Digital Logic Design

Assignment 5

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15459

Csc-201

Q1

$A = 1$, $B = 0$, $C_{in} = 1$

Sol:

$$\Sigma = (A \oplus B) \oplus C$$

$$\Sigma = (1 \oplus 0) \oplus 1$$

$$\Sigma = (1) \oplus 1$$

$$\boxed{\Sigma = 0}$$

$$C_{out} = AB + (A \oplus B) C$$

$$C_{out} = (1)(0) + (1 \oplus 0) 1$$

$$C_{out} = 0 + (1)(1)$$

$$\boxed{C_{out} = 1}$$

Ans.

Q2:

$\Sigma = 0$, $C_{out} = 0$

$A = ?$, $B = ?$

for Σ and C_{out} both to be zero. the A and B most be zero

$\boxed{\begin{matrix} A = 0 \\ B = 0 \end{matrix}}$

$$\Sigma = A \oplus B$$

Ans. $0 = 0 \oplus 0$

$$C_{out} = AB$$

$C_{out} = 0 \cdot 0$

Q3)

$A = 1$, $B = 1$, $C_{in} = 1$

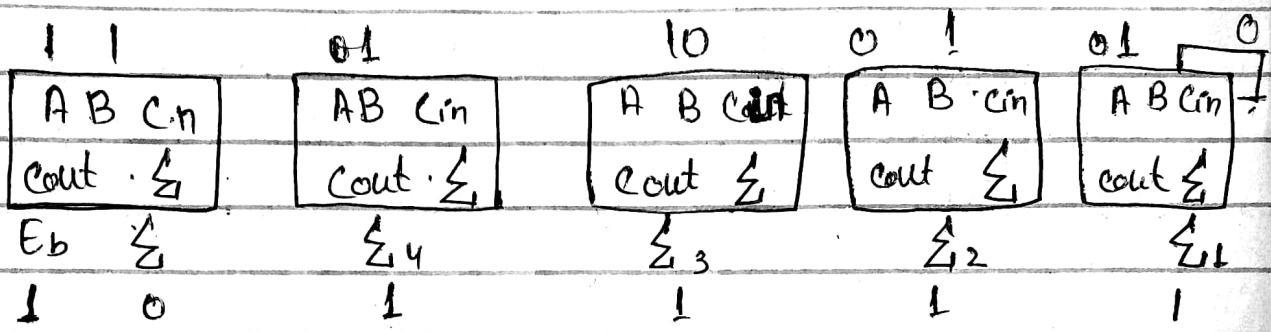
$$\Sigma = (A \oplus B) \oplus C_{in}$$

$$C_{out} = AB + (A \oplus B) C_{in}$$

$\Sigma = (1 \oplus 1) \oplus 1$	$Cout = 1 \cdot 1 + (1 \oplus 1) 1$
$\Sigma_1 = (0) \oplus 1$	$Cout = 1 + (0) 1$
$\boxed{\Sigma_1 = 1}$	$\boxed{Cout = 1}$

Ans.

Q4):-



$$\begin{array}{rl} & A = +1\ 0\ 1\ 1\ 0 \\ + & B = +1\ 1\ 0\ 0\ 1 \\ \hline & 1\ 0\ 1\ 1\ 1\ 1 \end{array}$$

Ans.

Q5)

(a) When the $\overline{Add}$ / subt is High, the input bits of B will be complemented, and the resulting Σ will be the subtraction of the input bits.

(b) When the $\overline{Add}$ / subt is Low, the input bits of B will not be elonged. and the circuit will work as a paralleled adder for the input bits.

Q6:

$\overline{Add}/subt = 1$, $A = 1010$, $B = 1101$

for Σ_0 : $A_0 = 0$, $B_0 = 1 \oplus 1$, $Cin = 1$

$\Sigma_0 = 0 + 0 + 1 = \boxed{1}$, $Cout = 0$

for Σ_1: $A_1 = 1$, $B_1 = 1 \oplus 0$, $Cin = 0$

$\Sigma_1 = 1 + 1 + 0 = \boxed{0}$, $cout = 1$

for Σ_2 : $A_2 = 0$ $B_2 = 1 \oplus 1$ $Cin = 1$

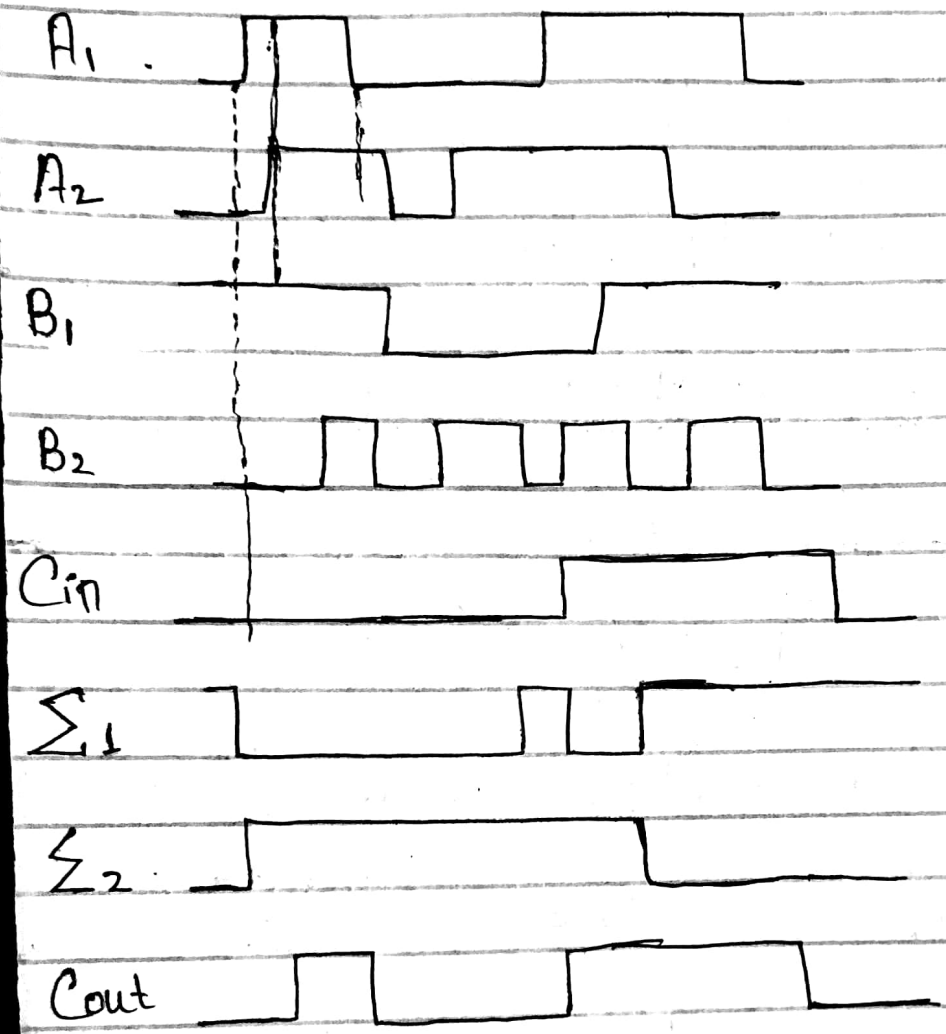
$\Sigma_2 = 0 + 0 + 1 = \boxed{1}$, $Cout = 0$

for Σ_3 : $A_3 = 1$, $B_3 = 1 \oplus 1$, $Cout = 0$

$\Sigma_3 = 1 + 0 + 0 = \boxed{1}$, $cout$ 0

$\Sigma = \Sigma_3 \Sigma_2 \Sigma_1 \Sigma_0 = 1101$, $Cout = 0$ Ans.

Q7 :-



Q8)

$A_1 = 1010$, $A_2 = 1100$, $A_3 = 0101$, $A_4 = 1101$

$B_1 = 1001$, $B_2 = 1011$, $B_3 = 0000$, $B_4 = 0001$

Sol:

A_4	A_3	A_2	A_1	+	B_4	B_3	B_2	B_1	=	Σ_5	Σ_4	Σ_3	Σ_2	Σ_1
1	0	1	1		0	0	1	1		0	1	1	1	0
1	1	1	0		0	0	0	0		0	1	1	1	0
0	0	0	1		0	0	1	0		0	0	0	1	1
1	1	0	0		1	0	1	1		1	0	1	1	1

$\Sigma_5 = 0\ 0\ 0\ 0\ 1$

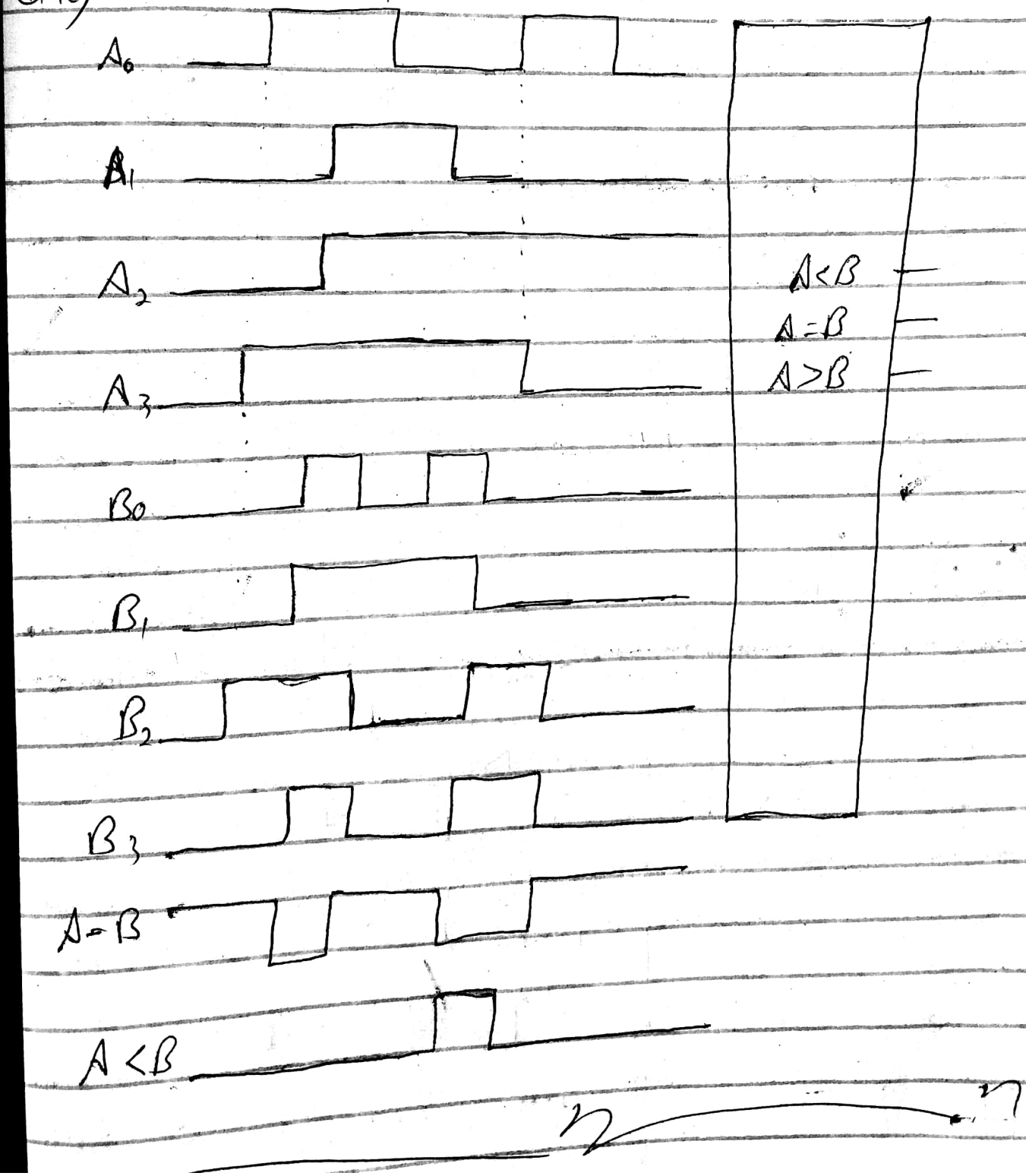
$\Sigma_4 = 1\ 1\ 0\ 0$

$\Sigma_3 = 1\ 1\ 0\ 1$

$\Sigma_2 = 1\ 1\ 1\ 1$

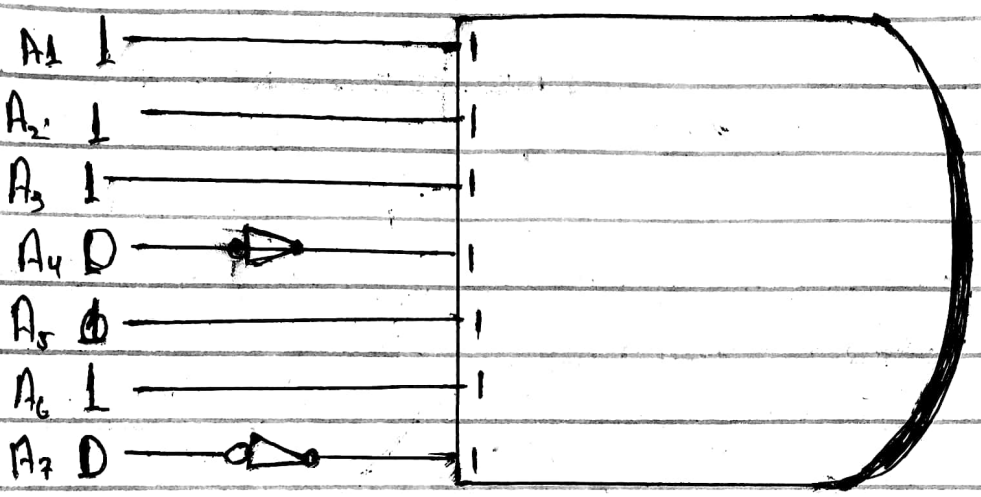
$\Sigma_1 = 0\ 0\ 1\ 1$ Ans.

Q'10)



Q11)

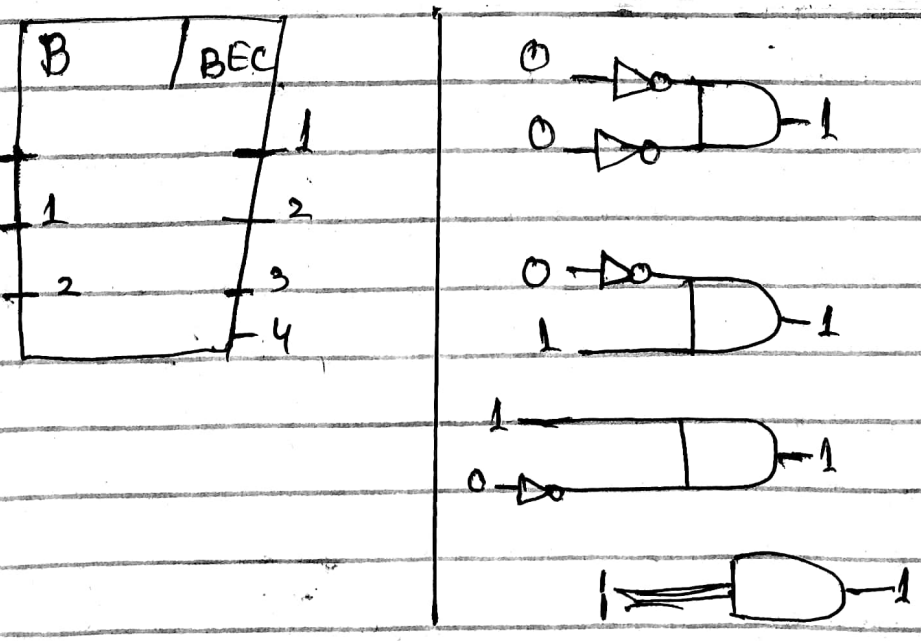
For the output to be High for the given code 1110110, following is the decoding logics that can be used to decode the given code.



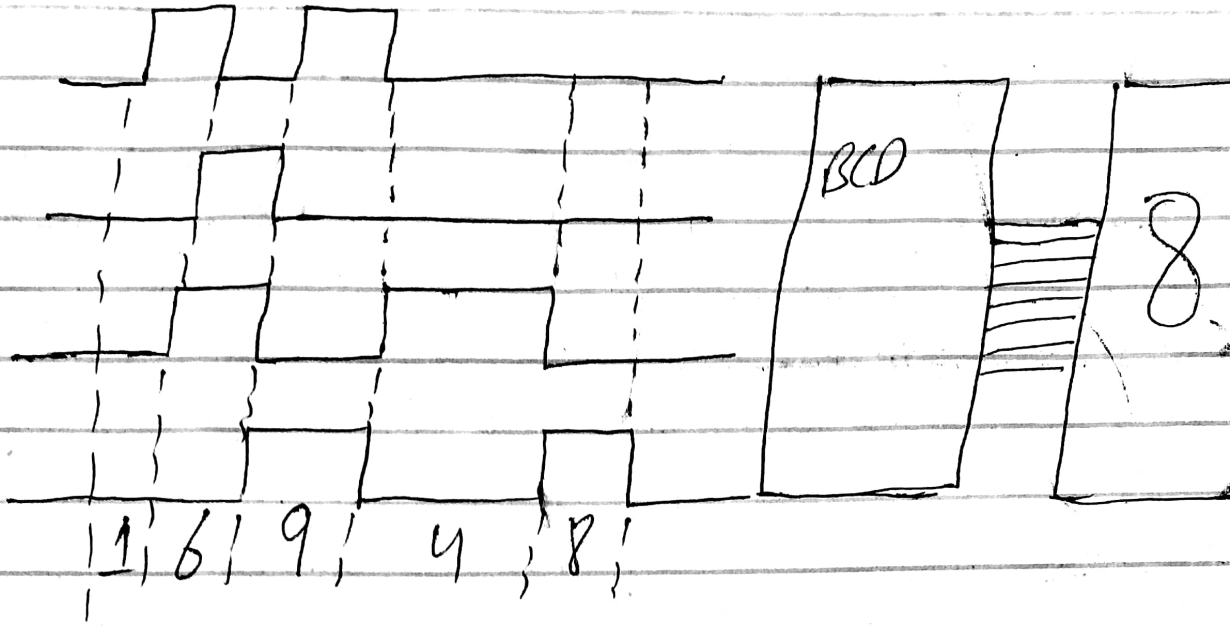
$$X = \overline{A_7}\, A_6\, A_5\, A_4\, A_3\, A_2\, A_1$$

Ans.

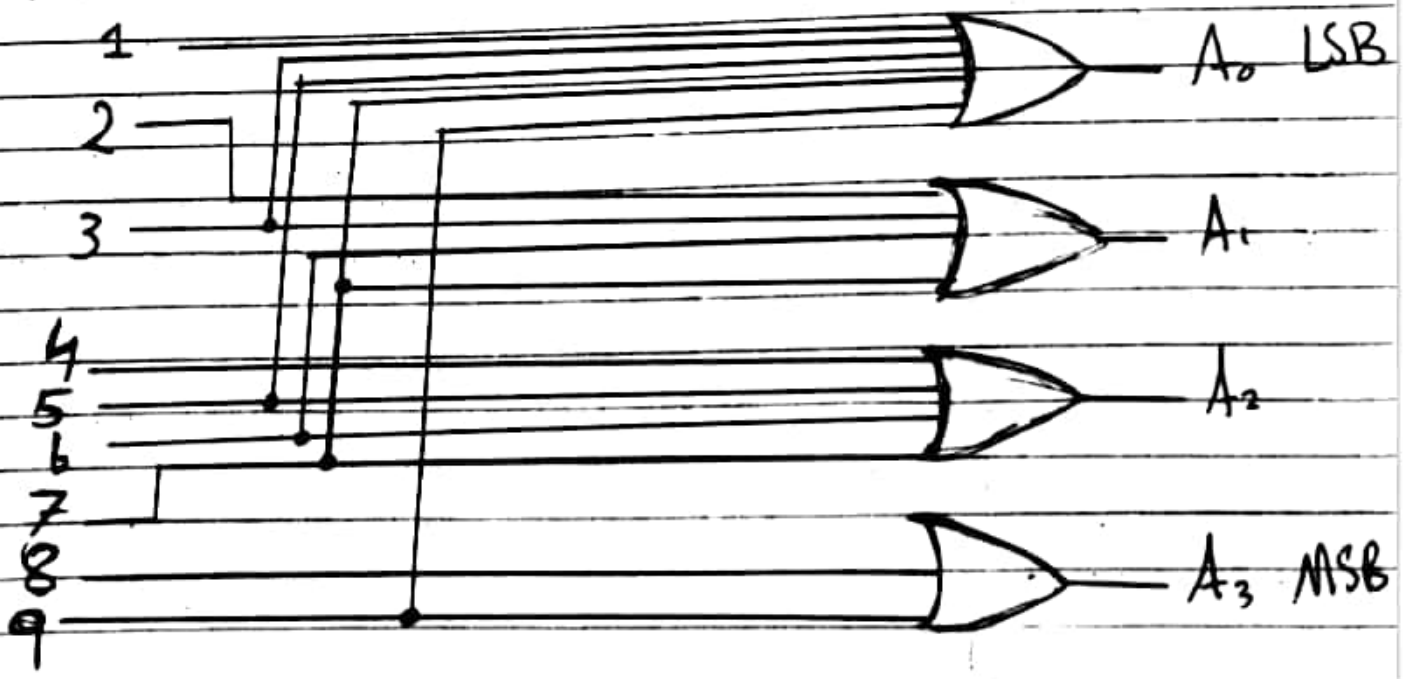
Q12)



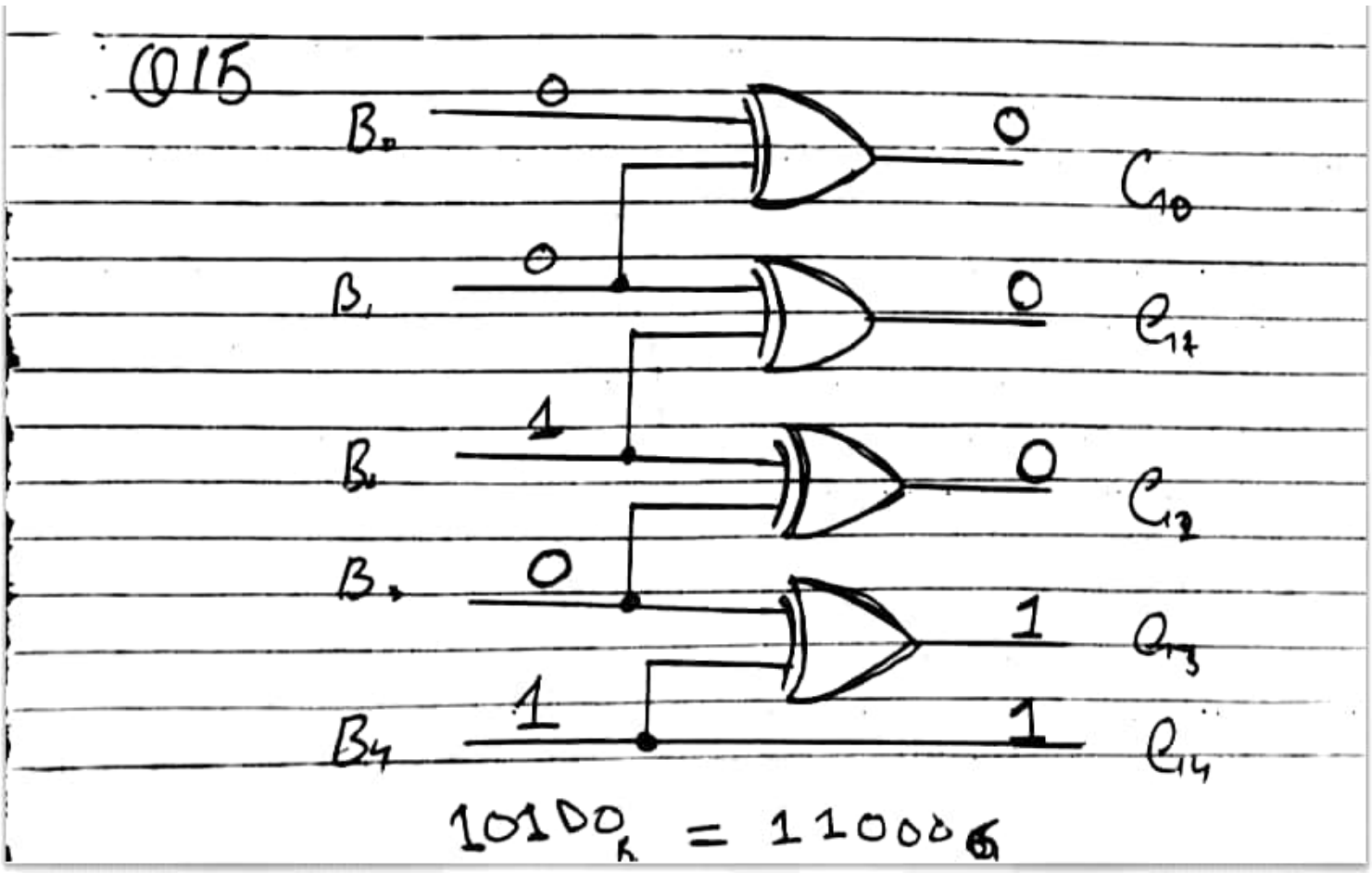
(Q13)



Q14:

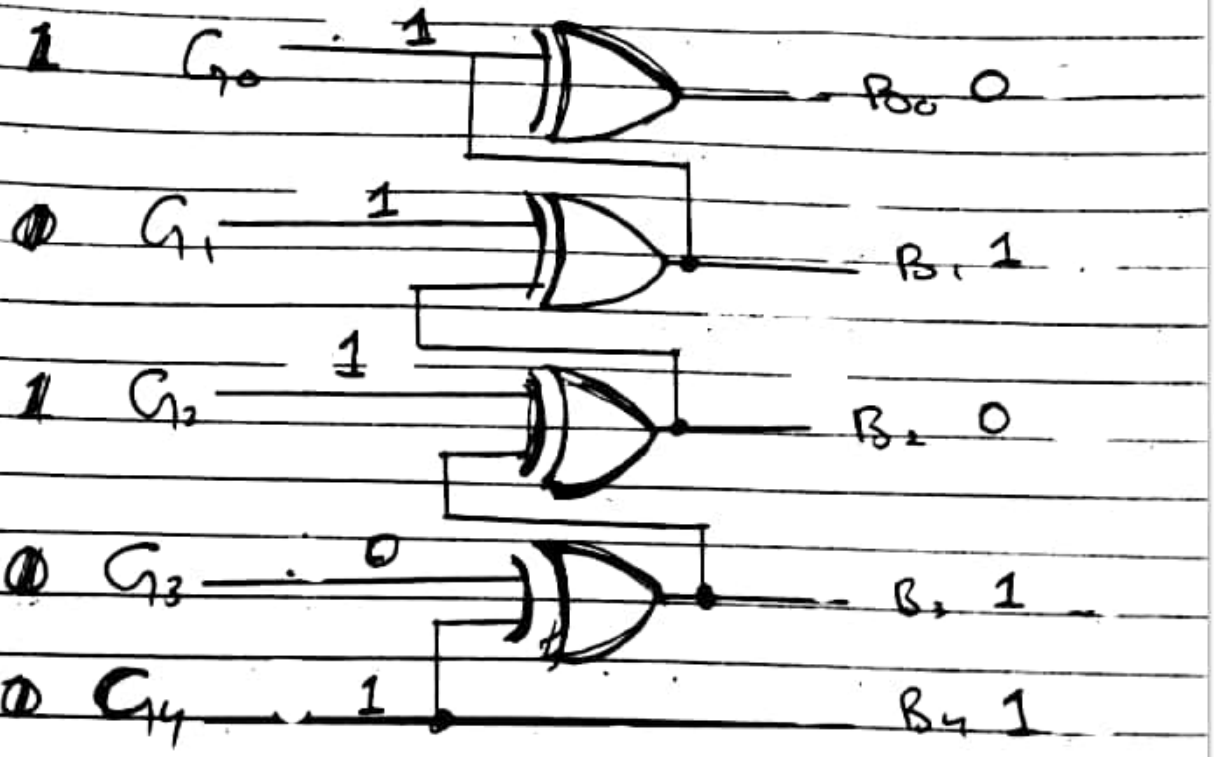


Q15



$10100_R = 11000_{6}$

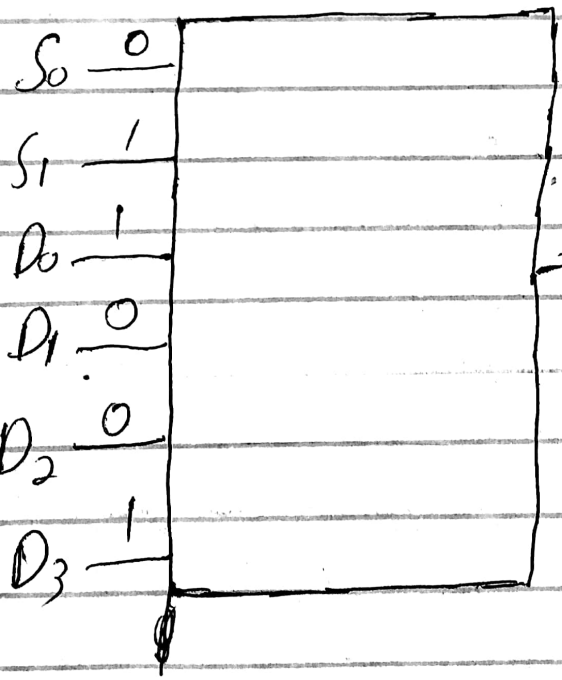
Q16:



$10111_G = 11010_B$

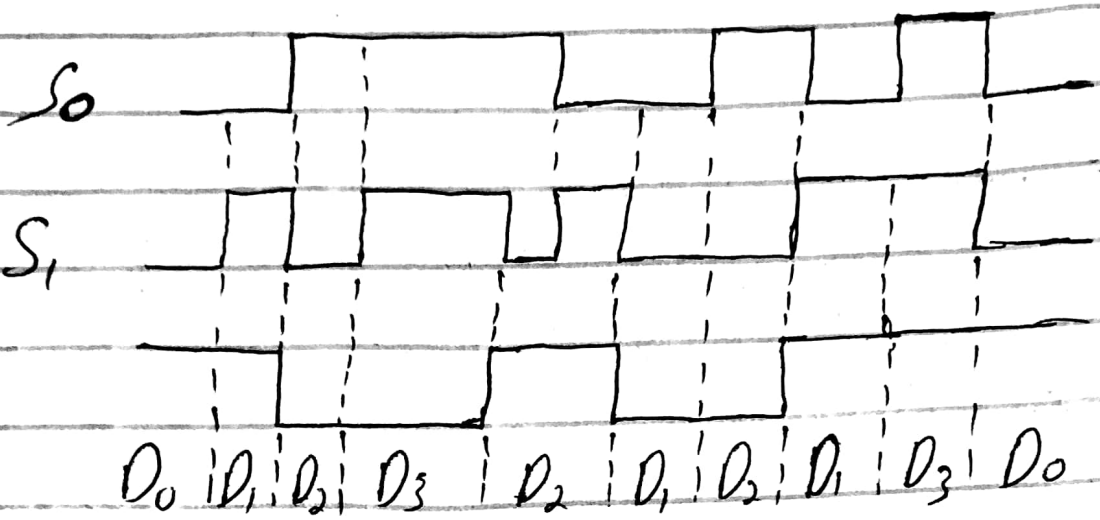
Dm

Q17)

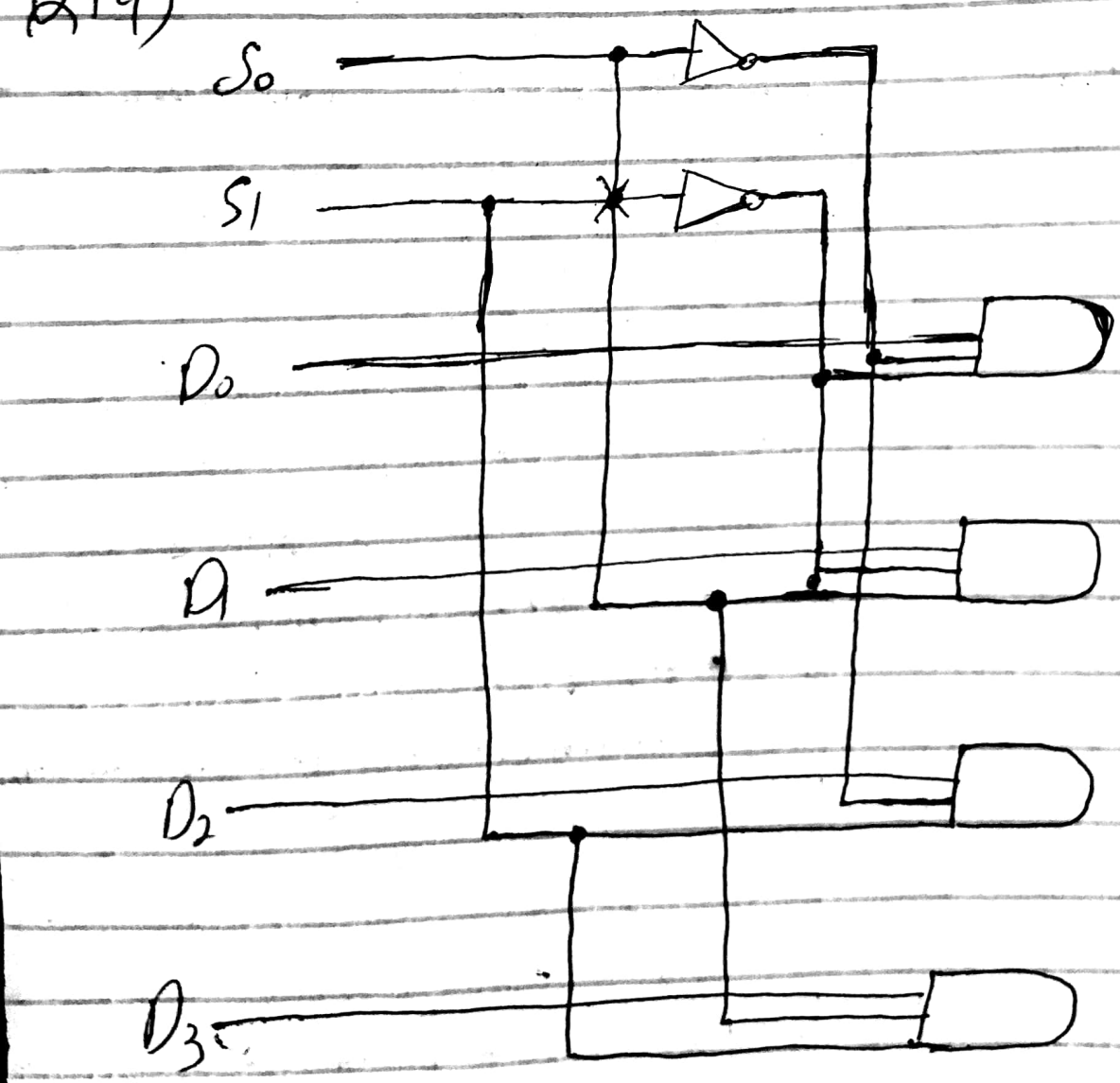


$S_0 S_1 = 01 \Rightarrow 0$

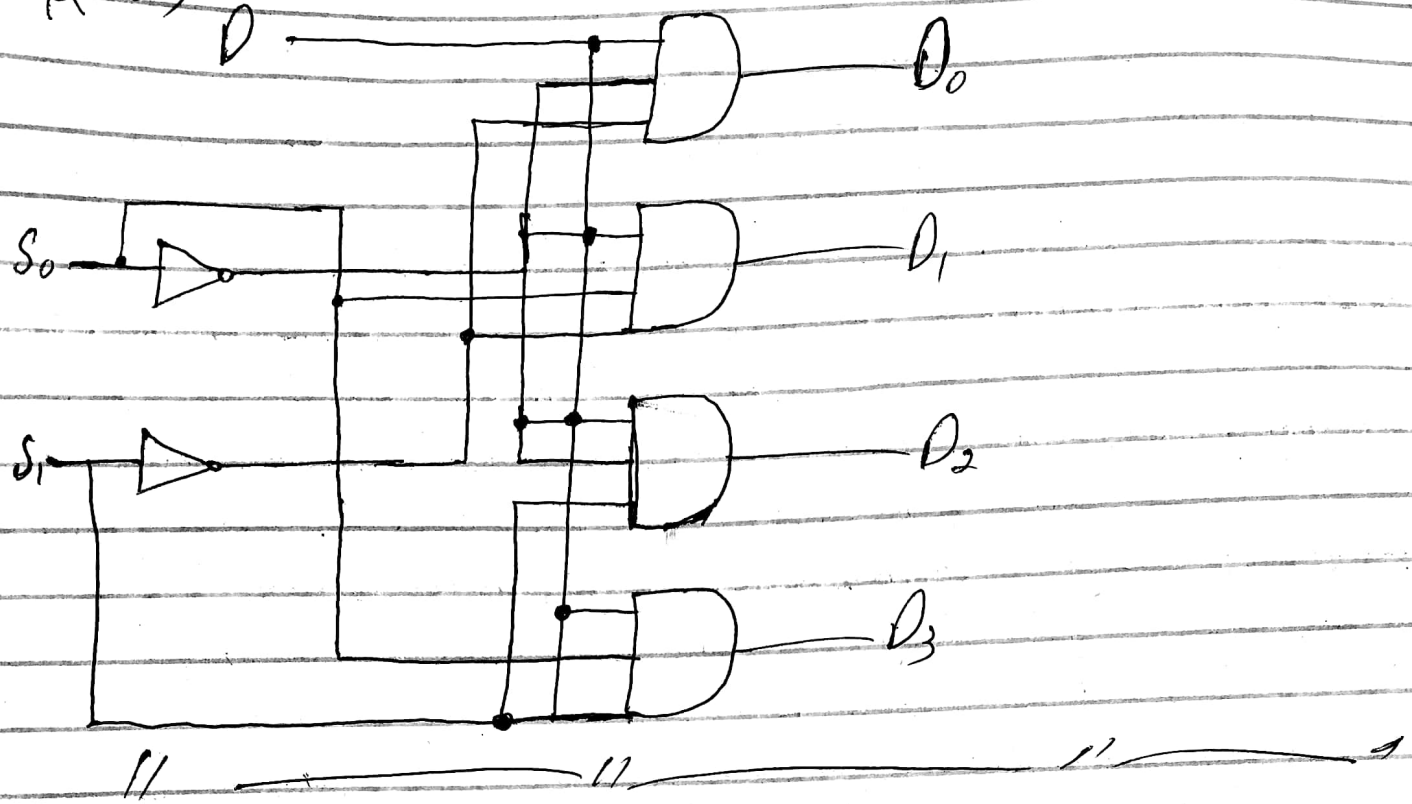
18)



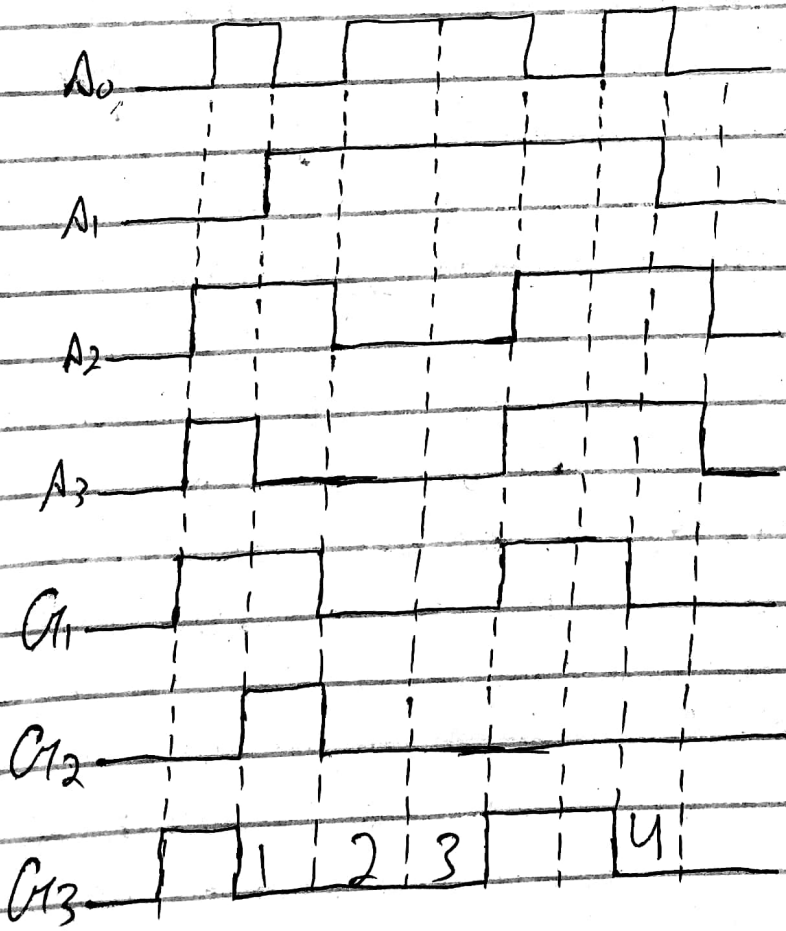
Q19)



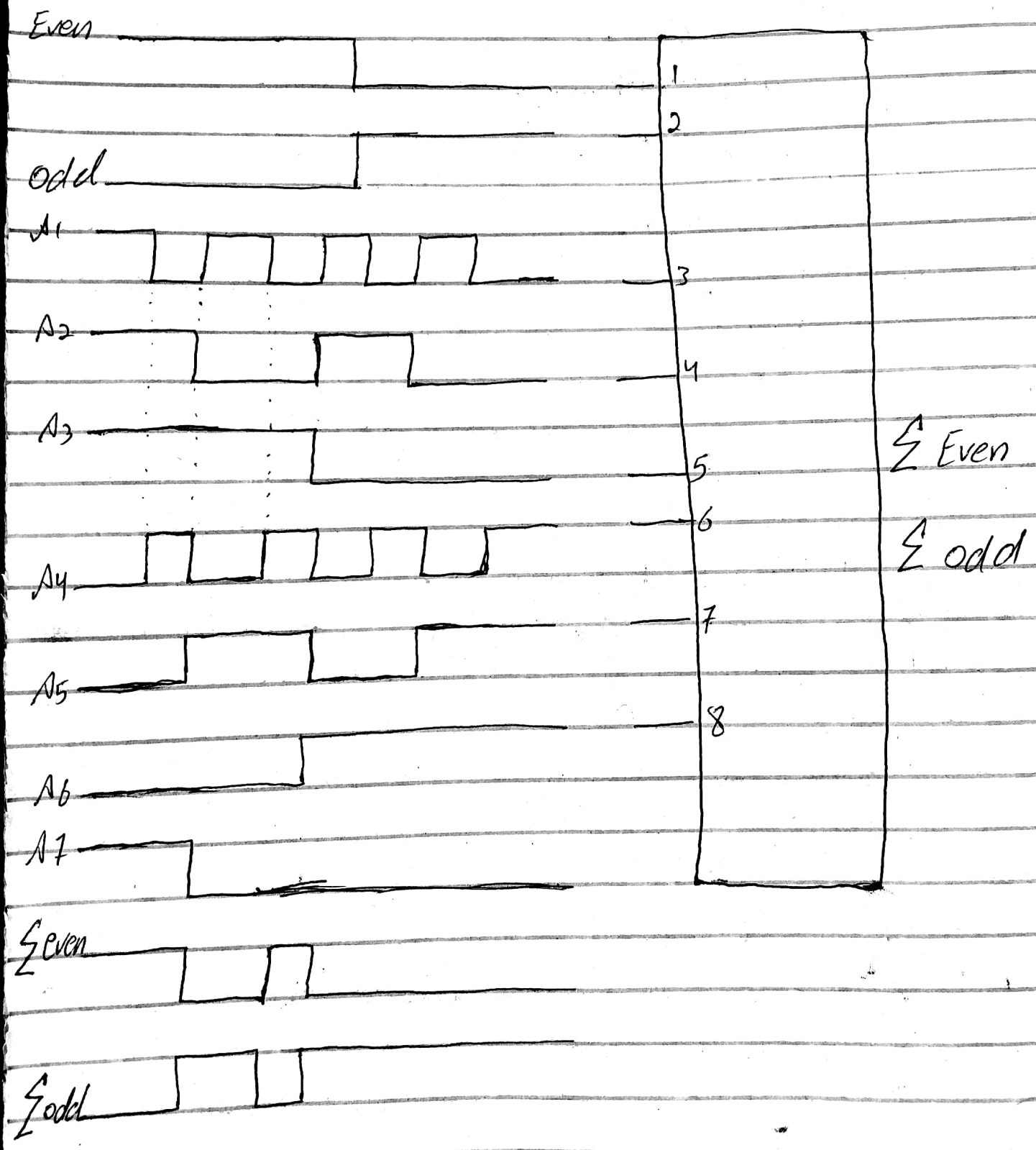
(Q26)



(Q20)



Even Parity occurs four time and is shown by law.



Q23