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ID : 15431

Assignment : no 5

Subject : Digital Logic Design

Course code(CS): CSC-201

Program : BC (CS)

Assignment No : 5

Name = Irfan ullah

ID = 15431

Subject = DLD

Program = BC(CS)

Q1. Determine the output of a full-adder for the following inputs A = 1, B = 0, C_{in} = 1

Sol:

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

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

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

$\Sigma = (1) \oplus 1$

$\Sigma = 0$

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

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

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

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

Q2 What are the half-adder input that will produce the following output $\Sigma = 0, C_{out} = 0$

Sol:

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

$A = ?, B = ?$

For Σ and C_{out} both to be zero the A and B must be zero

$\boxed{A = 0, B = 0}$

$\Sigma = A \oplus B$

$0 = 0 \oplus 0$

$C_{out} = AB$

$C_{out} = 0 \cdot 0$

Q3 Determine the outputs of a full - adder for the following input A = 1, B = 1, cin = 1

A = 1 , B = 1, Cin = 1

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

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

$\Sigma = (0) \oplus 1$

$\boxed{\Sigma = 1}$

$Cout = AB + (A \oplus B) Cin$

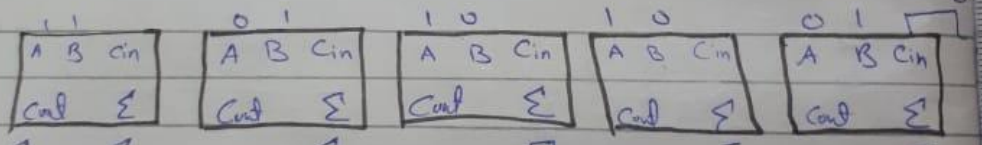
$Cout = 1 \cdot 1 + (1 \oplus 1) 1$

$Cout = 1 + (0) 1$

$\boxed{Cout = 1}$

Q5:-

Q4:-



$$A = 16110$$
$$B = 11001$$
$$101111$$

Ans

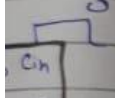
Q5:-

(a) when the Add/Subt is High input bits of B will be complemented and the resulting Σ will be the subtraction of the input bits.

(b) When the Add/Subt is Low the input bits of B will not be changed and the circuit will work as the parralled adder for the input bits.

Q6:-

Add/Subt = 1. A = 1010, B = 1101



For Σ_0: $A_0 = 0$, $B_0 = 1 \oplus 1$, $C_{in} = 1$

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

For Σ_1: $A_1 = 1$, $B_1 = 0 \oplus 0$, $C_{in} = 0$

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

For Σ_2: $A_2 = 0$, $B_2 = 1 \oplus 1$, $C_{in} = 1$

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

For Σ_3: $A_3 = 1$, $B_3 = 1 \oplus 1$, Carry = 0

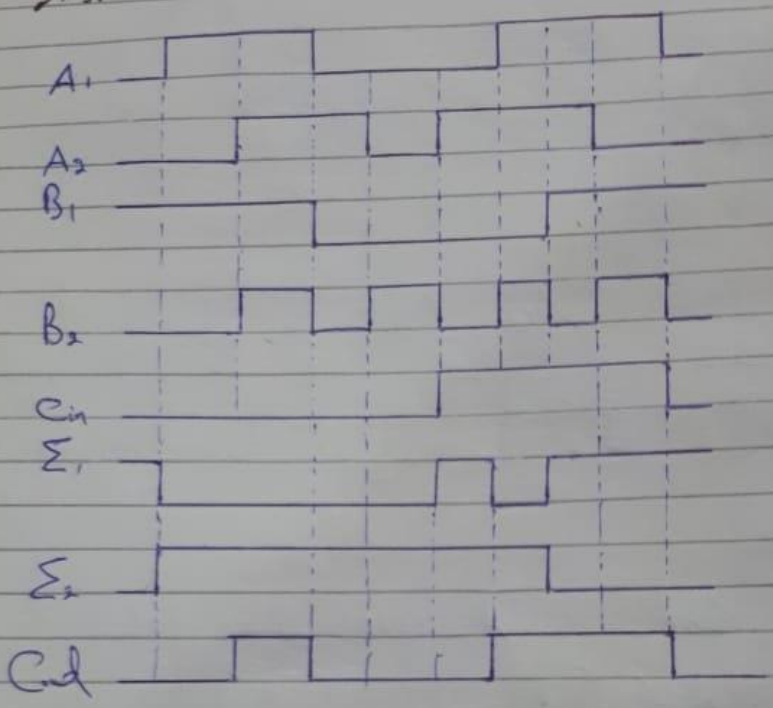
$\Sigma_3 = 1 + 0 + 0 = \boxed{1}$, Carry = 0

$\Sigma = \Sigma_3 \Sigma_2 \Sigma_1 \Sigma_0 = \underline{1}\,\underline{1}\,0\,\underline{1}$, Carry = 0

Ans.

Q 7:-

Ans:-



Q 8:-

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

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

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

$\Sigma_5 = 0001$

$\Sigma_4 = 1100$

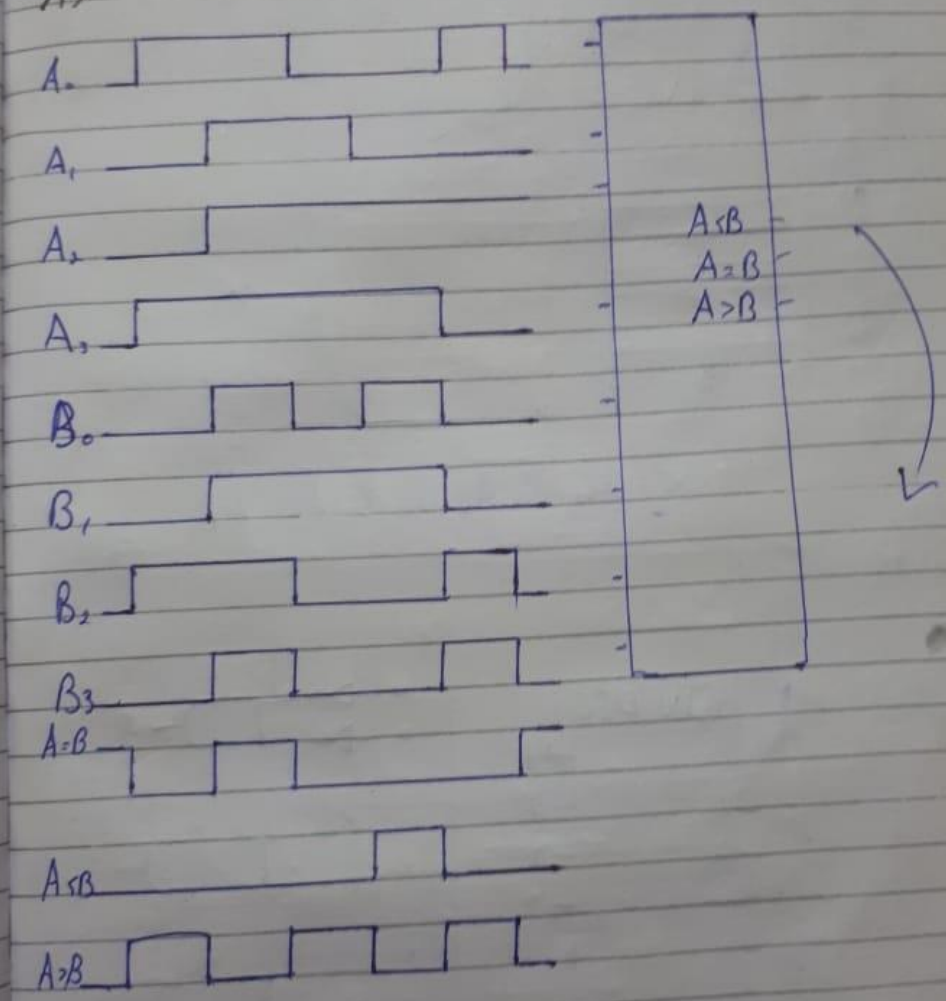
$\Sigma_3 = 1101$

$\Sigma_2 = 1111$

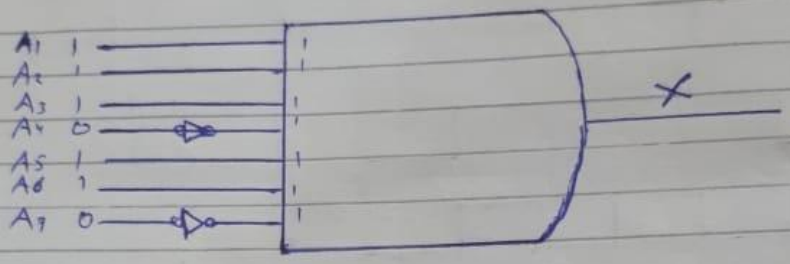
$\Sigma_1 = 0011$

Q10

Ans

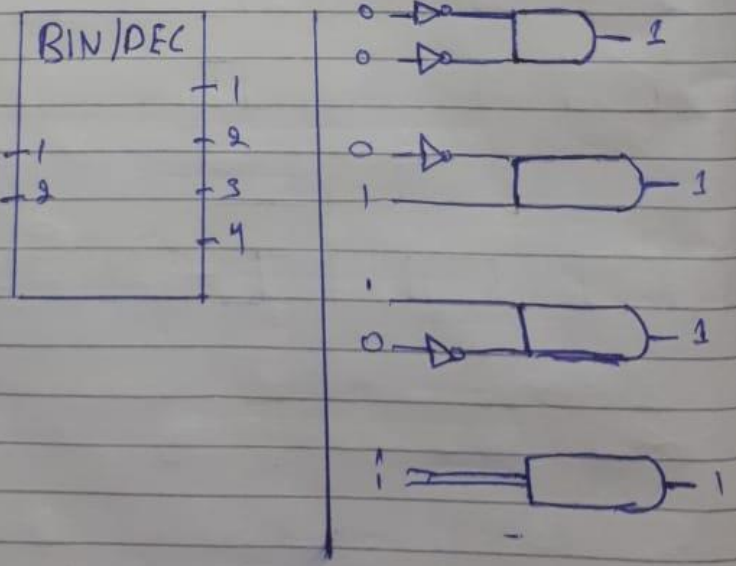


Q11 For the output to be High for the given code 1110110 following is the decoding logics that can be used to decode the given code

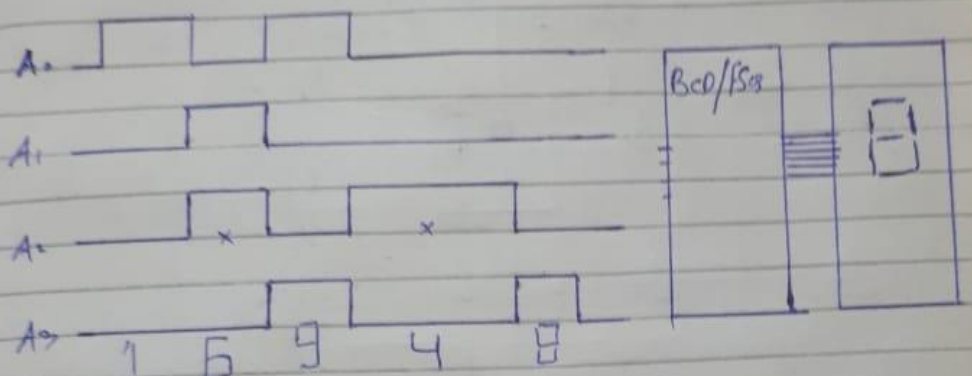


$$X = \bar{A}_7 A_6 A_5 \bar{A}_4 A_3 A_2 A_1$$

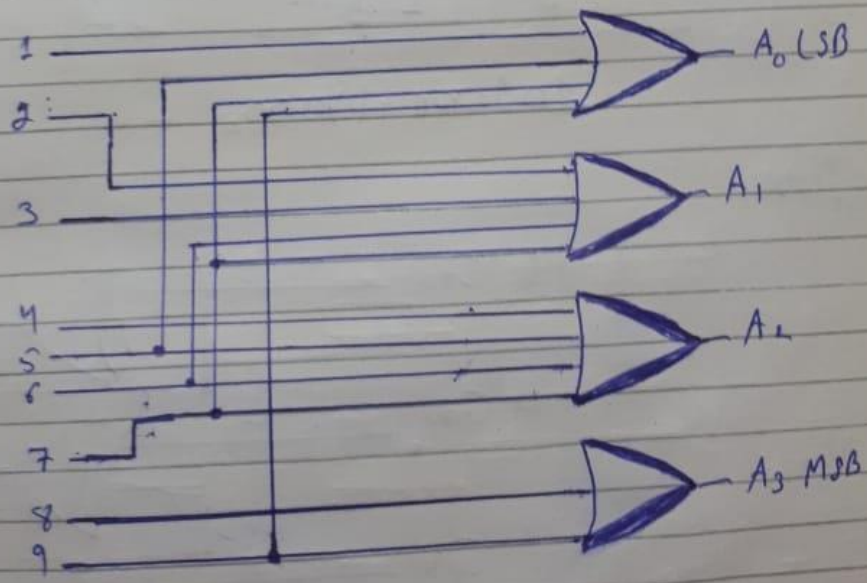
Q12:-



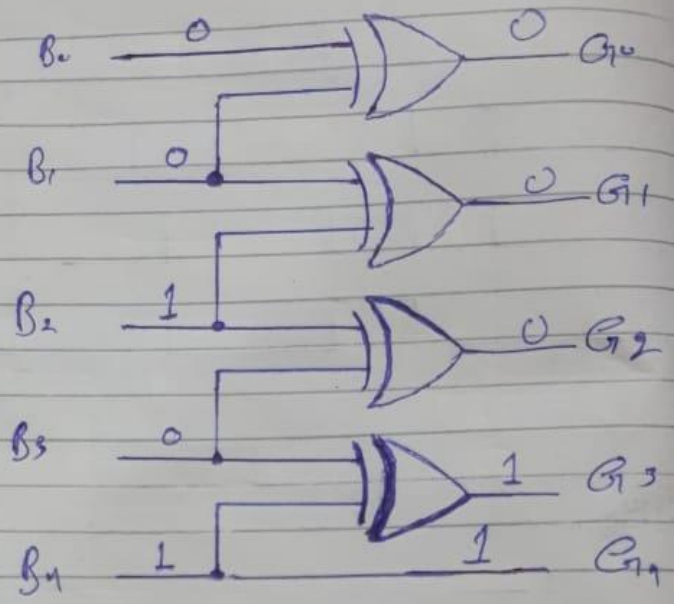
Q13:-



Q14:-

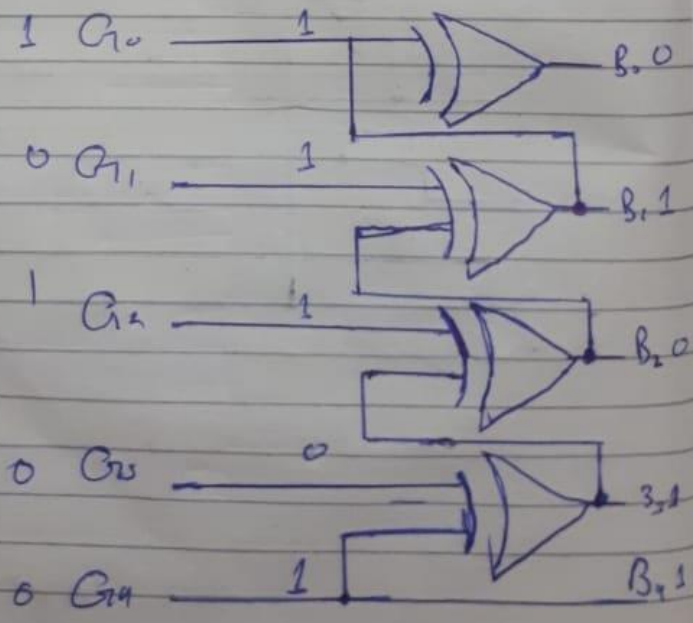


Q15



$10100_2 = 11000_3$

Q16.

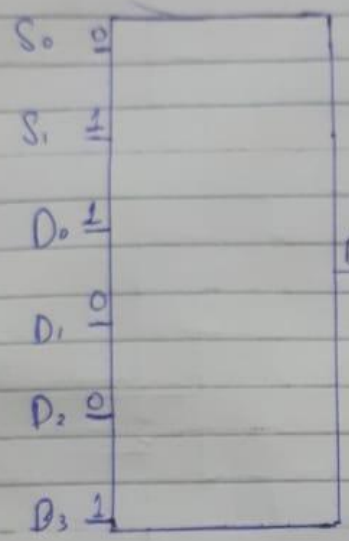


$10111_2 = 11012_3$

Q17

Q18

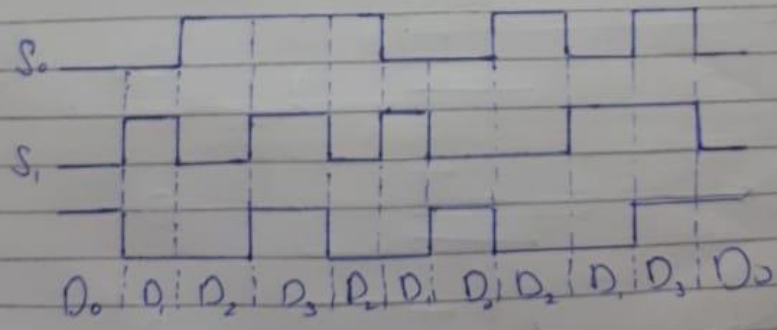
Q17



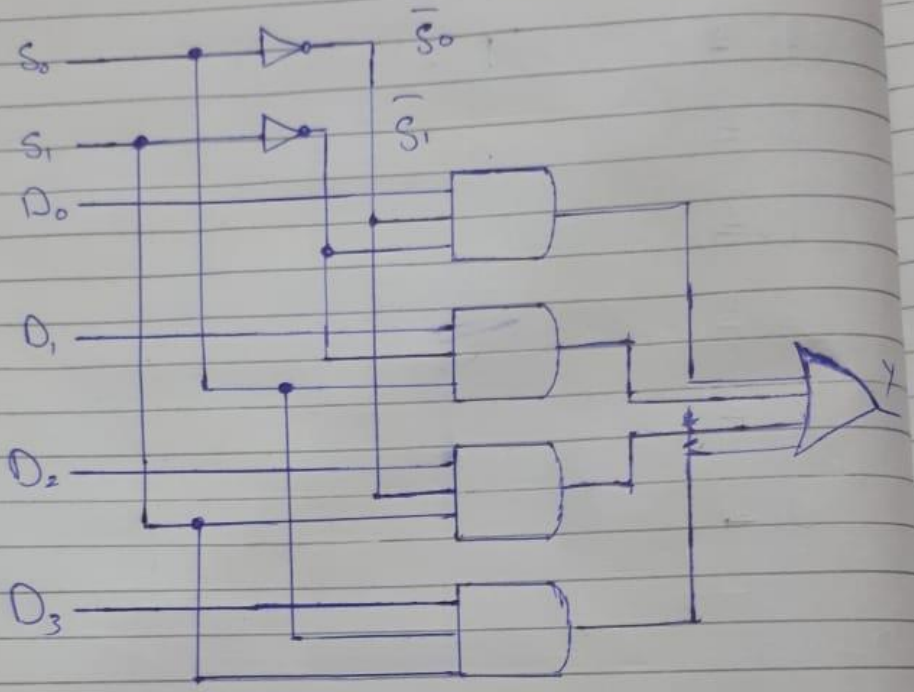
$D_1 = 0$ ✓

$S_0 S_1 = 01 \Rightarrow D_1$

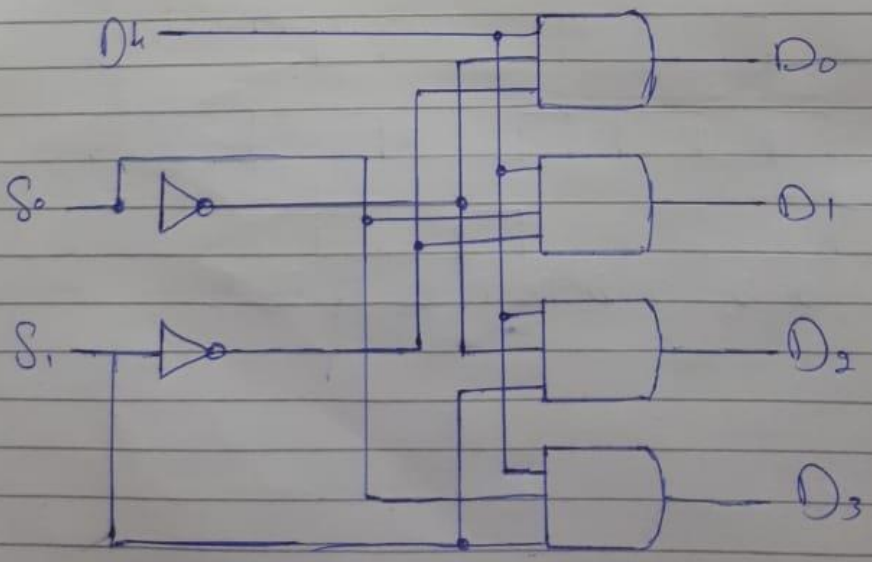
Q18



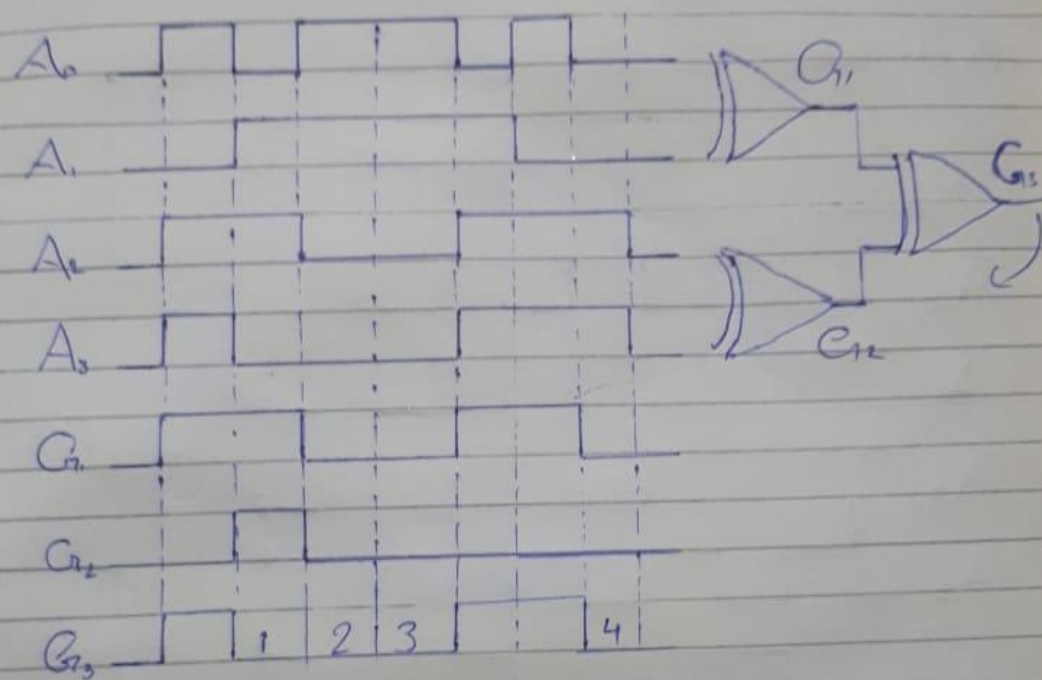
Q19



Q20

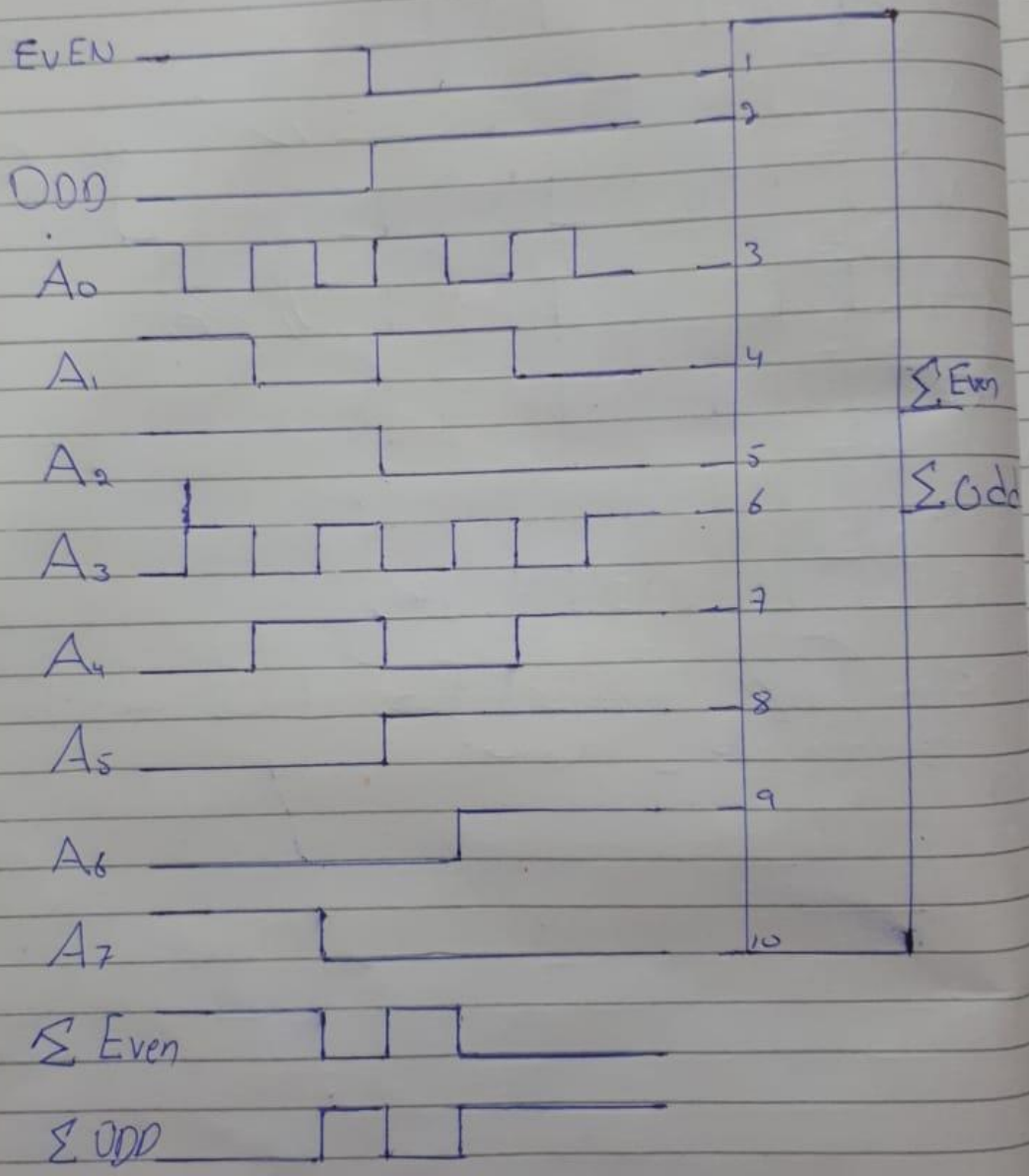


Q2'

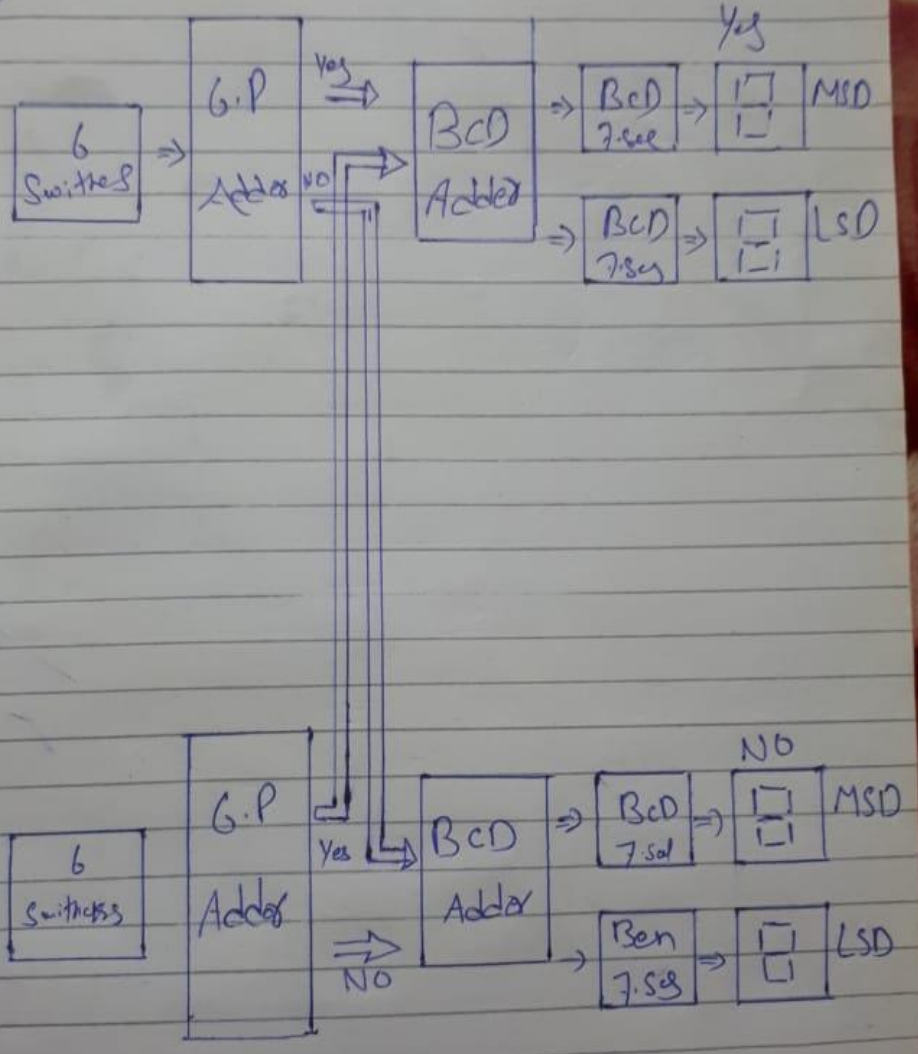


Even Parity Occurs Fours times and is shown by Four'

Q.22


EVEN
ODD
A0
A1
A2
A3
A4
A5
A6
A7
Σ Even
Σ ODD
1
2
3
4
5
6
7
8
9
10
Σ Even
Σ Odd

Q23


6 Switches
G.P Adder
Yes
No
BCD Adder
BCD 7 seg
MSD
BCD 7 seg
LSD
6 Switches
G.P Adder
Yes
No
BCD Adder
BCD 7 seg
NO
MSD
Ben 7 seg
LSD