NAME : UMAIR KHAN

I.D : 14596

SECTION : A

SEMESTER : BS (SE)

SUBJECT : DIGITAL LOGIC AND DESIGN

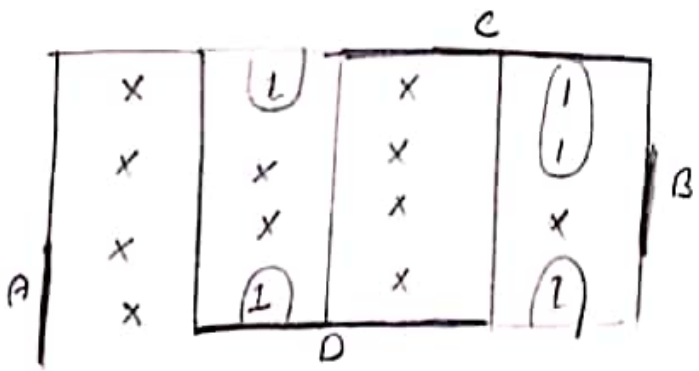
INSTRUCTOR : MUHAMMAD AMIN

EXAMINATION : FINAL TERM

Q 1) ANSWER:

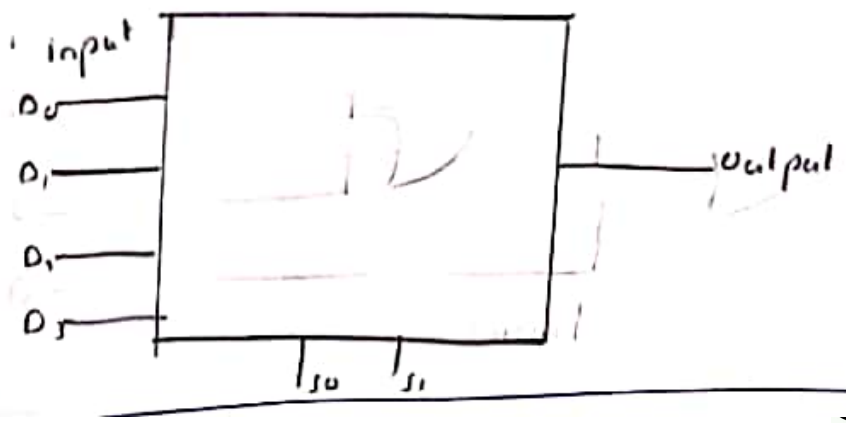
A	B	C	D	X
1	0	0	0	0
0	1	0	0	0
1	1	0	0	0
0	0	1	0	1
1	0	1	0	1
0	1	1	0	1
1	1	1	0	0
0	0	0	1	1
1	0	0	1	1
0	0	0	0	0

K - map



$X = A + D + C$

$A + C + D$



3) **ANSWER:**

Add/sub = 1

So Add = 0 , Sub = 1

A = 1010

B = 1101

FOR ADD

Add	A	B	Add	Curry
0	1	1	0	1
0	0	1	1	0
0	1	0	1	0
0	0	1	1	0

FOR SUB

Sub	A	B	Sub	Curry
1	1	1	1	1
1	0	1	0	1
1	1	0	1	1
1	0	1	0	1

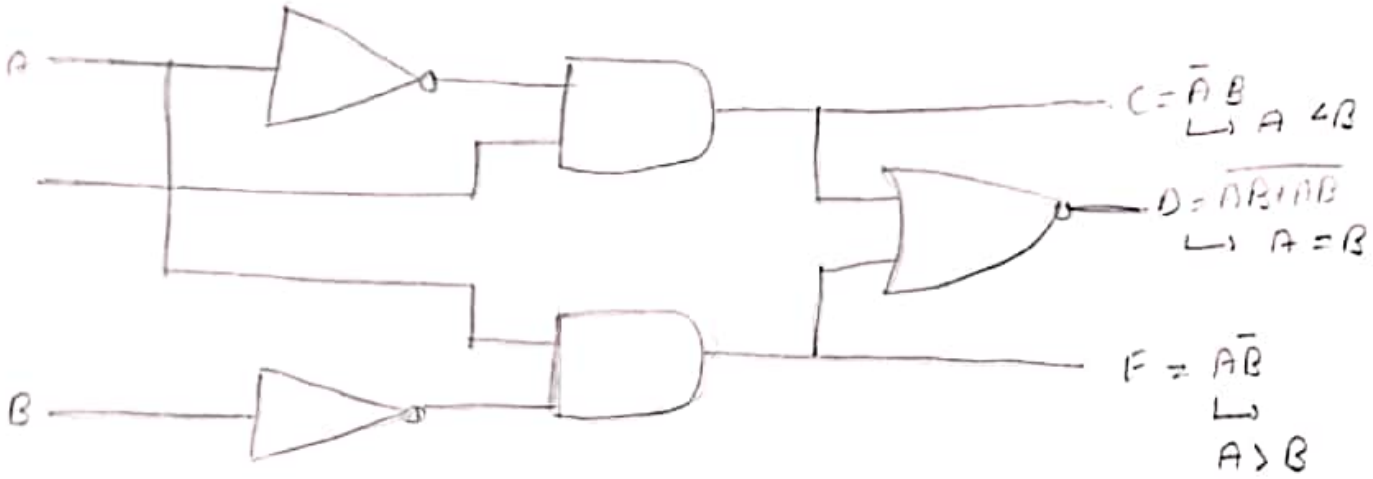
Q4)

ANSWER:

$A > B$, $A = B$, $A < B$

We consider the simple 1-bit comparator below.

1-Bit Digital Comparator Circuit:



TRUTH TABLE:

Inputs		Outputs		
B	A	A > B	A = B	A < B
0	0	0	1	0
0	1	1	0	0
1	0	0	0	1
1	1	0	1	0

Q 5) ANSWER

4-bit Gray to Binary Converter:

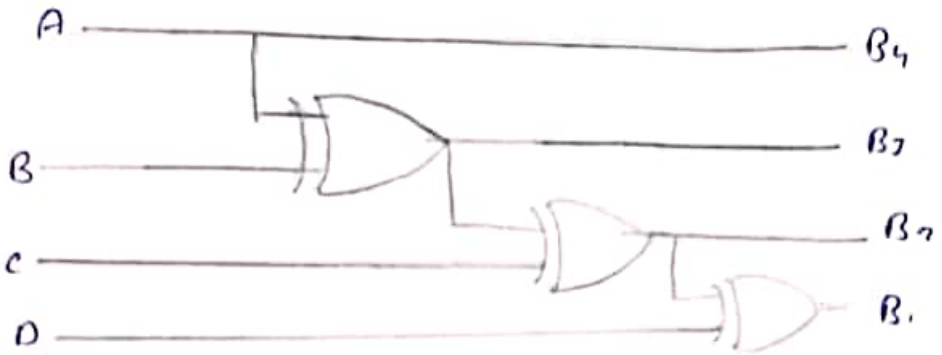
In a grey to binary code converter, the input is gray code and output is its equivalent binary code.

EXAMPLE:

First we draw gray code conversion table.

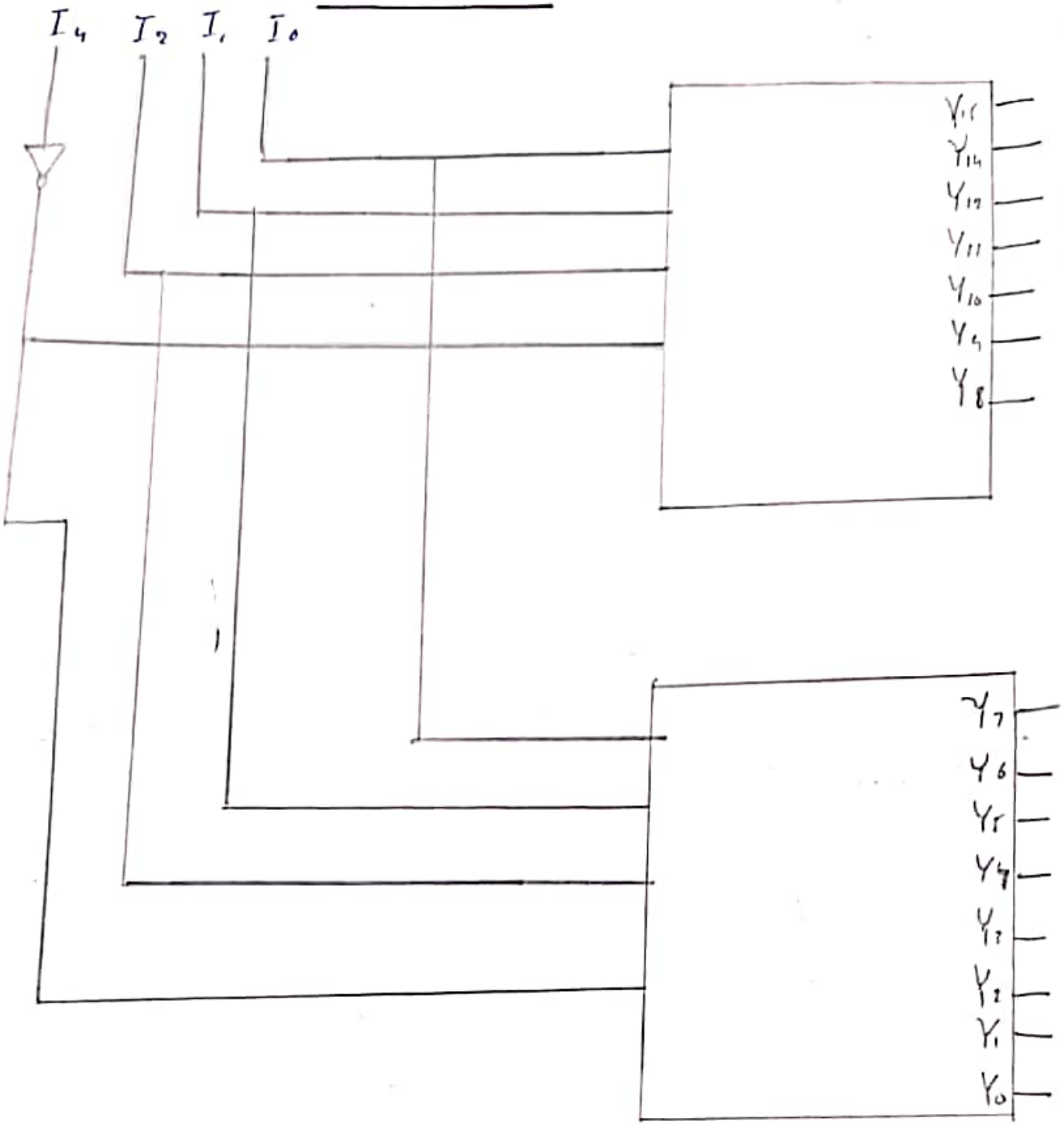
4-bit Gray Code	4-bit binary code
0 0 0 0	0 0 0 0
0 0 0 1	0 0 0 1
0 0 1 1	0 0 1 0
0 0 1 0	0 0 1 1
0 1 1 0	0 1 0 0
0 1 1 1	0 1 0 1
0 1 0 1	0 1 1 0
0 1 0 0	0 1 1 1
1 1 0 0	1 0 0 0
1 1 0 1	1 0 0 1
1 1 1 1	1 0 1 0
1 1 1 0	1 0 1 1
1 0 1 0	1 1 0 0
1 0 1 1	1 1 0 1
1 0 0 1	1 1 1 0
1 0 0 0	1 1 1 1

Circuit

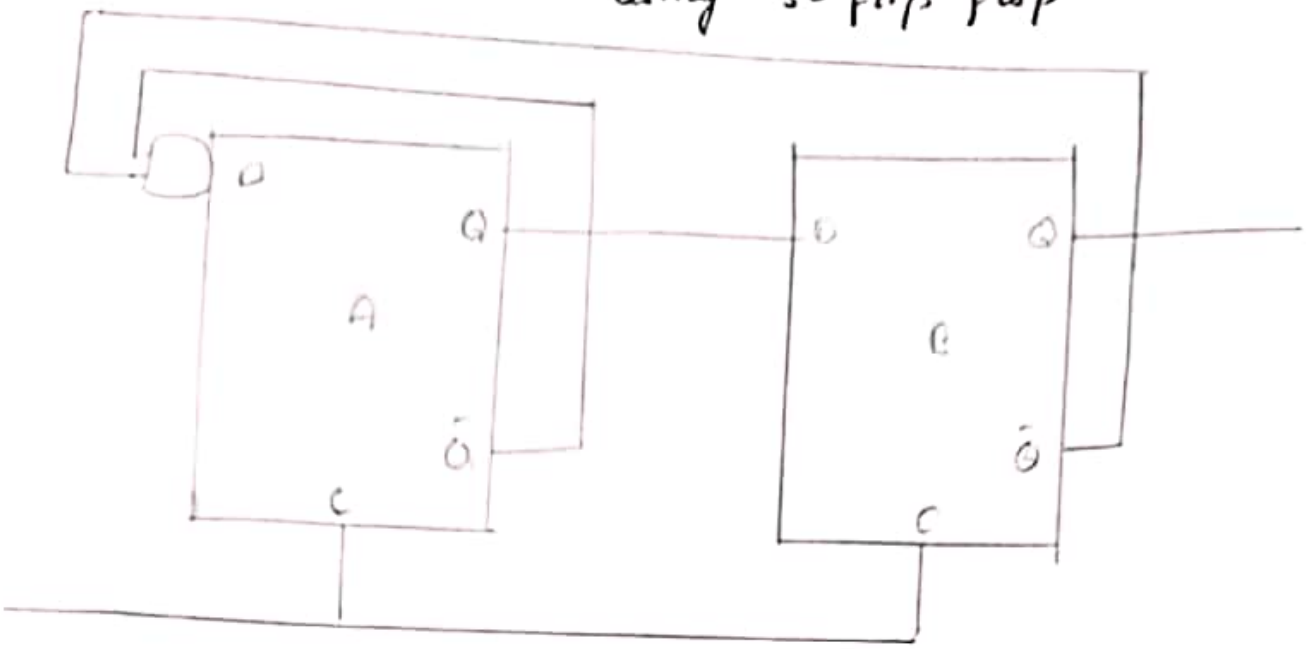


1 0 1 1 Gray
↓ ↓ ↓ ↓
1 → 1 0 → 1 Binary

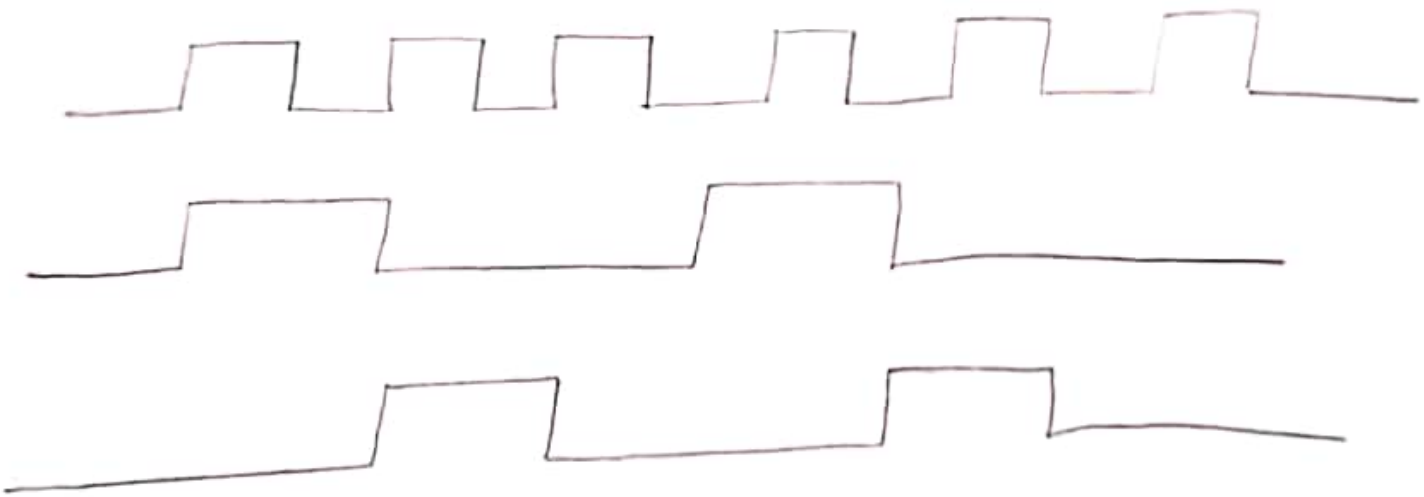
Q 6) ANSWER: 4-bit decoder



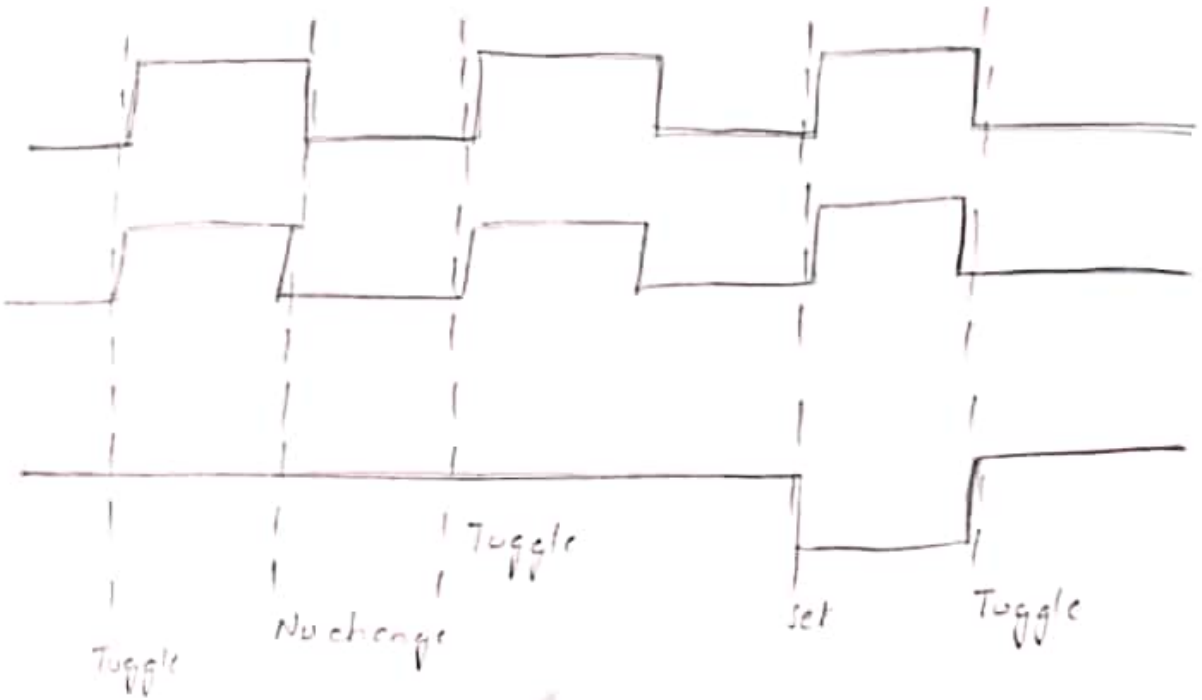
Q 7) **ANSWER:** Logic diagram of frequency divider using 3-flip flop



Dividing by 3



Q 8) ANSWER :



Q 9) **ANSWER:**