NAME FAYYAZ Ahmad

ID 13460

Subject Digital Logic Design / Digital System

program B.S (Tele)

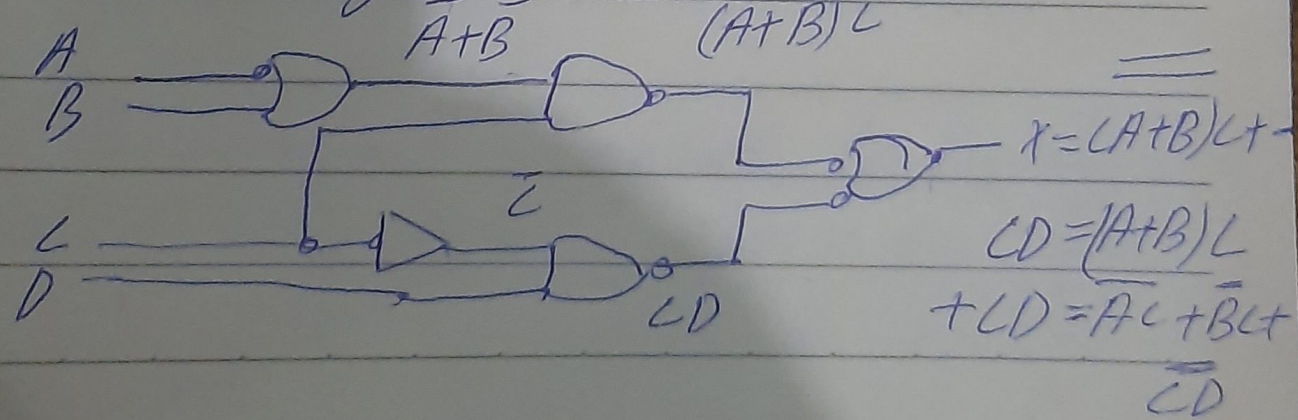
instructor : Muhmmad Amin.

Date. No.

Q1:- Draw the logic circuit using the input (A, B, C, D) and output (X) waveforms in Figure Q1:-

Ans:-

The out expression for the circuit is developed in the SOP form indicates that the output is high when A is Low and C is high or when B is Low and C is high or when C is Low and D is high



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Q2: For the 4-input multiplexer data inputs are given as
$D_0 = 0, D_1 = 1, D_2 = 0, D_3 = 1$

Find the output y if the select inputs are given as:-

a) $S_0 = 1, S_1 = 0$
b) $S_0 = 0 \quad S_1 = 1$
c) $S_0 = 1 \quad S_1 = 1$
d) $S_0 = 0, S_1 = 0$

Ans. The data output is equal to D_0 only if

$S_1 = 0 = 0 : y = D0\bar{S}_1\bar{S}_0$

The data output is equal to D_1 only if
$S_1 = 0$ and $S_0 = 1 : y = D1\bar{S}1\bar{S}_0$

The data output is equal to D_2 only if
$S1 = 1$ and $S_0 = 0 : y = D_2 S_1 \bar{S}_0$

The data output is equal to D_3 only if
$S_1 = 1$ and $S_0 = 1 : y = D_3 S_1 S_0$.

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When these terms are ORed the total expression For the data output is

$$Y = D_0 \bar{S}_1 \bar{S}_0 + D_1 \bar{S}_1 S_0 + D_2 S_1 \bar{S}_0 + D_3 S_1 S_0$$

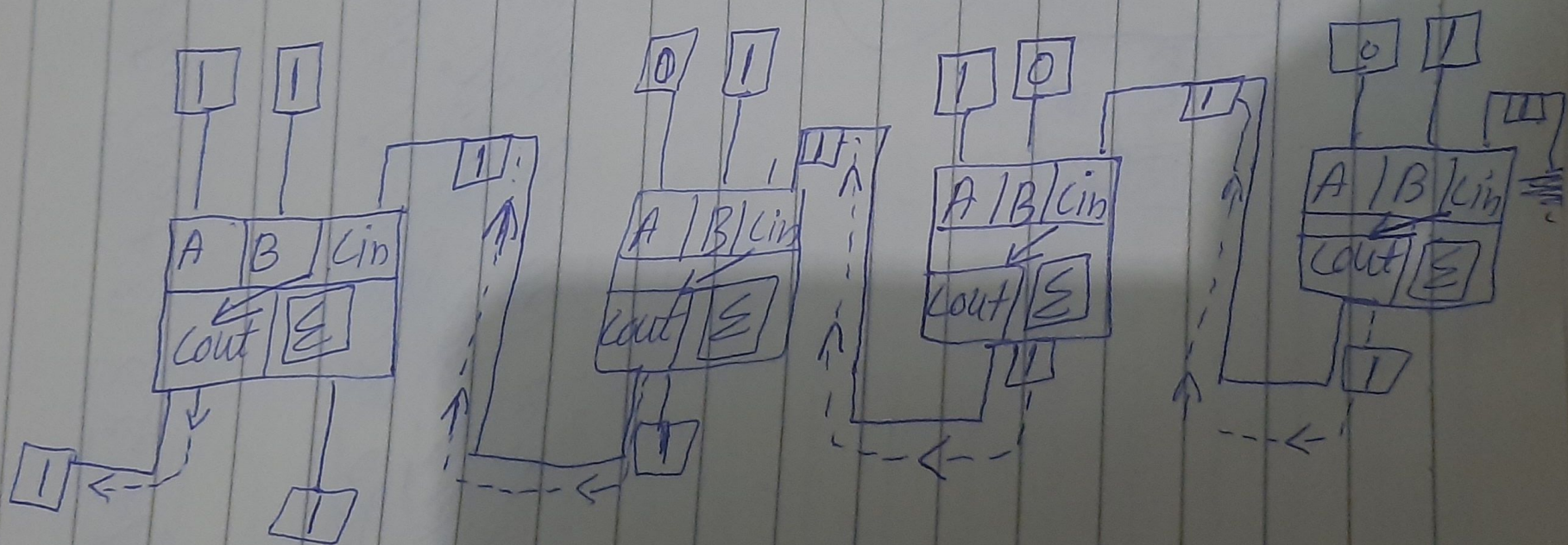
Q3

Ans

The Answer is

1001

Q3 Answer



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Q4:. Determine the $A=B$ $>A>B$ and $A<B$ output for the input numbers shown on the Comparator in figure 03:.

Ans:. Solution:.

The number on the A inputs is 0110 and the number on the B inputs is 0011. The $A>B$ output is high and the other output are low.

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Q5: Show the logic required to convert a 4-bit Gray code to binary and use that logic to convert the following Gray code to binary: ~~0111~~ 1011.

Solution:-

(1) The MSB is kept the same

(2) Next take the XOR of the First and the Second binary bit

(3) Next take the XOR of the Second and third binary bit

4) Next take the XOR of Third and Fourth binary bit

5) Lastly take the XOR of the fourth and Fifth binary bit.

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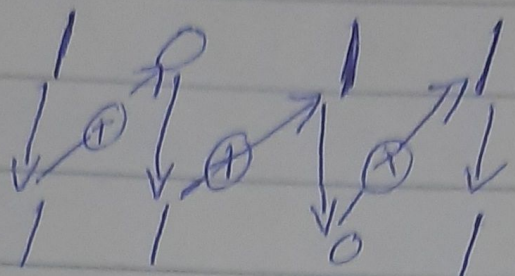
Gray code to binary conversion

g(3) g(2) g(1) g(0)



B(3) (B2) B(1) B(0)

i-e
$$b(3) = g(3)$$
$$b(2) = b(3) \oplus g(3)$$
$$b(1) = b(2) \oplus g(1)$$
$$b(0) = b(1) \oplus g(0).$$

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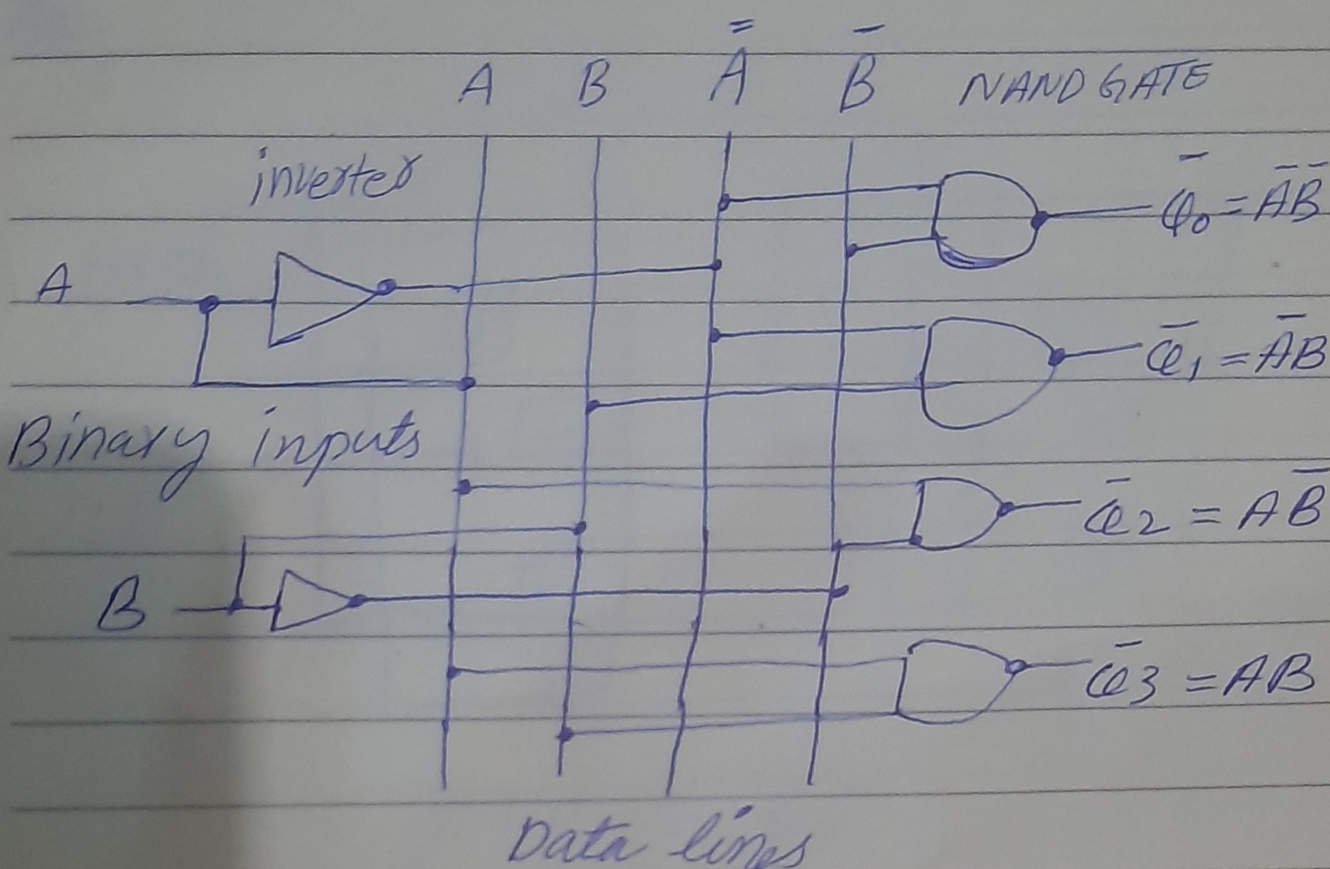
Q6:- Draw and explain the logic diagram

— — — — — — — — — — — — — — — — — —

— — — — — — — — — — — — — decoder:-

Solution:-



Truth Table.

A	B	Q_0	Q_1	Q_2	Q_3
0	0	0	1	1	1
0	1	1	0	1	1
1	0	1	1	0	1
1	1	1	1	1	0

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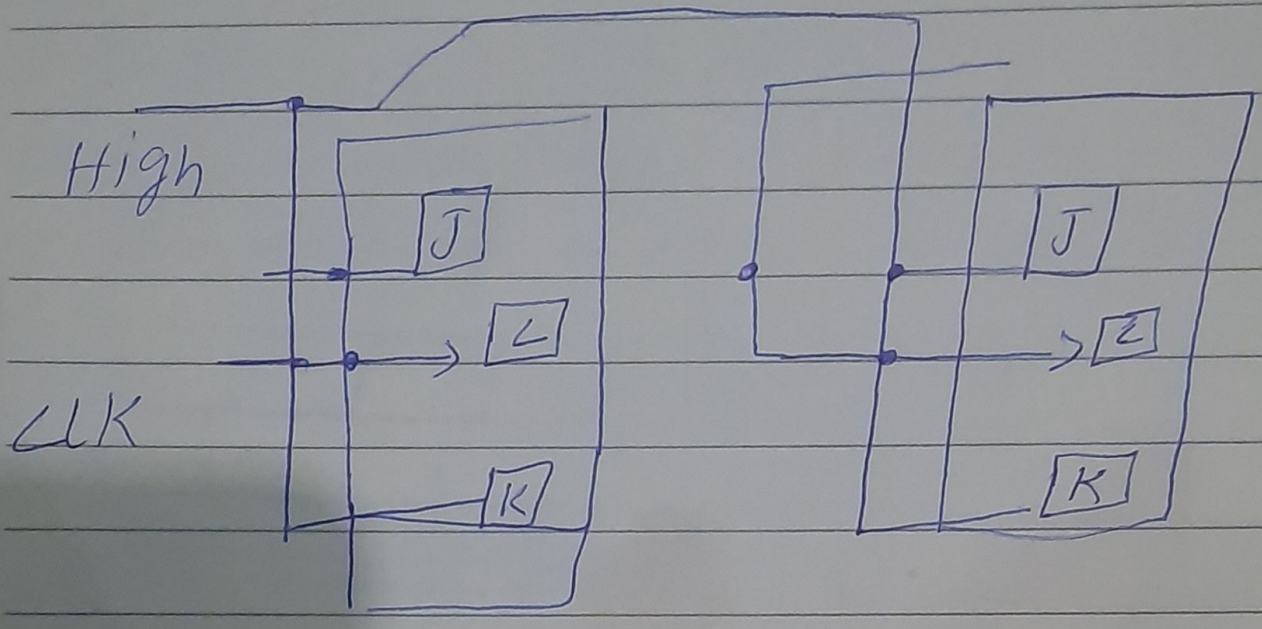
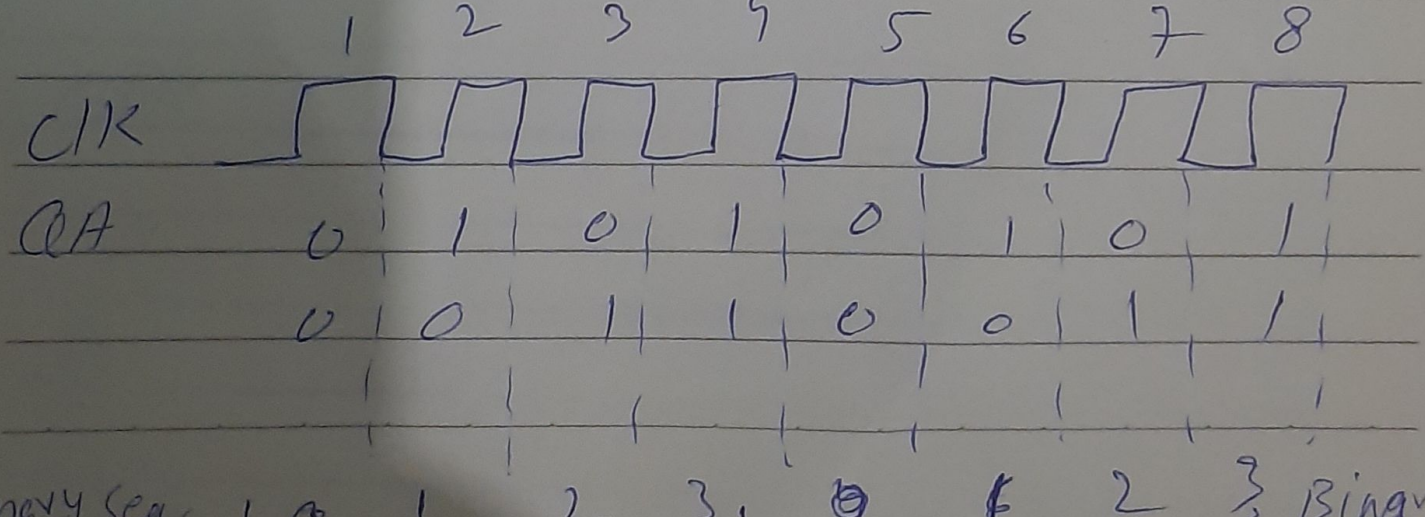
Q7: Draw and Explain the logic diagram ——— waveforms:-

Ans:-



Flip-Flop A Flip-Flop B



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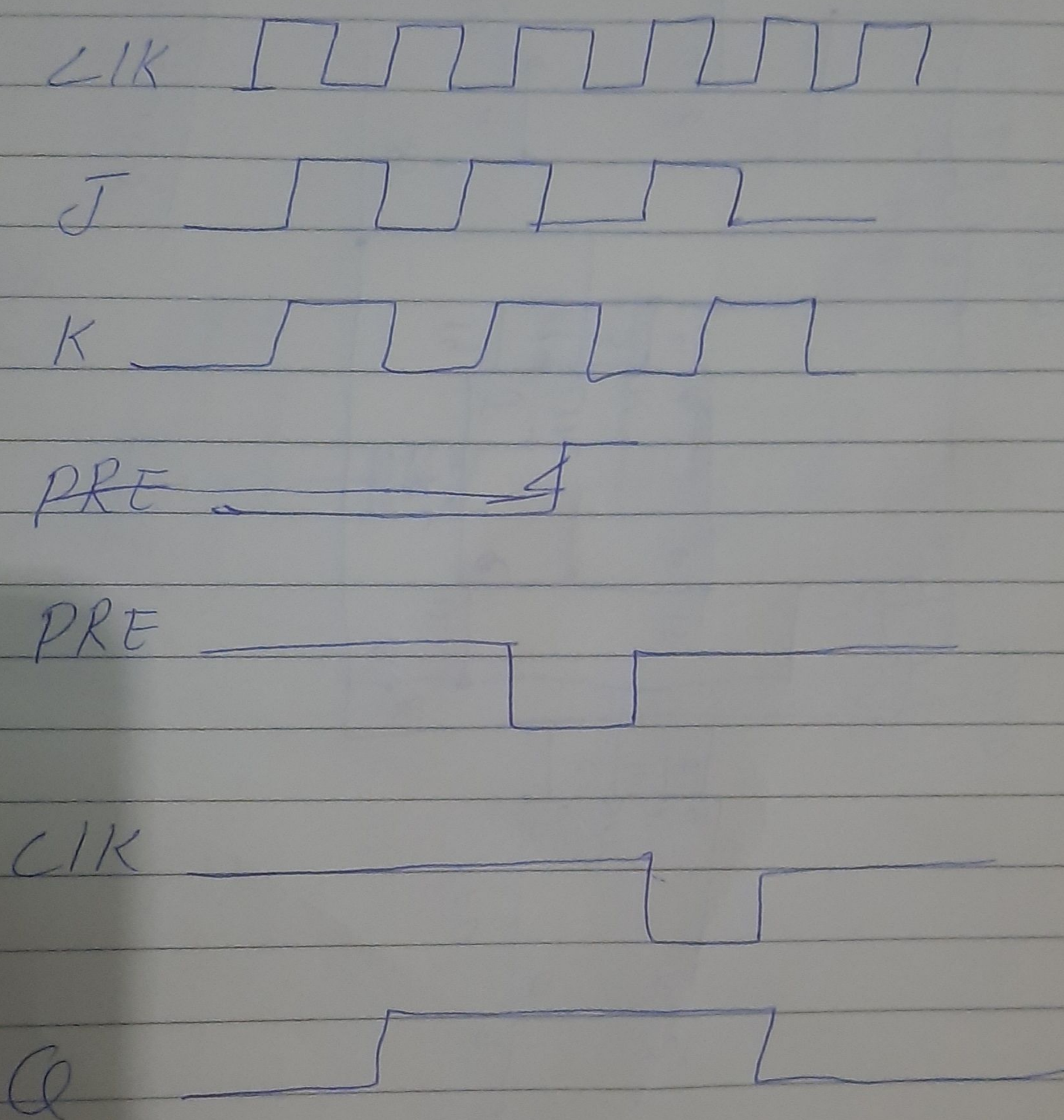
Q8:-

Determine - - - - - - - -

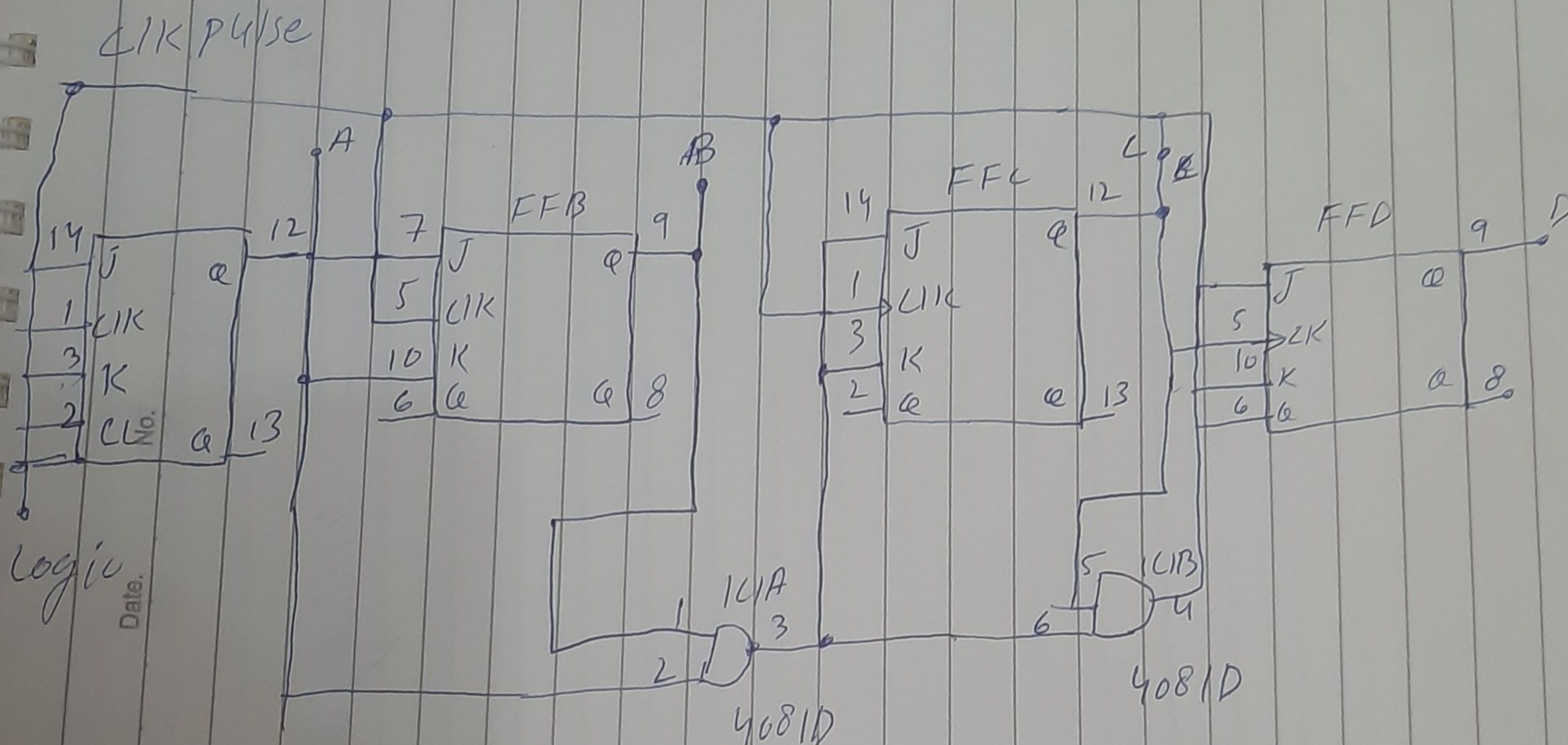
- - - - - - - - - - - - - - initially low.

sol



Q9

Answer



ClK pulse
A
AB
C
D
FFB
FFC
FFD
J
ClK
K
CL
Q
14
1
3
2
12
13
7
5
10
6
9
8
1C1A
1C1B
4081D
4081D
Logic