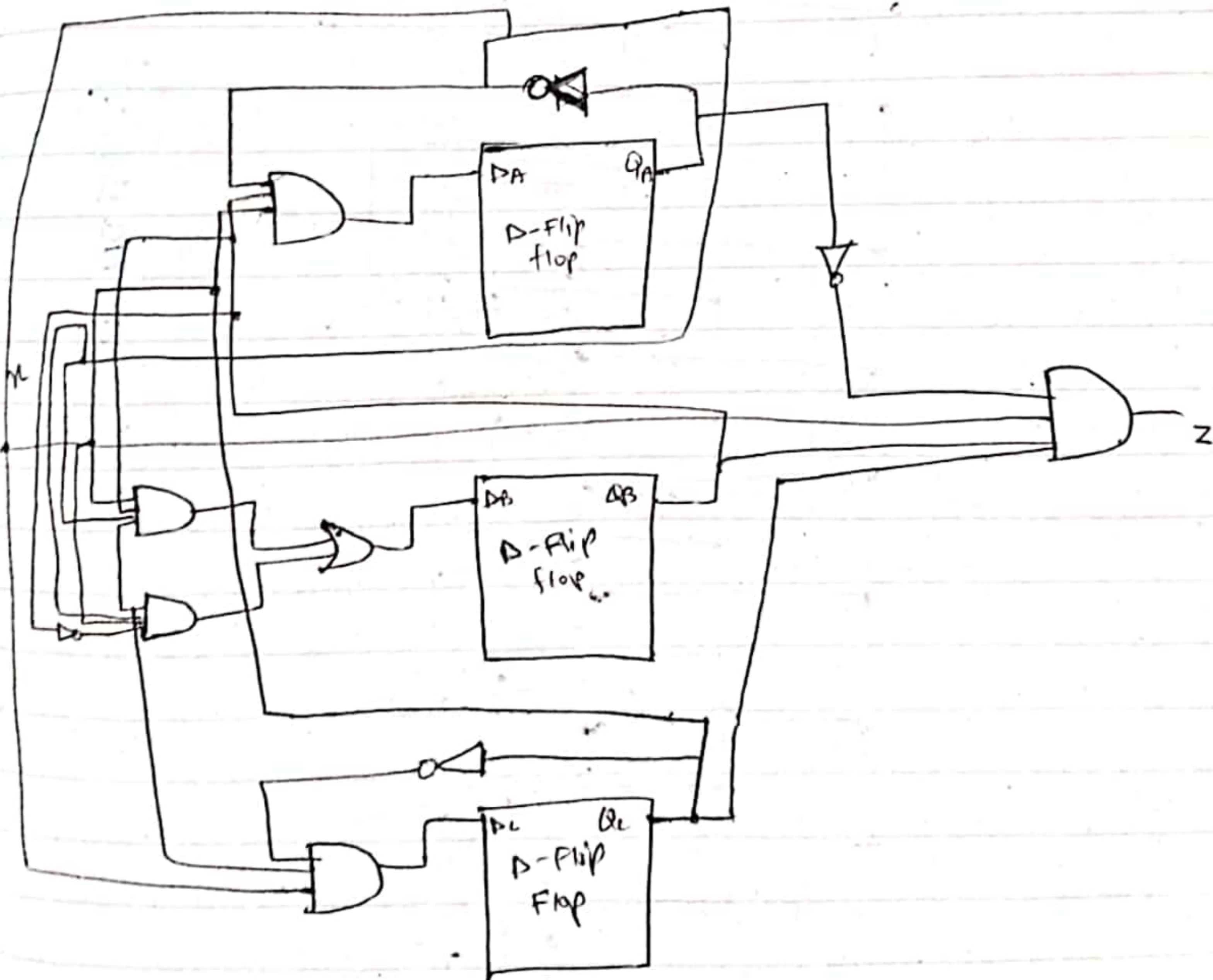
	$Q_C$	$x$	$00$	$01$	$11$	$10$
$Q_A$ $Q_B$						
$00$						
$01$					1	
$11$						
$10$						

$$Z = \overline{Q_A} Q_B Q_C x$$

For  $D_C$ ,

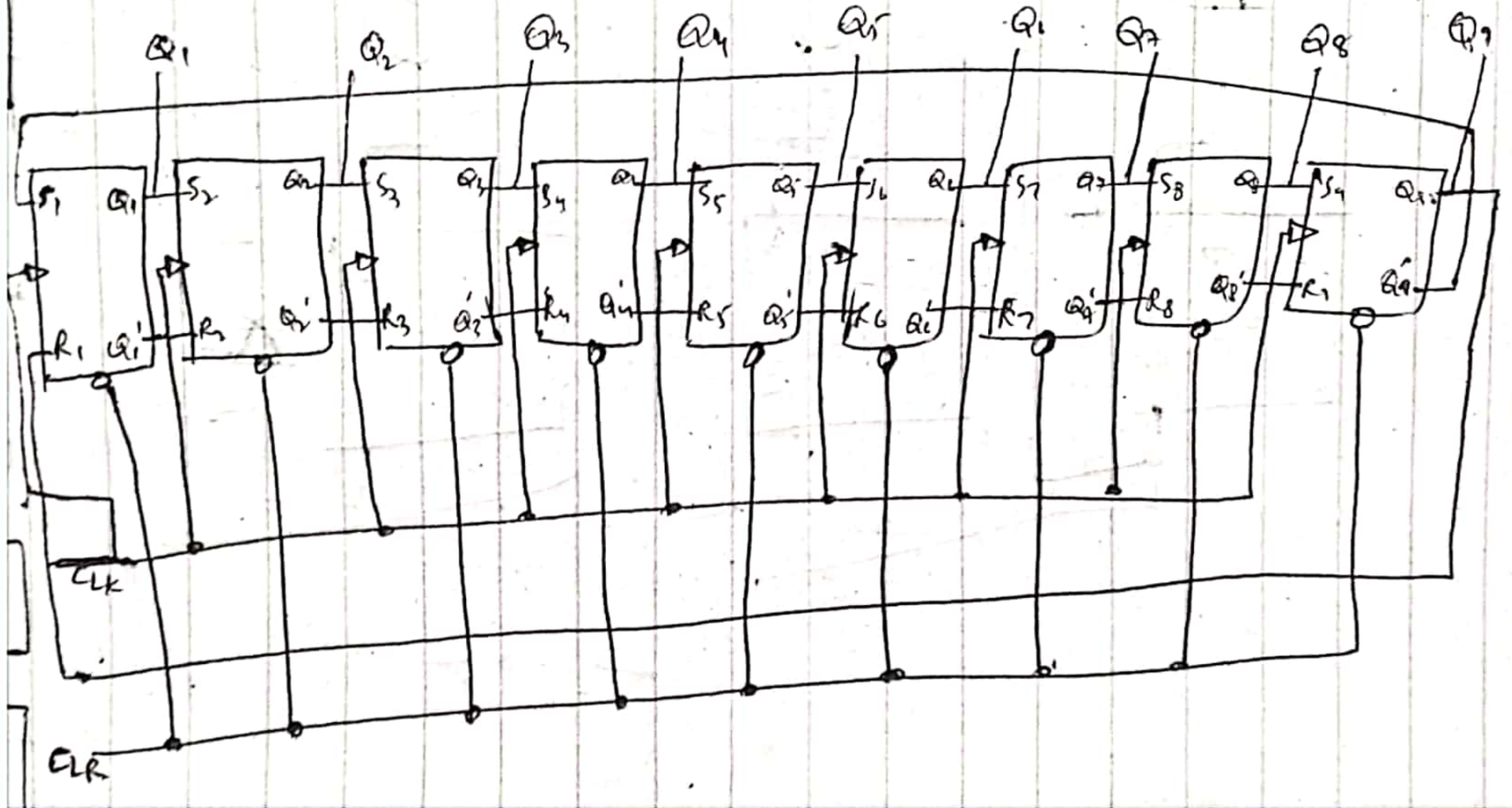
	$Q_C$	$x$	$00$	$01$	$11$	$10$
$Q_A$ $Q_B$						
$00$				1		
$01$				1		
$11$						
$10$						

$$D_C = \overline{Q_A} \overline{Q_C} x$$





# QUESTION 6



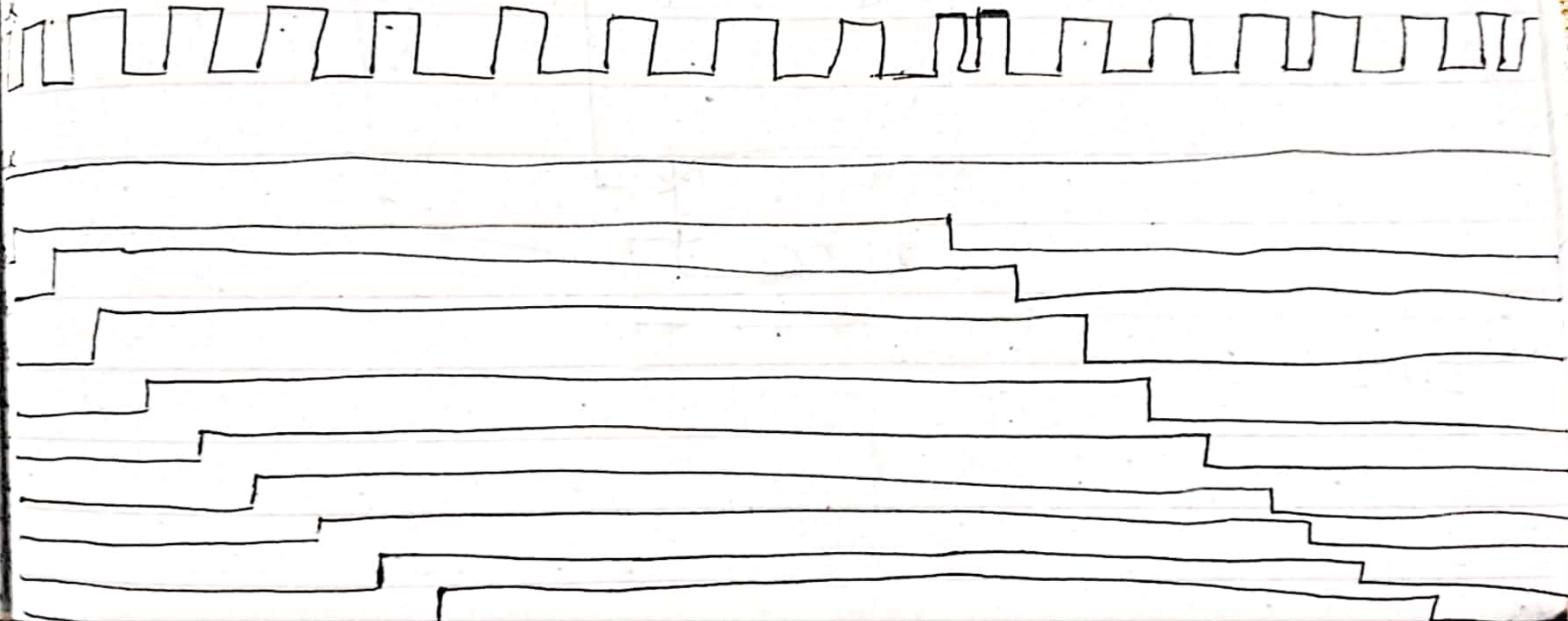


Sequence :

CLR	Q <sub>4</sub>	Q <sub>3</sub>	Q <sub>2</sub>	Q <sub>1</sub>	Q <sub>0</sub>	Q <sub>-1</sub>	Q <sub>-2</sub>	Q <sub>-3</sub>	Q <sub>-4</sub>
0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1	1
1	0	0	0	0	0	0	1	1	1
1	0	0	0	0	0	1	1	1	1
1	0	0	0	0	1	1	1	1	1
1	0	0	0	1	1	1	1	1	1
1	0	0	1	1	1	1	1	1	1
1	0	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	0
1	1	1	1	1	1	1	1	0	0
1	1	1	1	1	1	1	0	0	0
1	1	1	1	1	0	0	0	0	0
1	1	1	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0

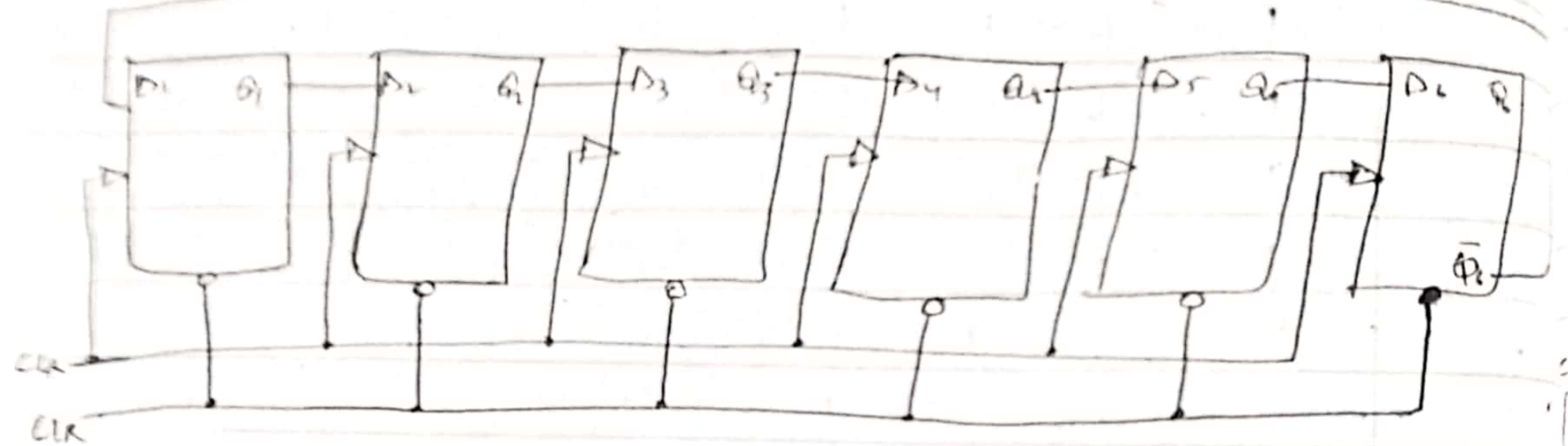


# TIMING DIAGRAM:





## QUESTION 7:



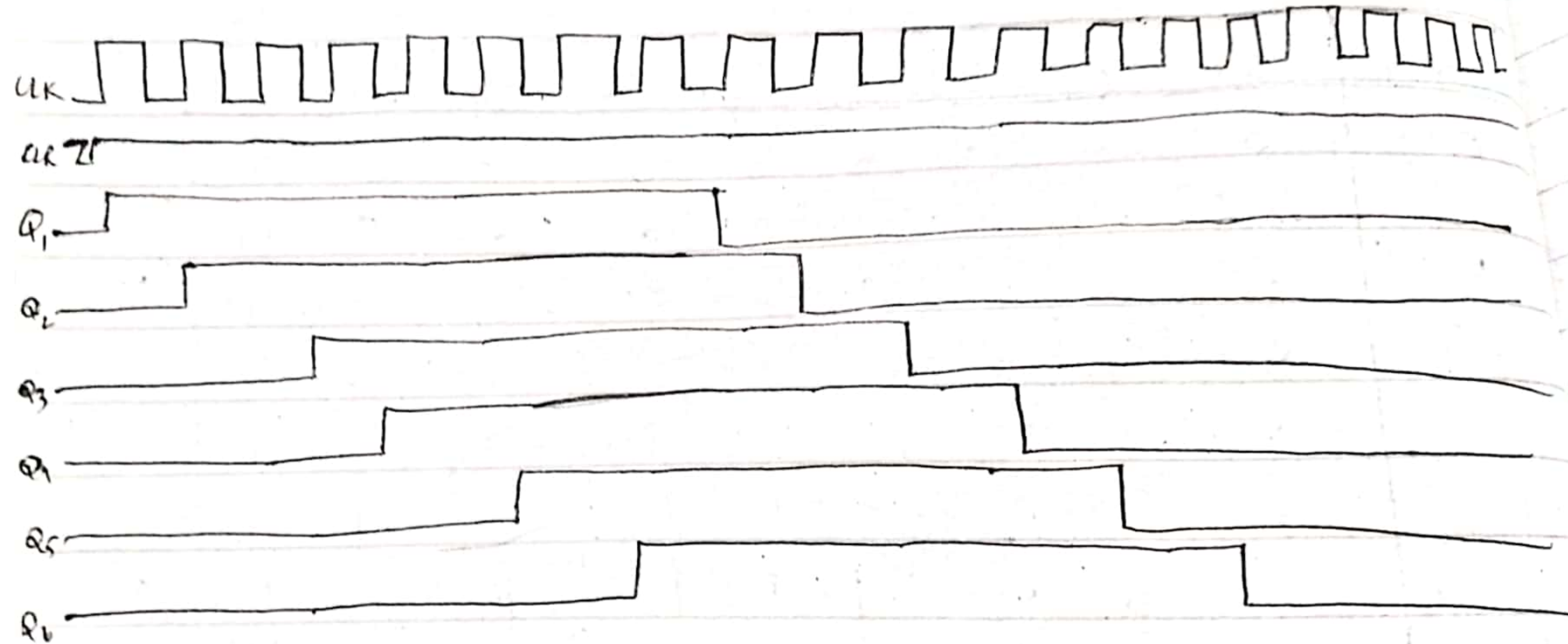


Sequence:

CLK	$Q_6$	$Q_5$	$Q_4$	$Q_3$	$Q_2$	$Q_1$
0	0	0	0	0	0	0
1	0	0	0	0	0	1
1	0	0	0	0	1	1
1	0	0	0	1	1	1
1	0	0	1	1	1	1
1	0	1	1	1	1	1
1	1	1	1	1	1	1
1	1	1	1	1	1	0
1	1	1	1	1	0	0
1	1	1	1	0	0	0
1	1	1	0	0	0	0
1	1	0	0	0	0	0
1	0	0	0	0	0	0

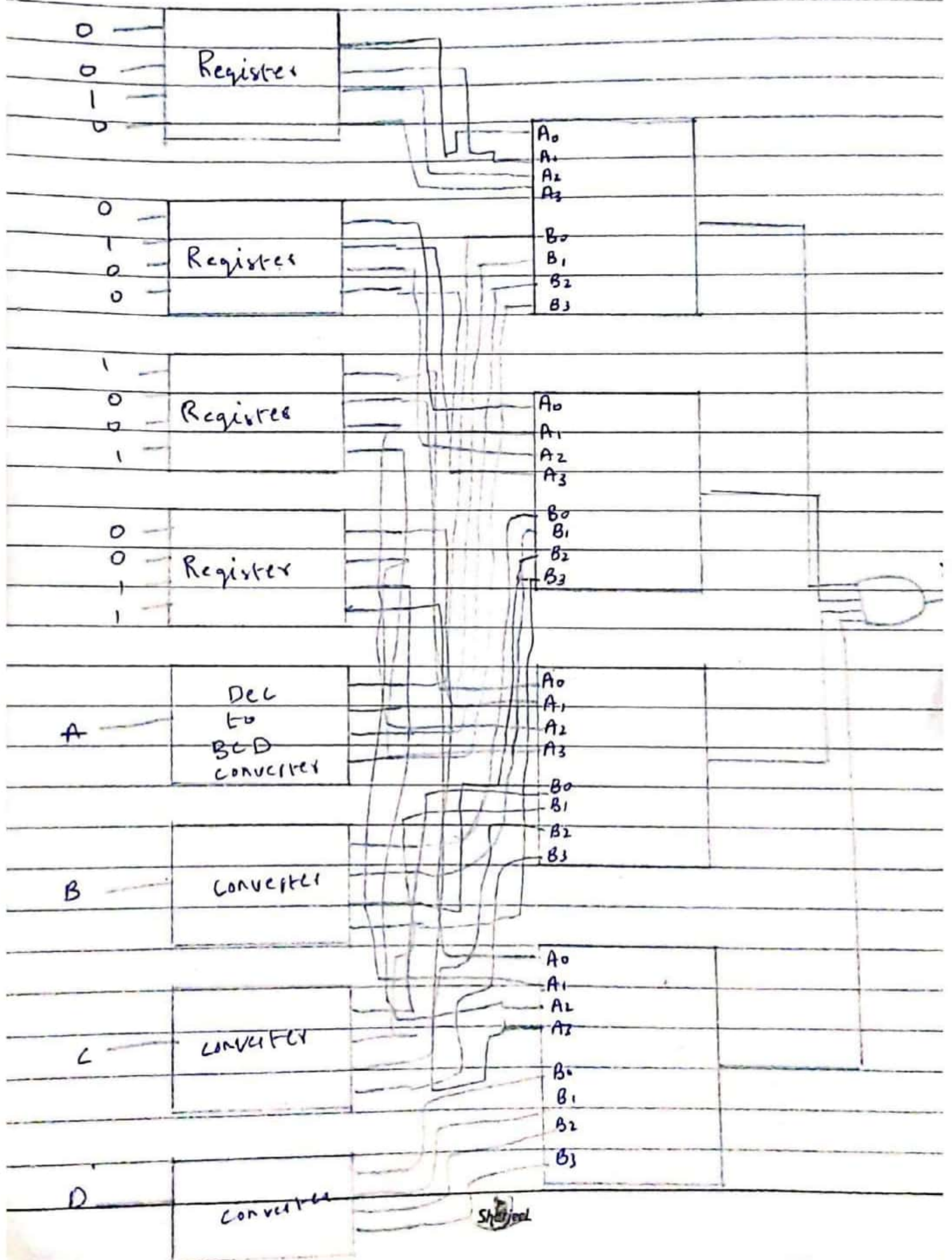


## TIMING DIAGRAM



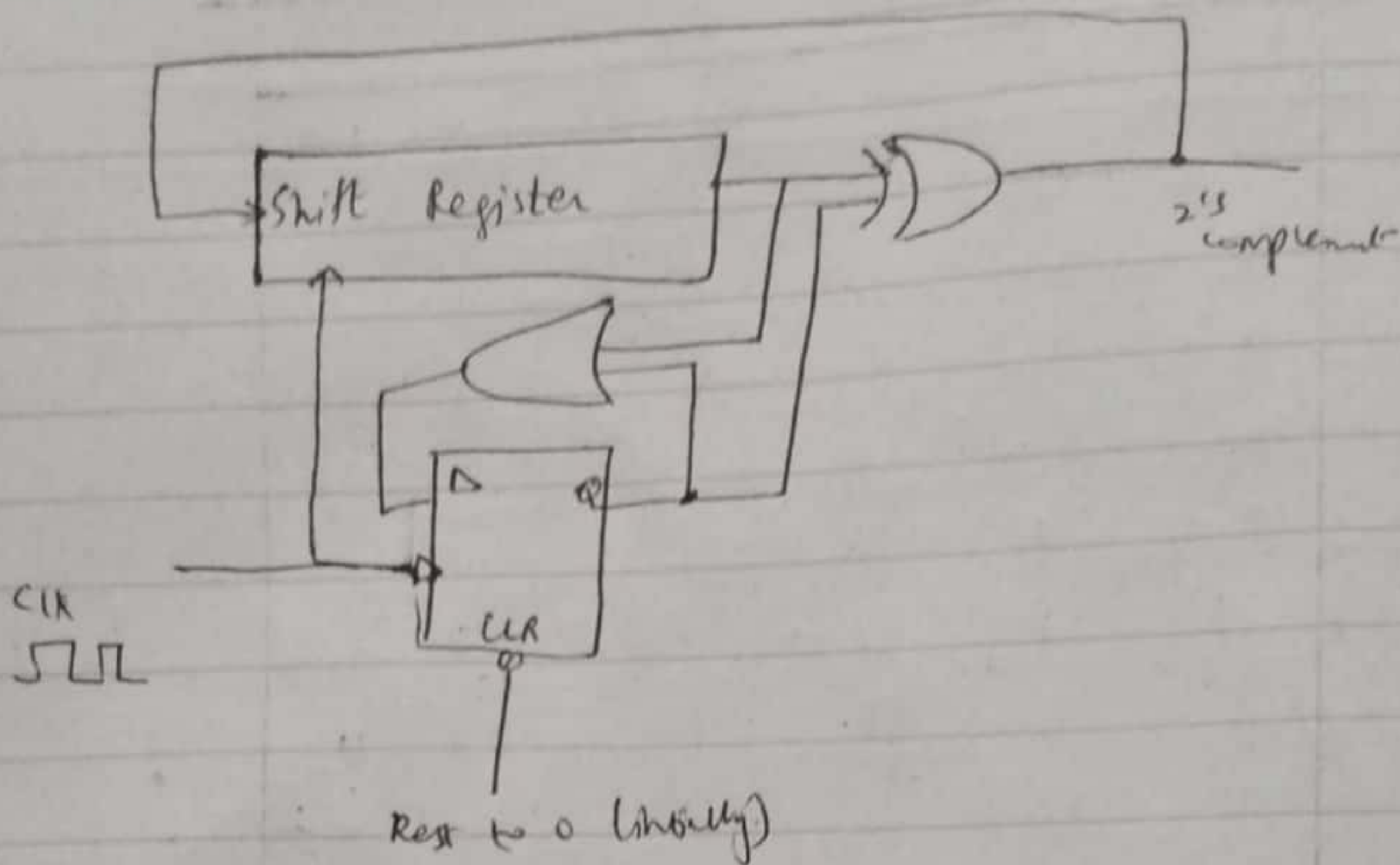


Q3)





## QUESTION 9



## QUESTION 10:

