Q#4

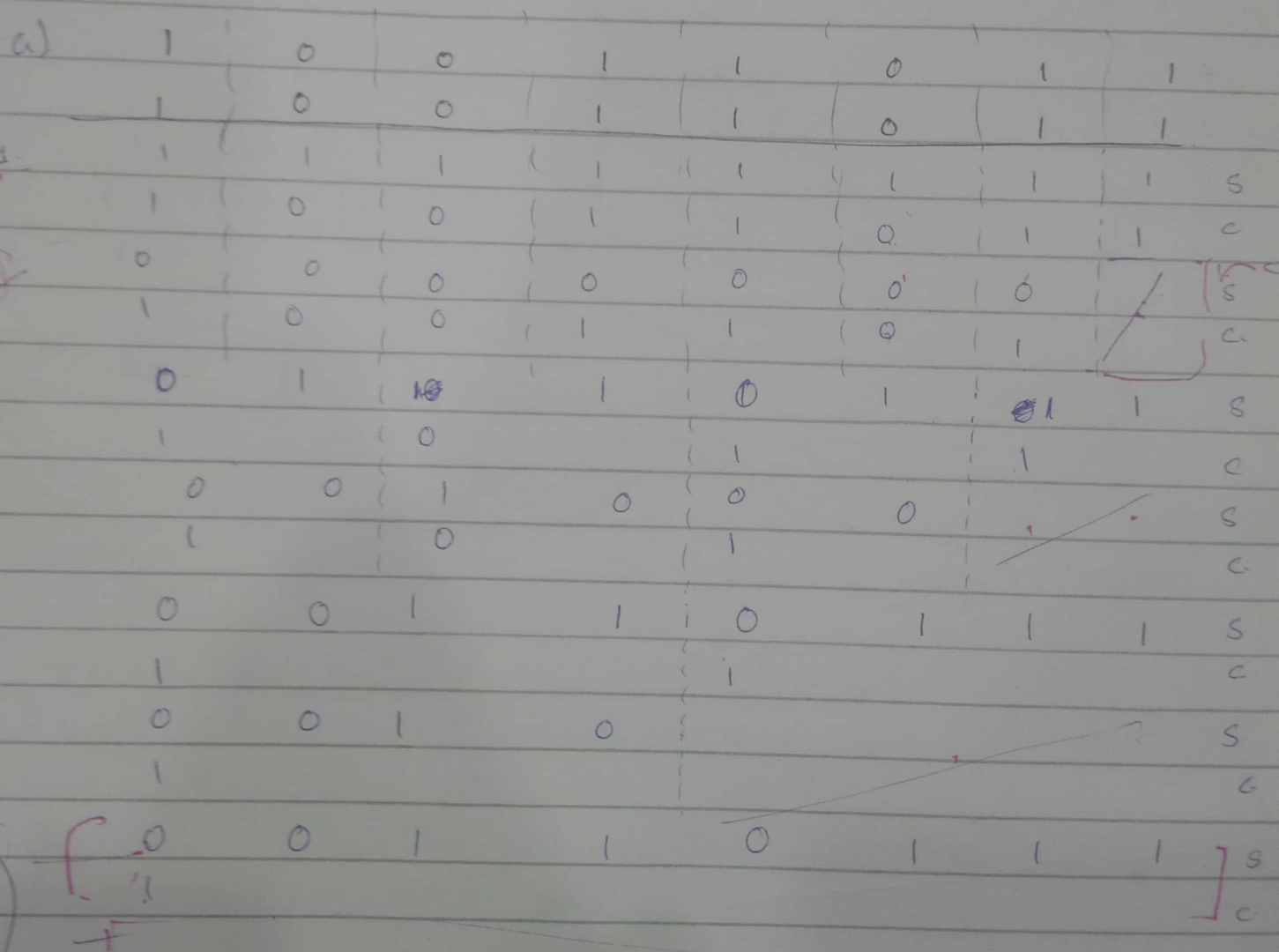
i) A-B for cin as 1 → Conditional Sum Adder
ii) A+B for (4 bit group) → Carry Select Adder.

A = 1 0 0 1 1 0 1 1

B = 0 1 1 0 0 1 0 1

-B = 1 0 0 1 1 0 1 1

a)



b

A 1 0 0 1 1 0 1 1

B 0 1 1 0 0 1 0 1

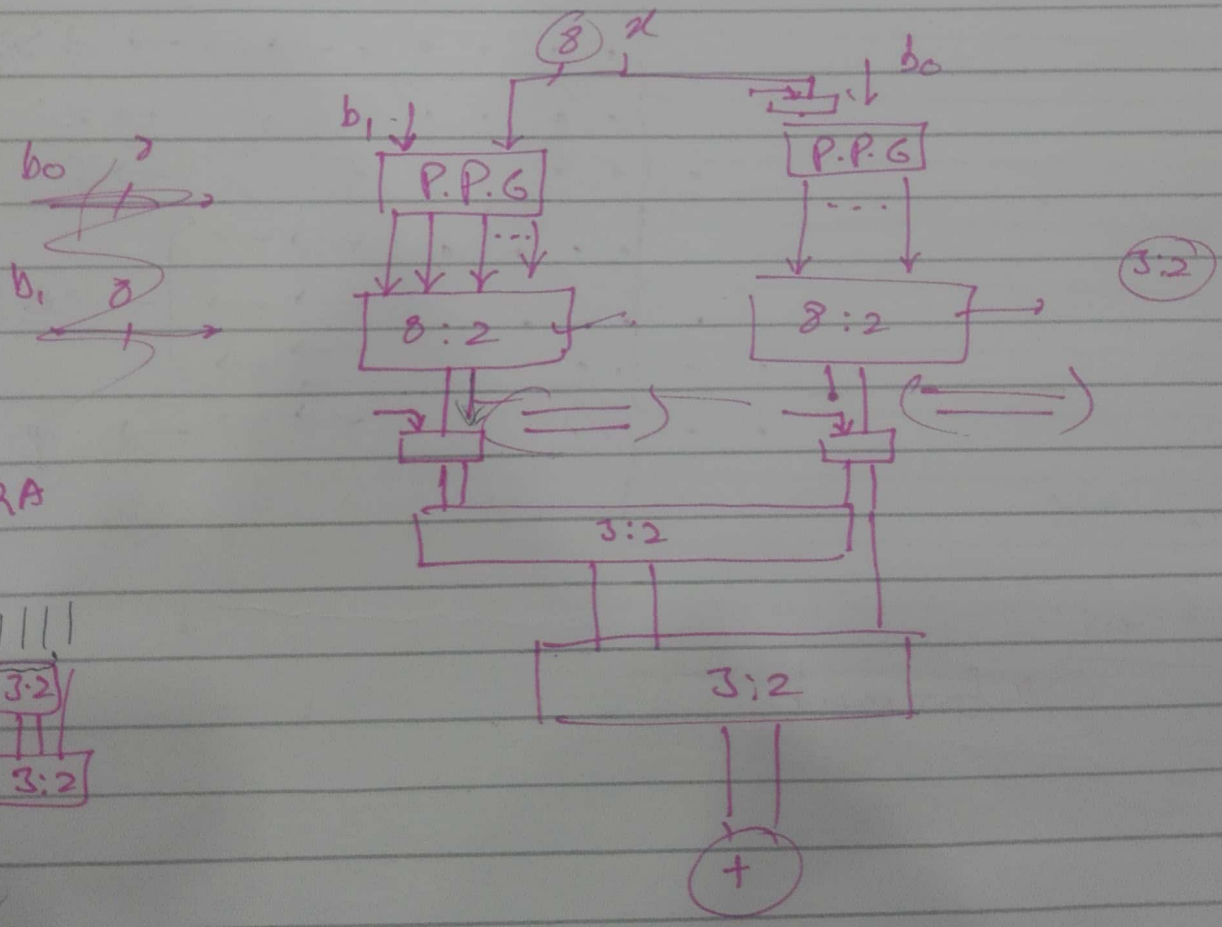
1 1 1 1 0 0 0 1 0 S cin=0
C

0 1

0 0 0 0 0 0 0 1 S cin=1
1 1 C

cin=0 0 0 0 0 0 0 0 0
1

cin=1 0 0 0 0 0 0 0 1
1



2 + 3 + 5

2.3 >>> 0.5

Queries :-

$x_2 < 0.33$

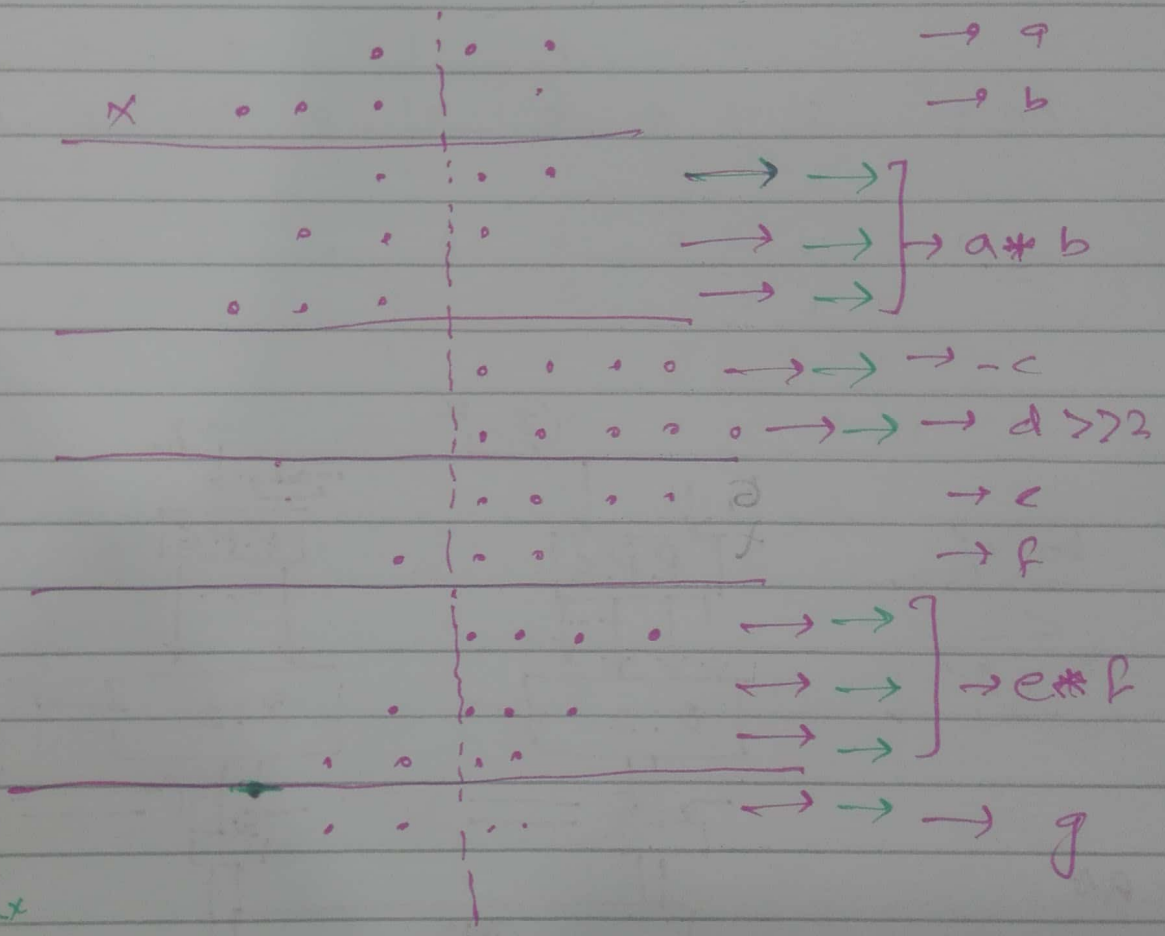
$x_2 < 0.09$

$x_1 < 0.6$

$x_1 < 0.69$

Root node :- Test with max. impurity decrease

Q:3).

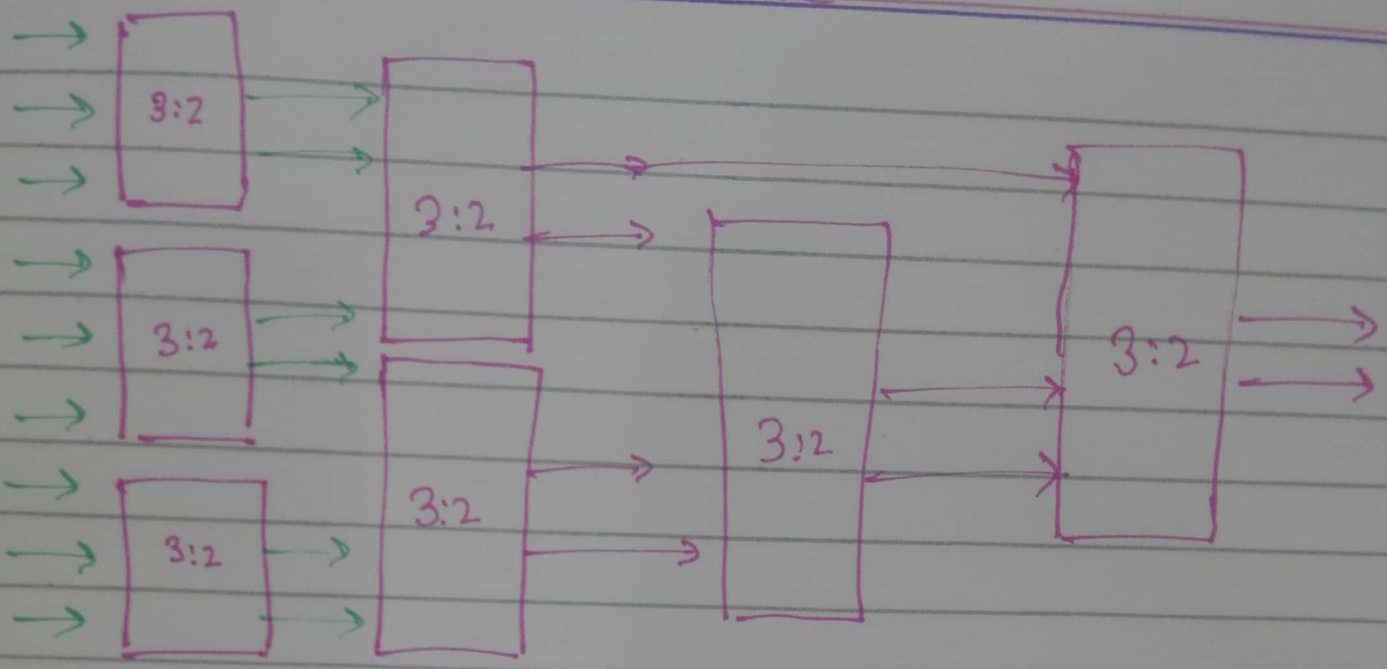



$\ell_{next-max}$

$y \rightarrow (Q_{3.5}$

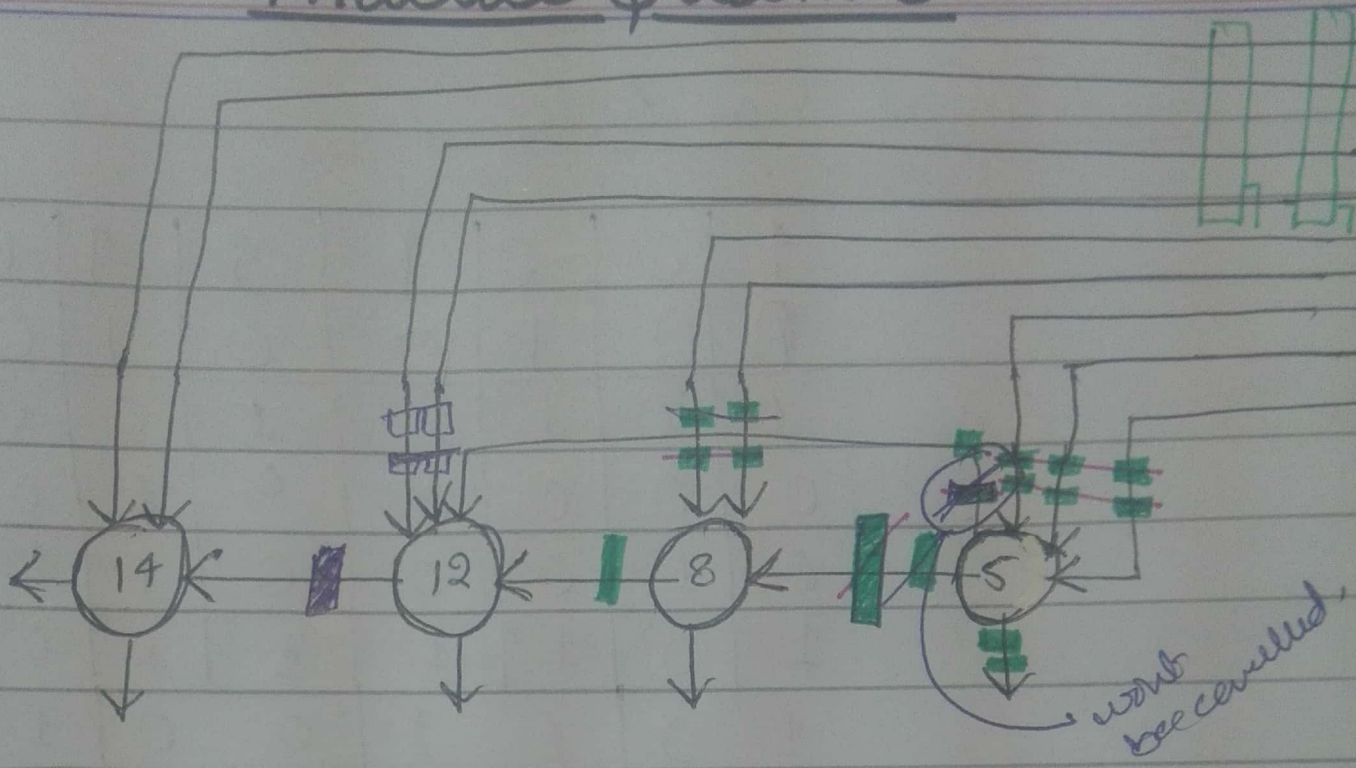
↘ for mat

# Wallace



# Practice Questions

Q13.




C·P = 14+12+8+5

C·P = 14+~~12~~
Pipelie

## Q-12

A = 1001_1101

B = 1101_1011

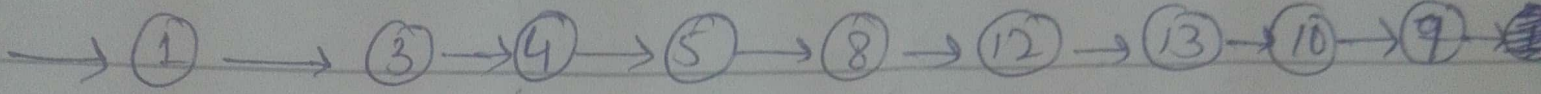
B′ = 0010_0101

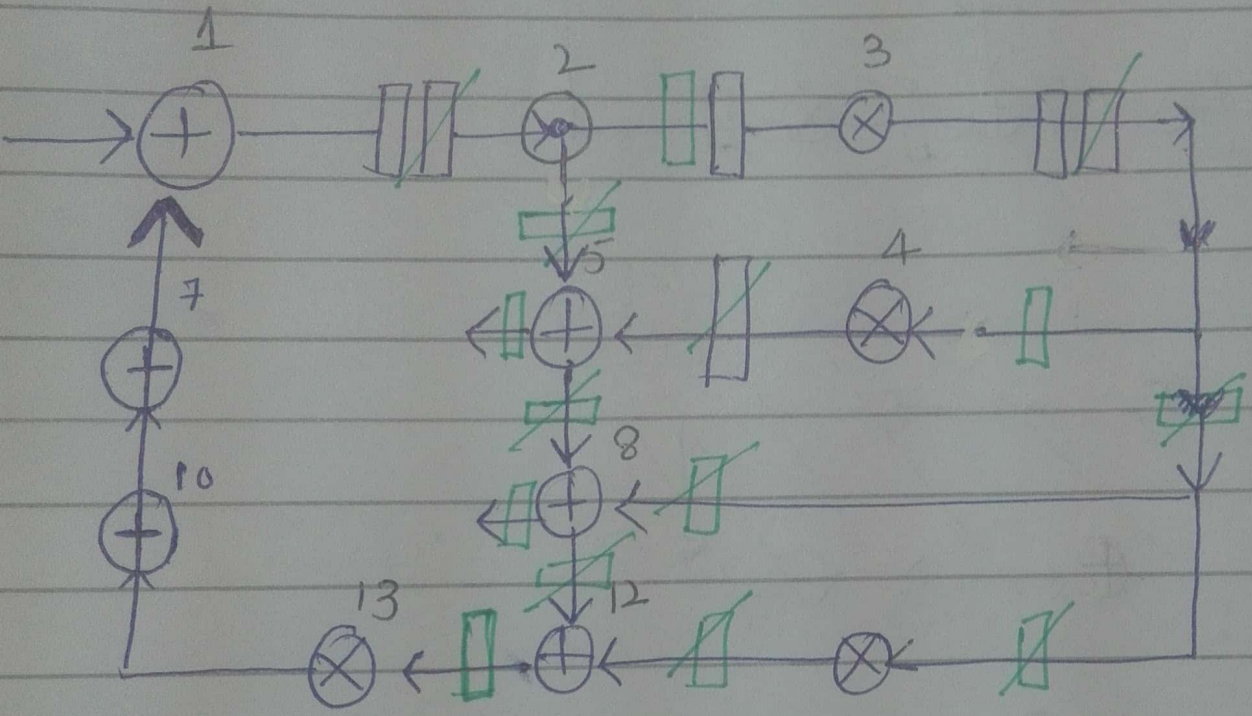
# Conditional Sum Adder

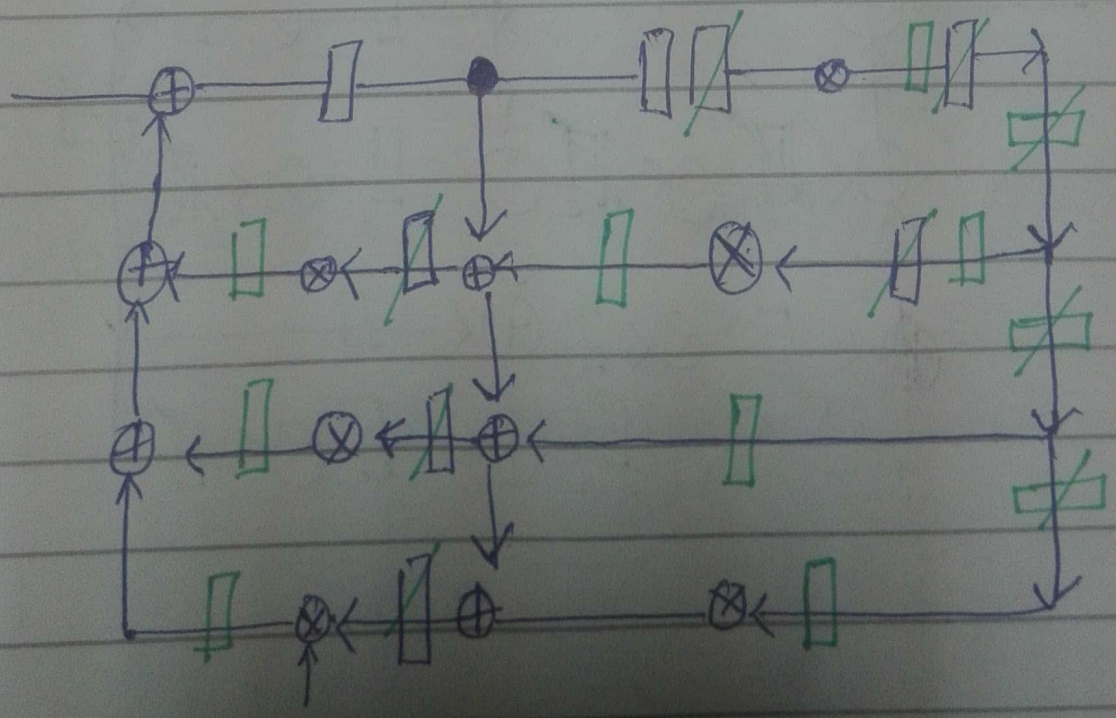
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | |
| 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | |
| 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | $C_{in}=0$ |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | S |
| 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | $S_{cin=1}$ |
| 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | C |
| 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | $S_0$ |
| 0 | | 0 | | 1 | | 0 | | C |
| 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | $S_1$ |
| 0 | | 1 | | 1 | | 0 | | C |
| 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | $S_0$ |
| 0 | | | | 1 | | | | C |
| 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | $S_1$ |
| 0 | | 1 | | 1 | | | | C |

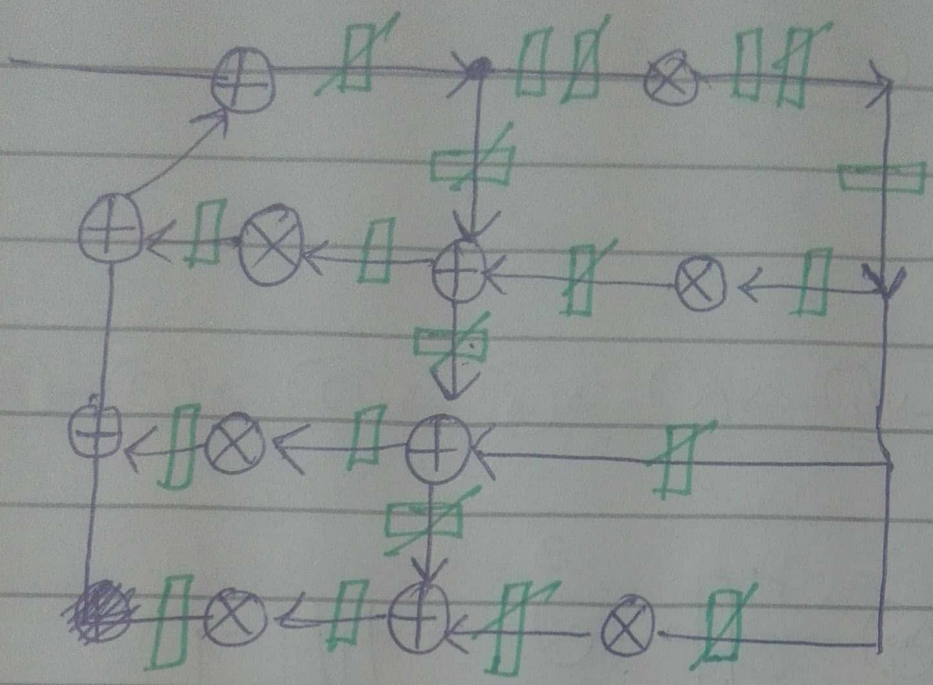
# Q8

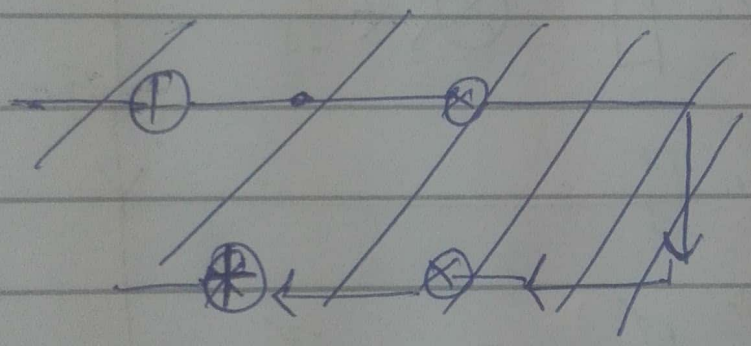
C.P Identify

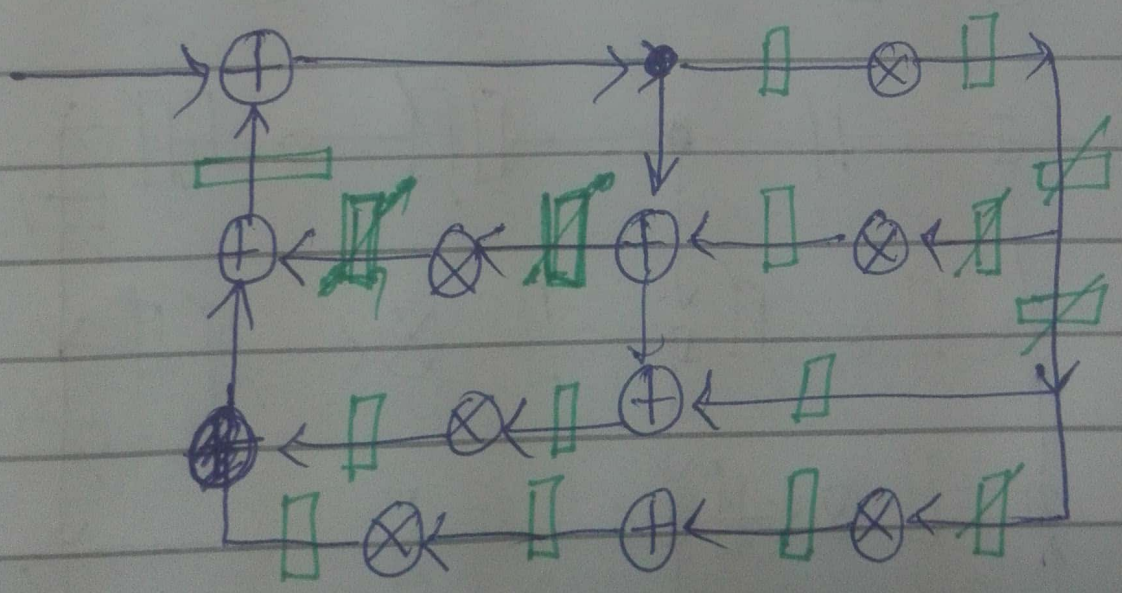


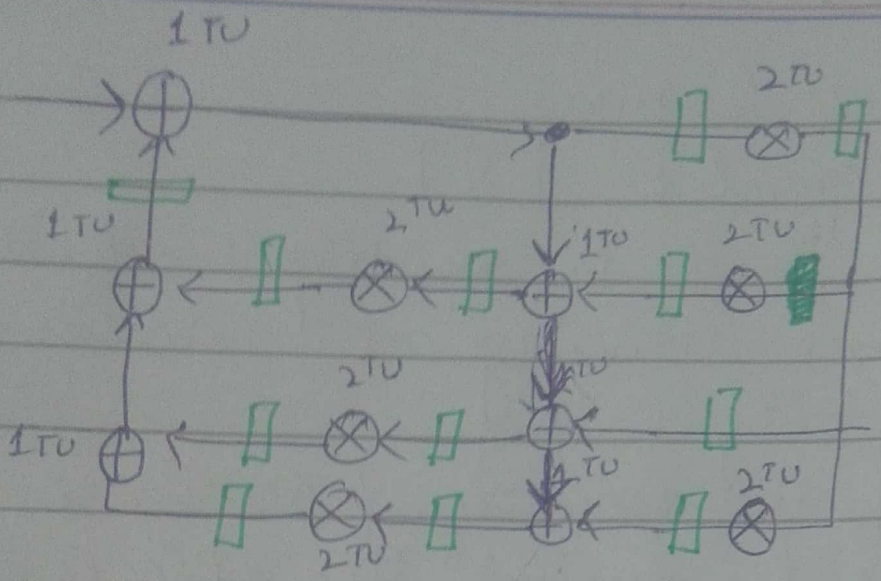





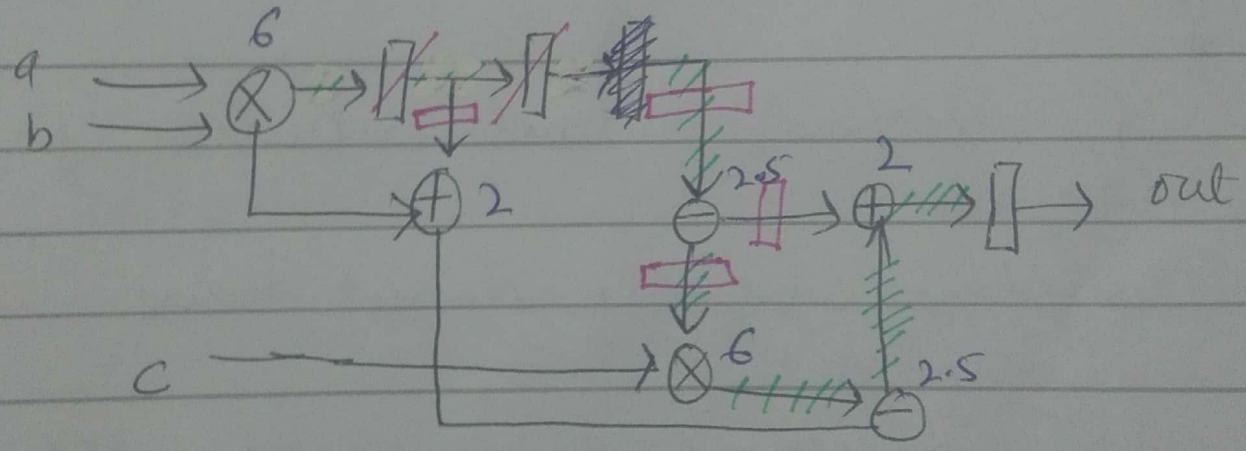







C.P = 3 TU

## Q5




C.P = 6 + 2.5 + 6 + 2.5 + 2 = 19

C.P  I/P → reg

reg → reg

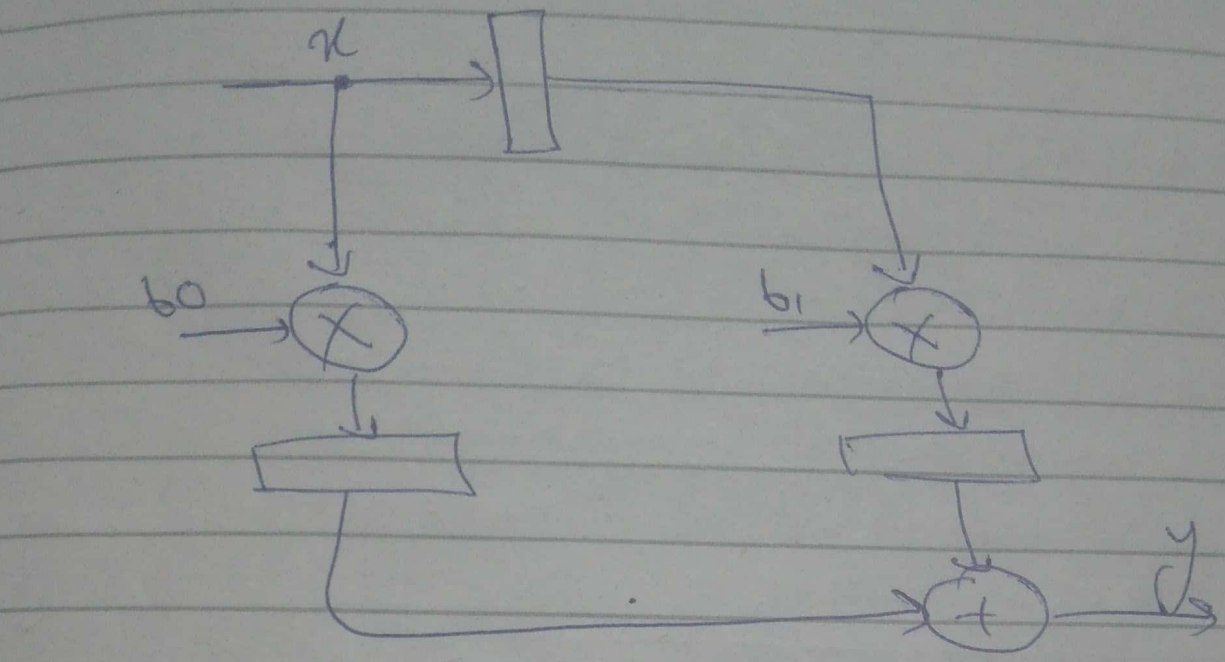
reg → o/p.

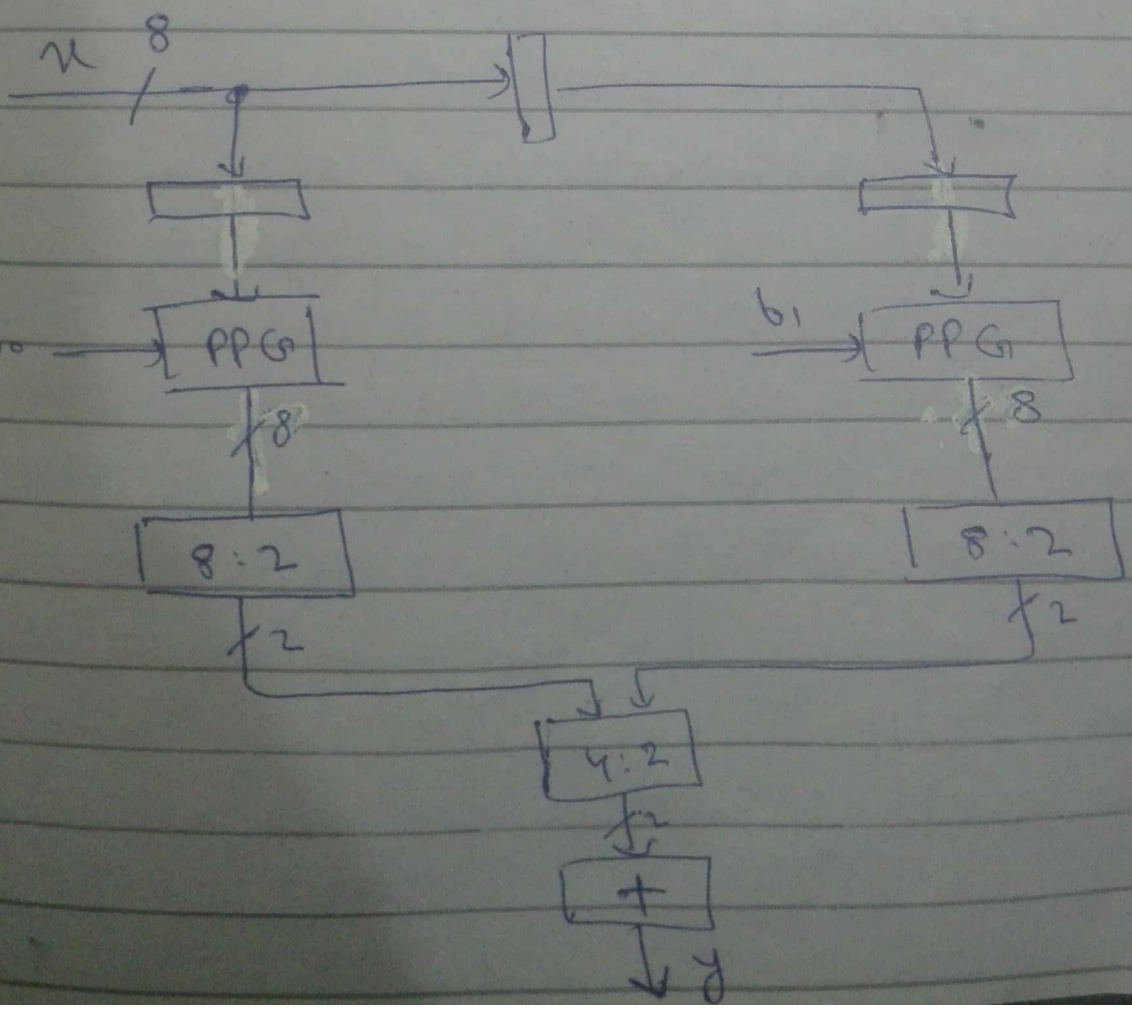
C.P = 2.5 + 6 + 2.5 + 2 = 13 TU

After Pipes = 8.5 TU.

# DSD Practice Q's

## Q#2 (a)

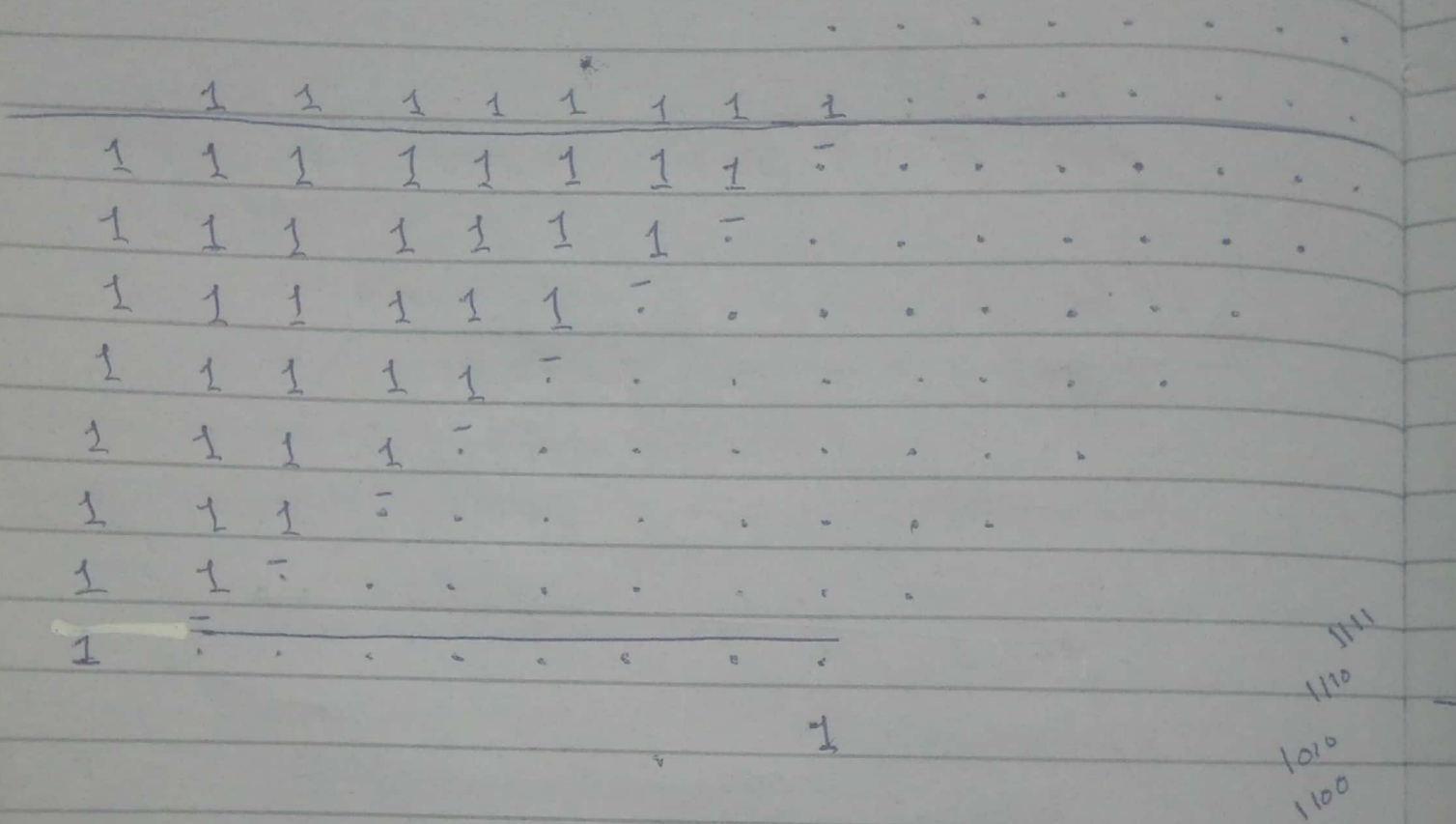


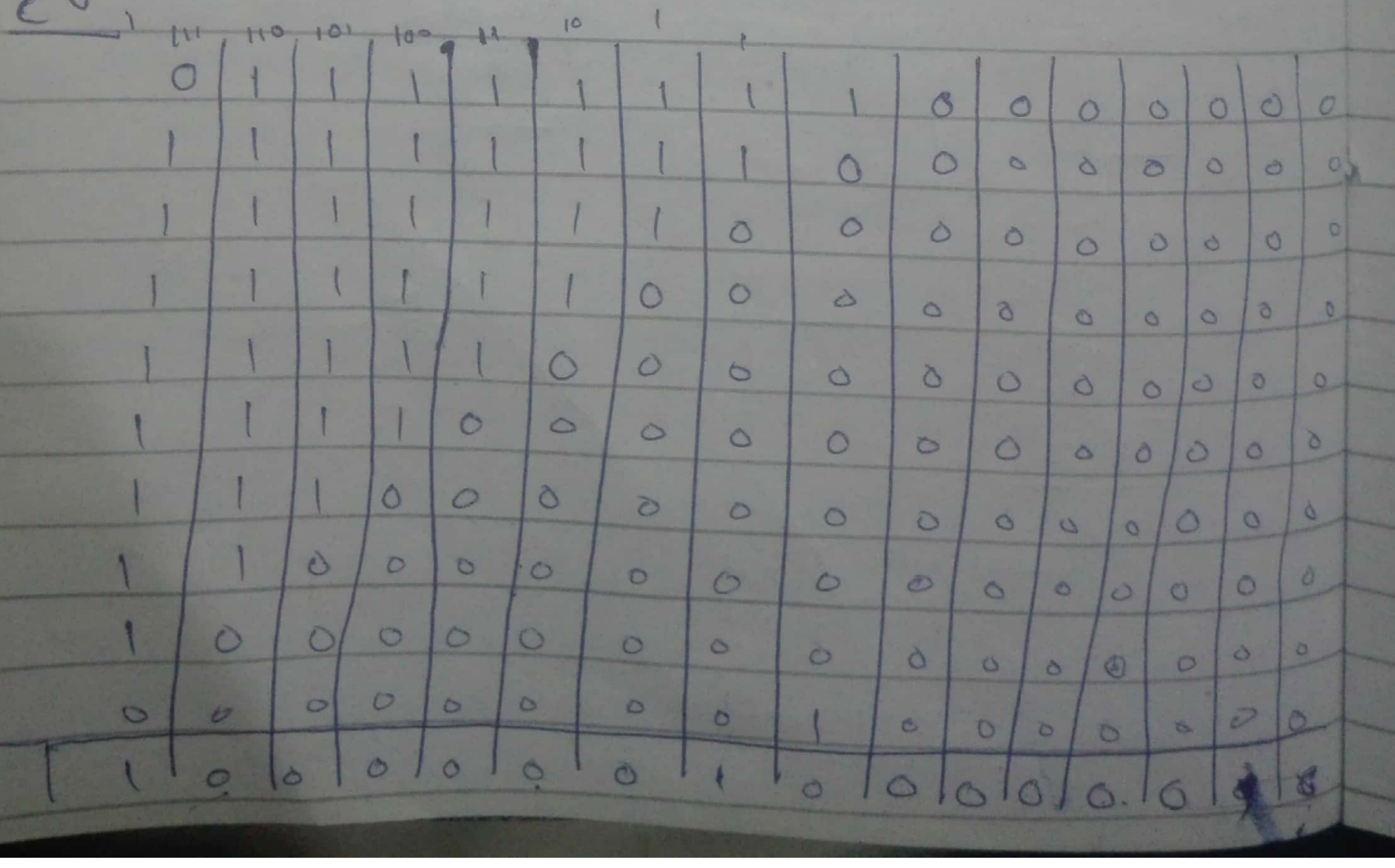



Q#2 (b)

Format Q1.7 x Q1.7 = Q2.14

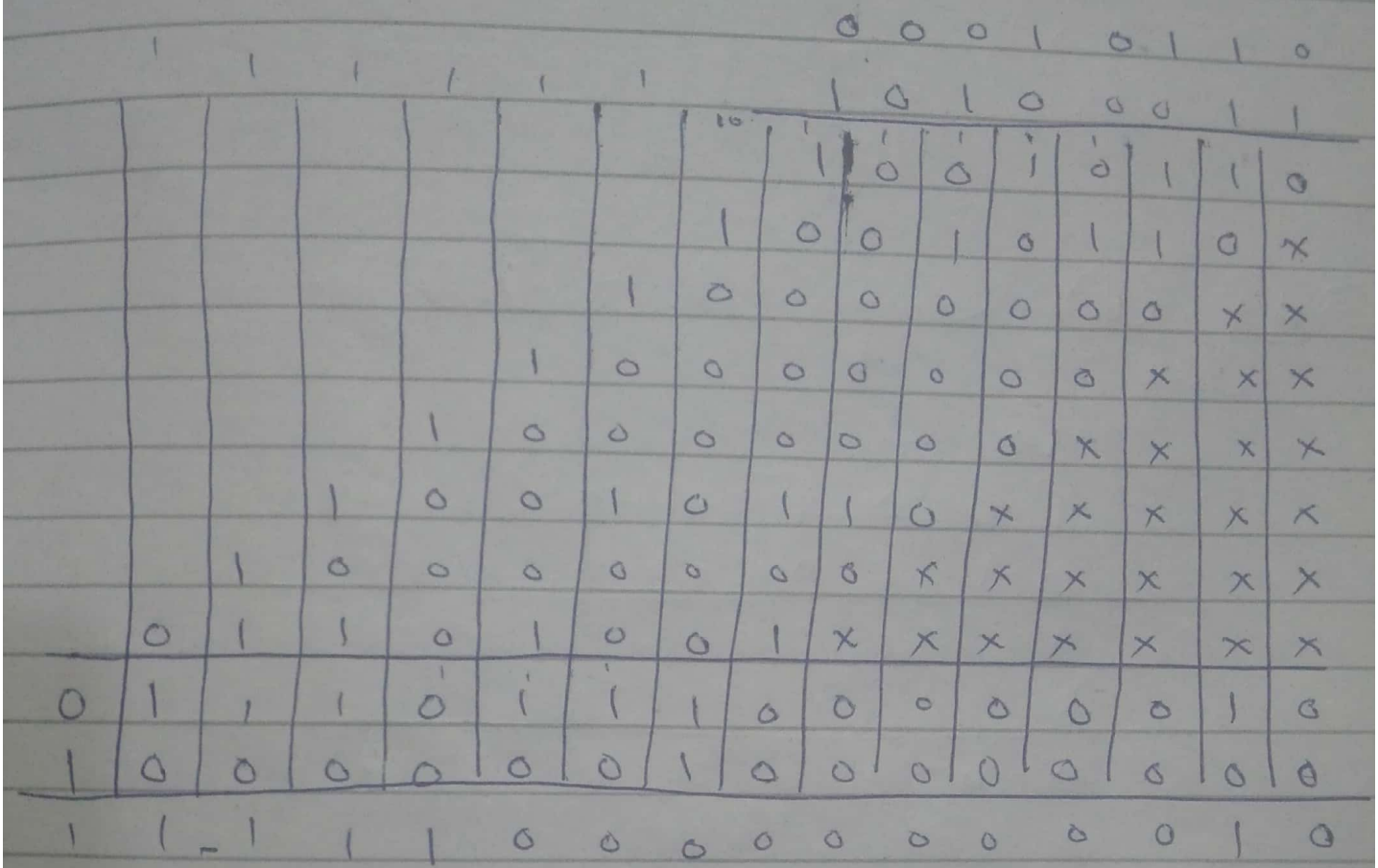
SxS



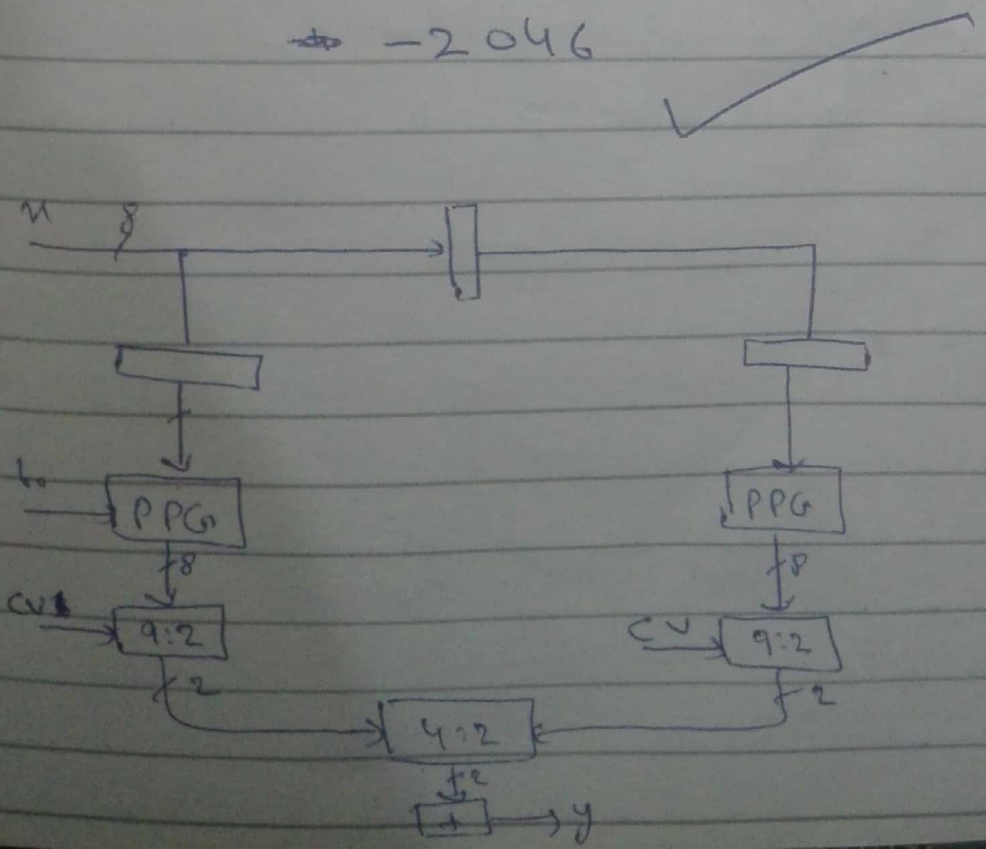


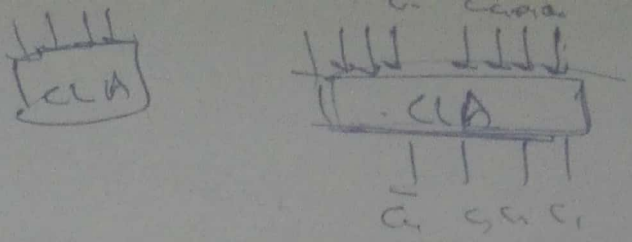
-2046

CV = 1000 0001 0000 0000



→ -2046






Q#4 (a) A-B using Conditional Sum Adder

$c_{in} = 1$

A = 1001 1011

B = 0110 0101

$\overline{B}$ = 1001 1010

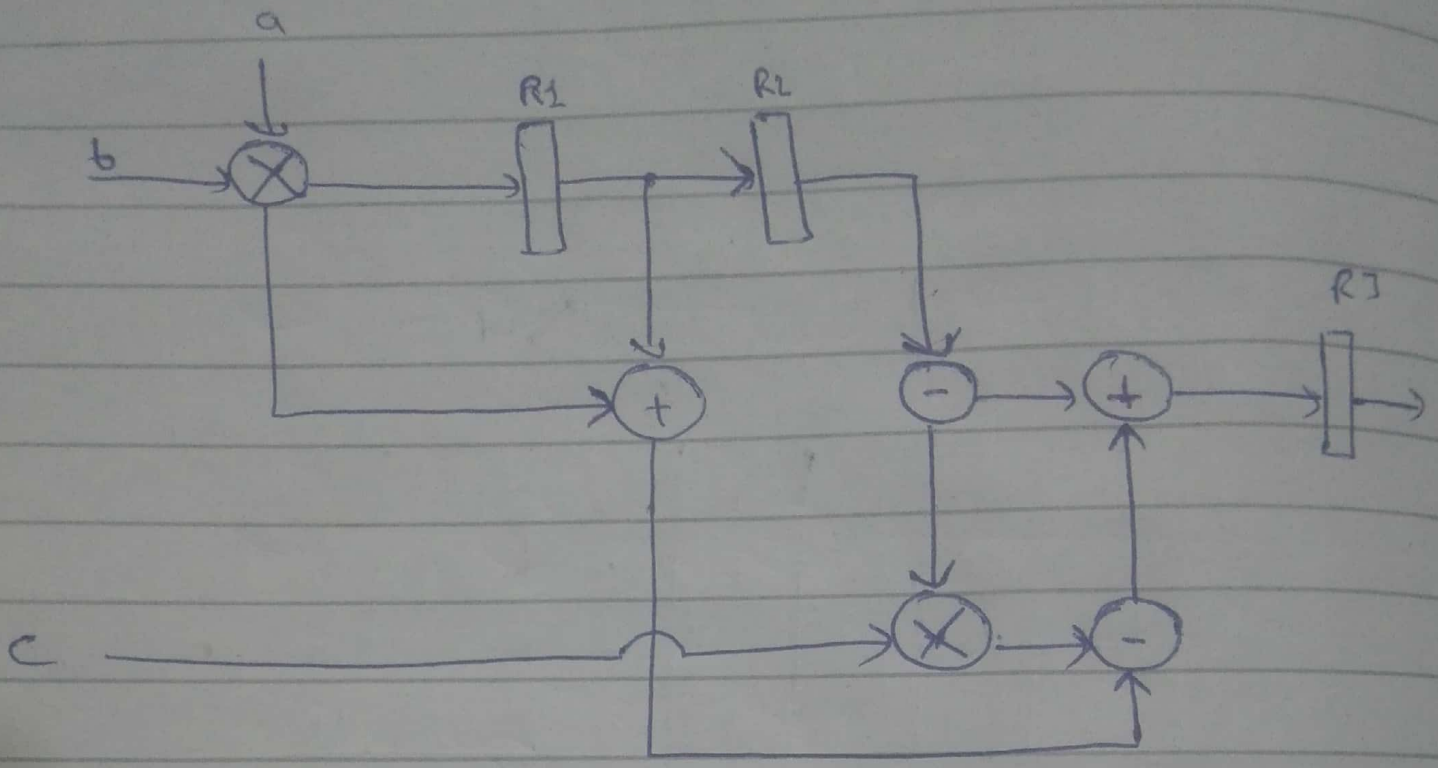
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | | |
| 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | / | S | $c_{in}=0$ |
| 1 | 0 | 0 | 1 | 1 | 0 | 1 | / | C | |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | S | $c_{in}=1$ |
| 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | C | |
| 0 | 0 | 1 | 0 | 0 | 0 | / | / | S | $c_{in}=0$ |
| 1 | | 0 | | 1 | | / | / | C | |
| 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | S | $c_{in}=1$ |
| 1 | | 0 | | 1 | | 1 | | C | |
| 0 | 0 | 1 | 0 | / | / | / | / | S | $c_{in}=0$ |
| 1 | | | | / | / | / | / | C | |
| 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | C | $c_{in}=1$ |
| 1 | | | | 1 | | | | C | |
| 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | | |
| 1 | | | | | | | | | |

Ans

2

is A unsigned?

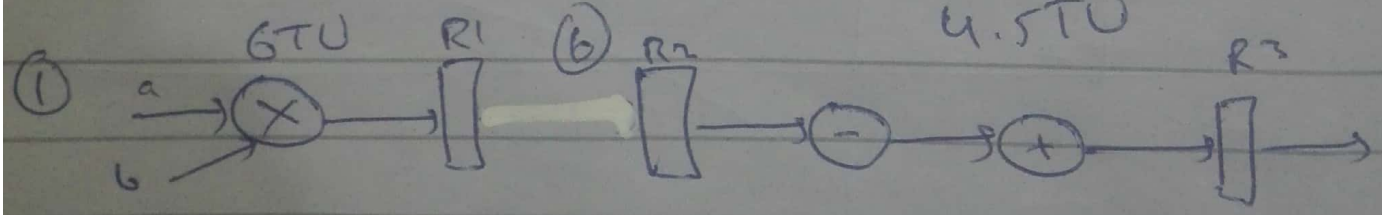
# Q#5

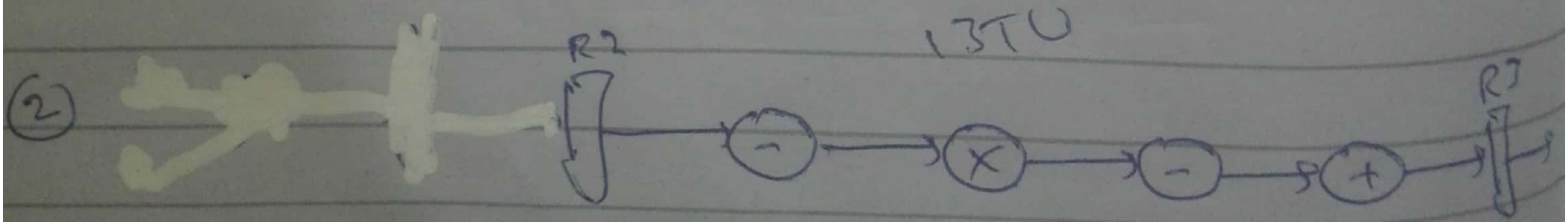


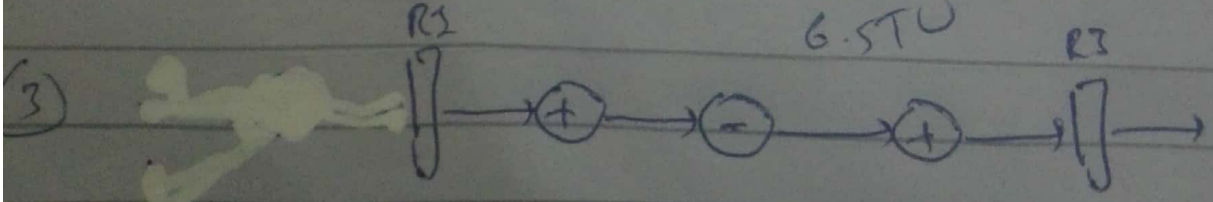

⊗ = 6TU

⊕ = 2TU

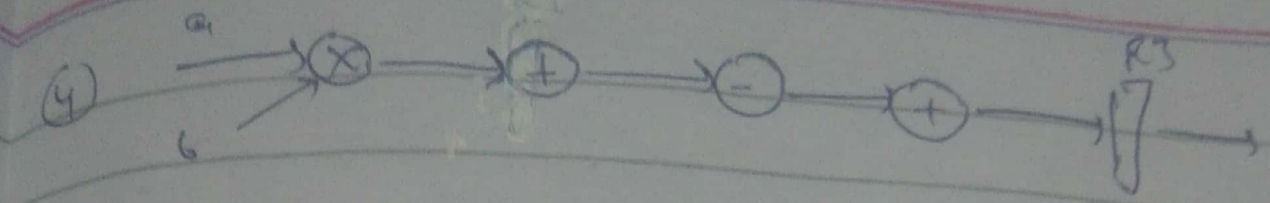
⊖ = 2.5TU



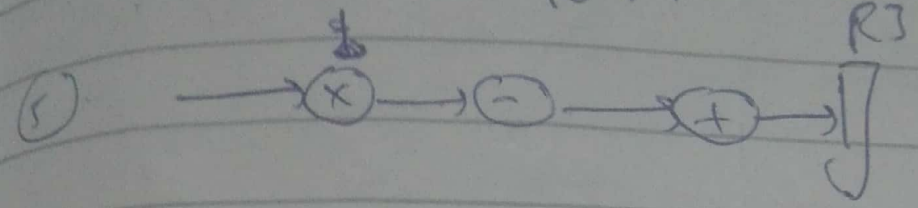



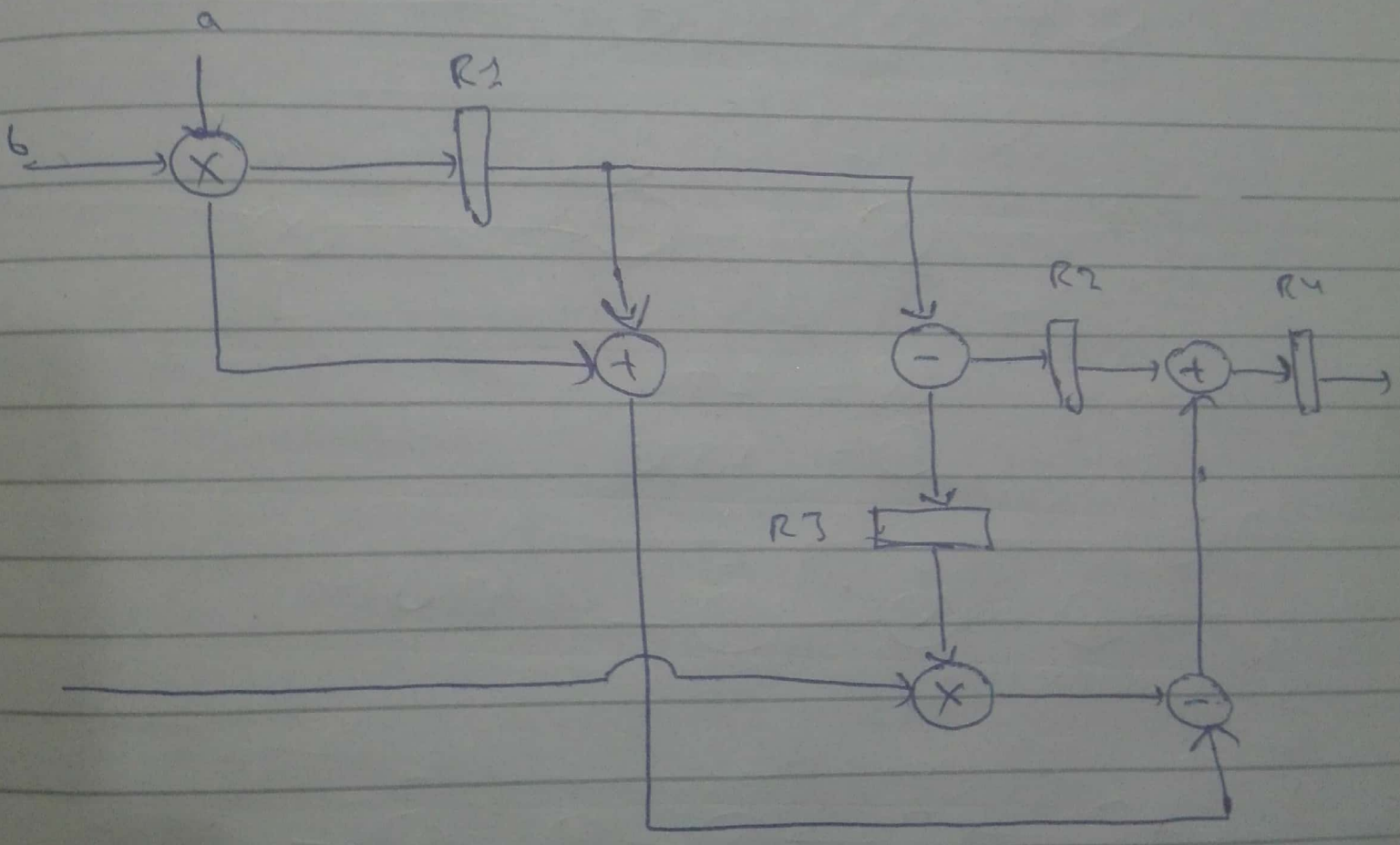
12.5TU

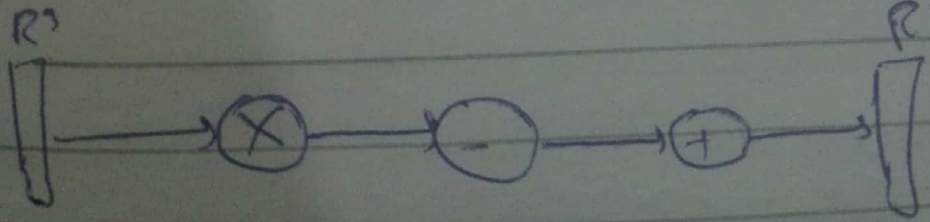



10.5TU



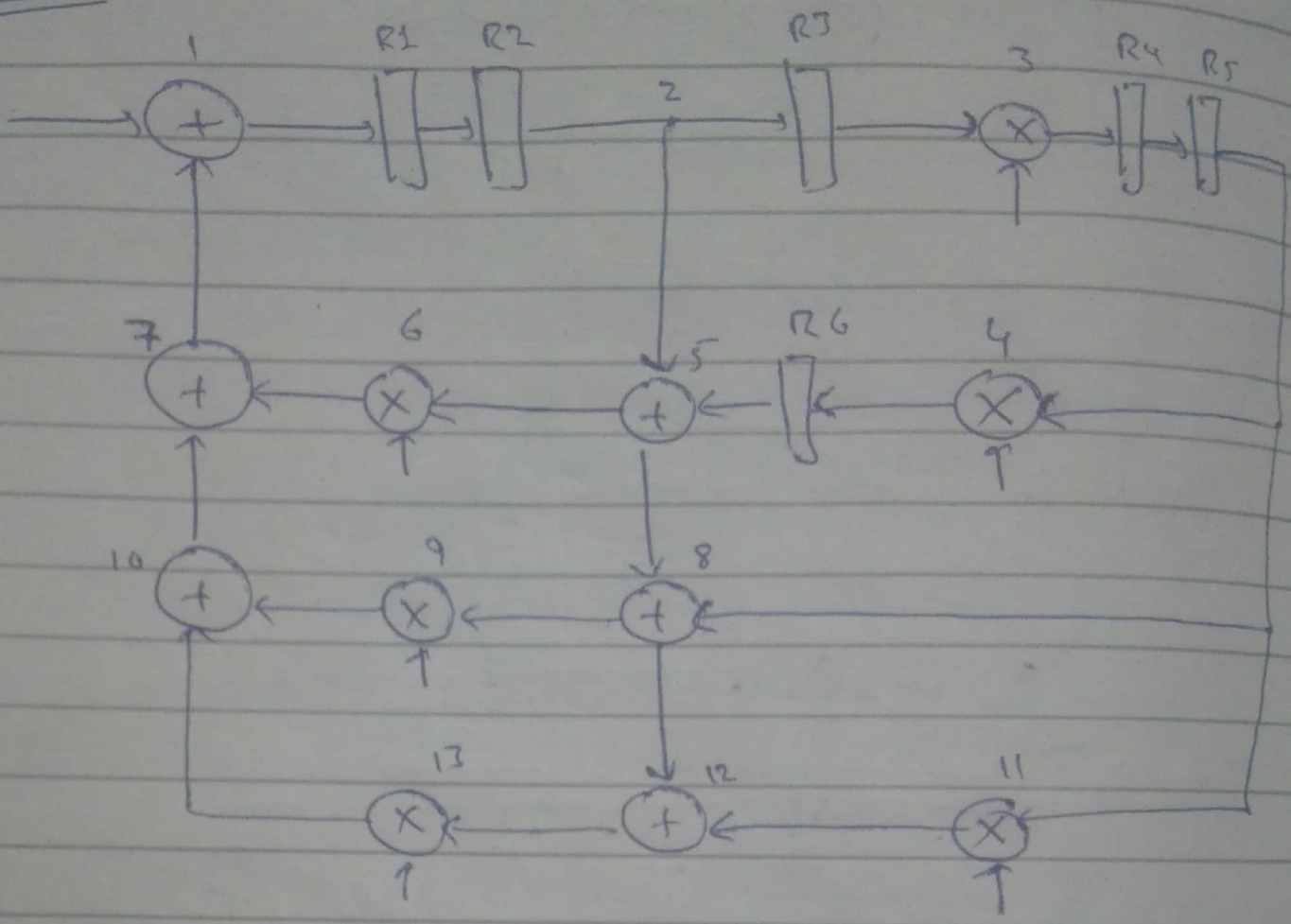

Path 2 is Critical Path



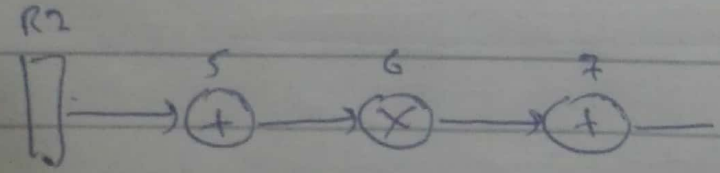

10.5TU

Q#8

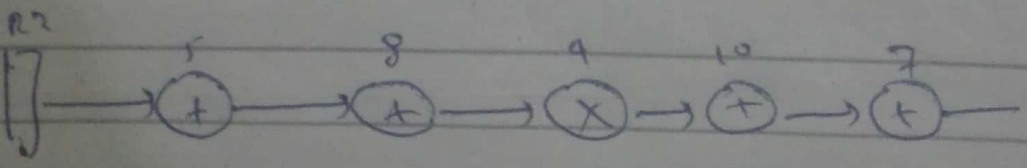



Assuming ⊗ = 2 TU

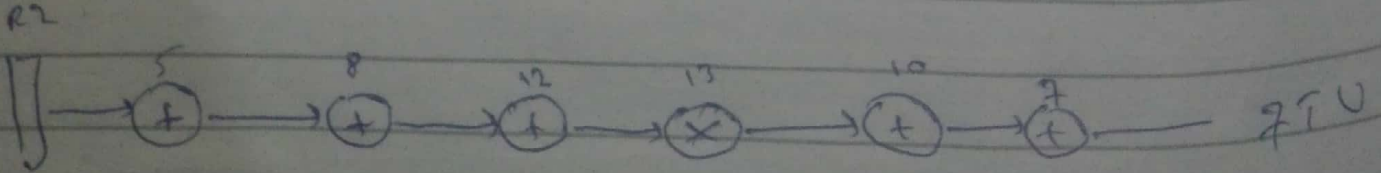
⊕ = 1 TU

(1) 

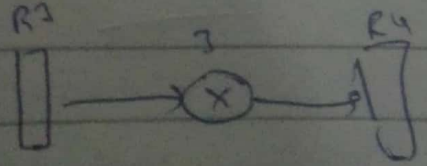
4TU

(2) 

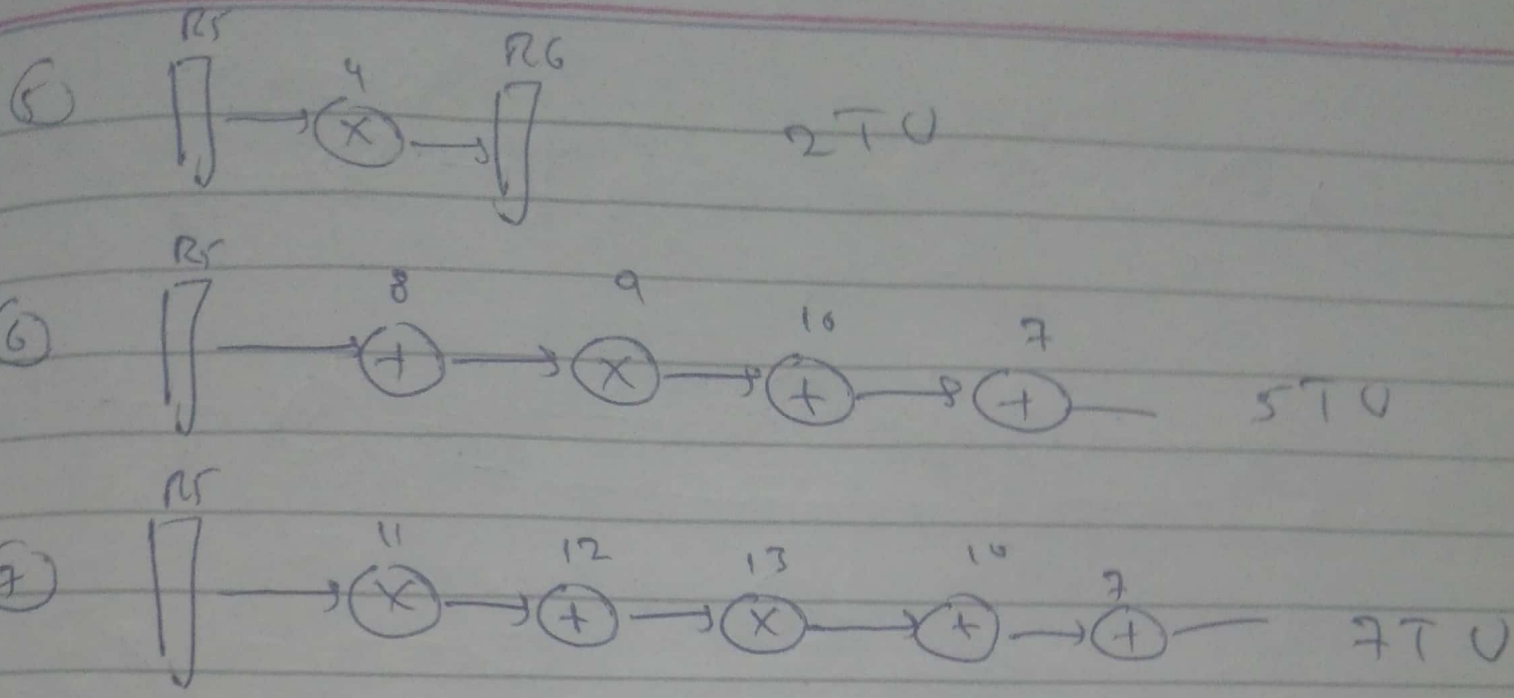
6TU

(3) 

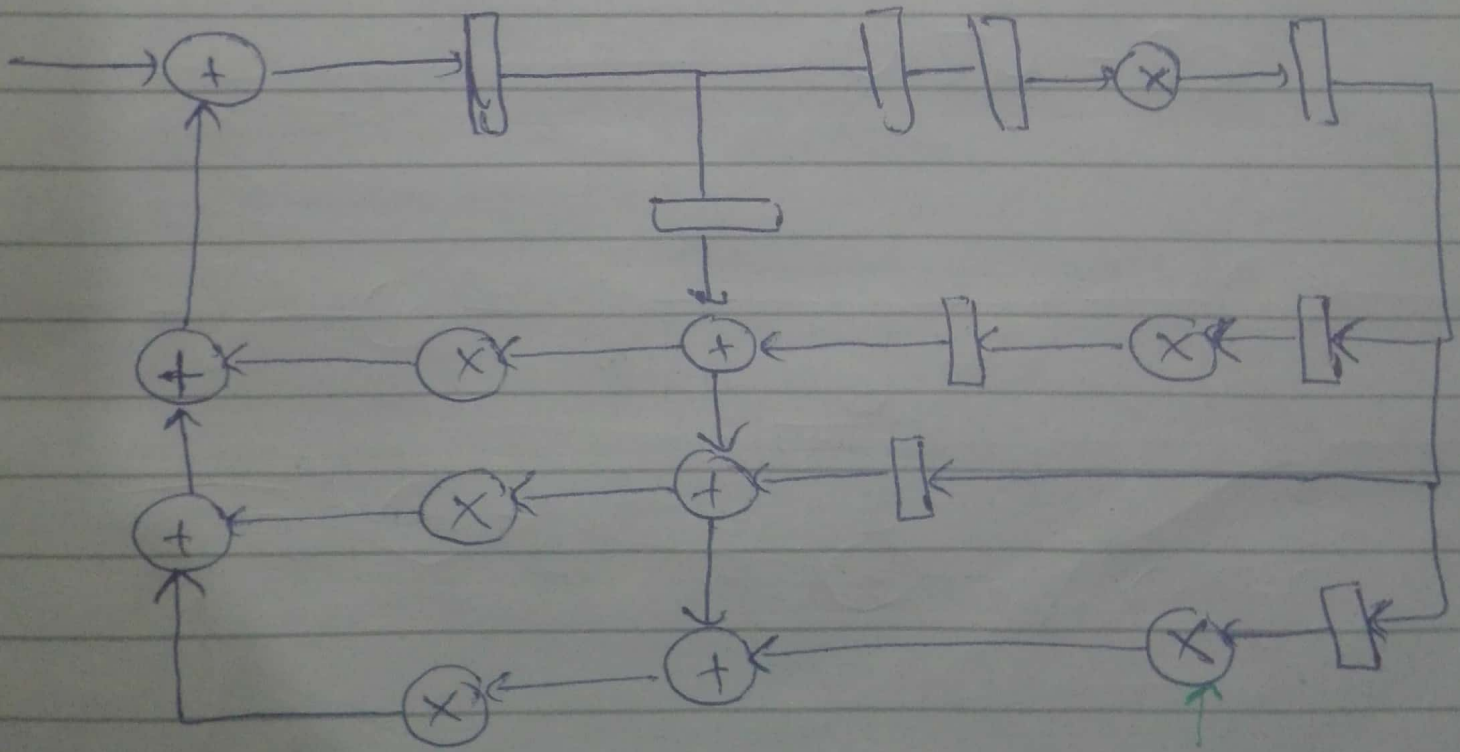
7TU

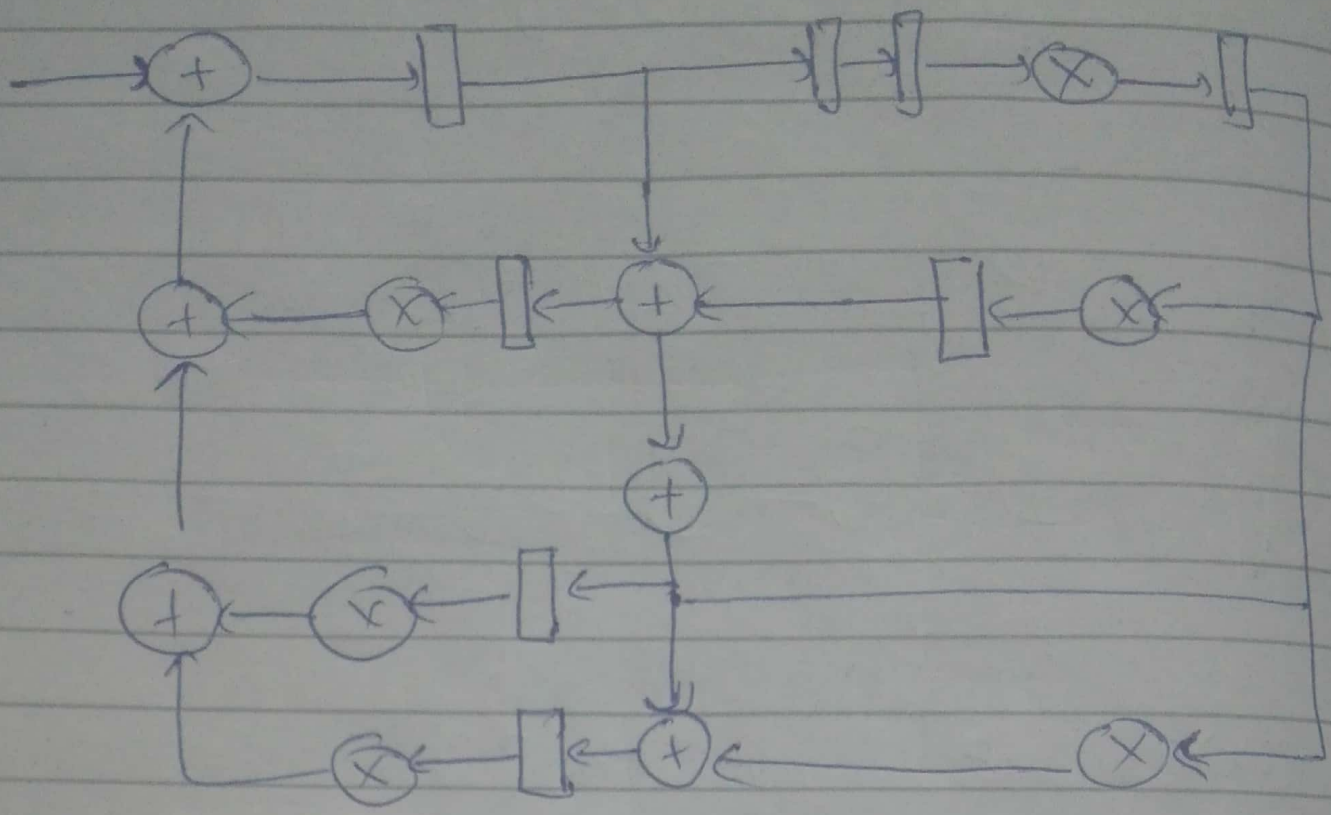
(4) 

2TU

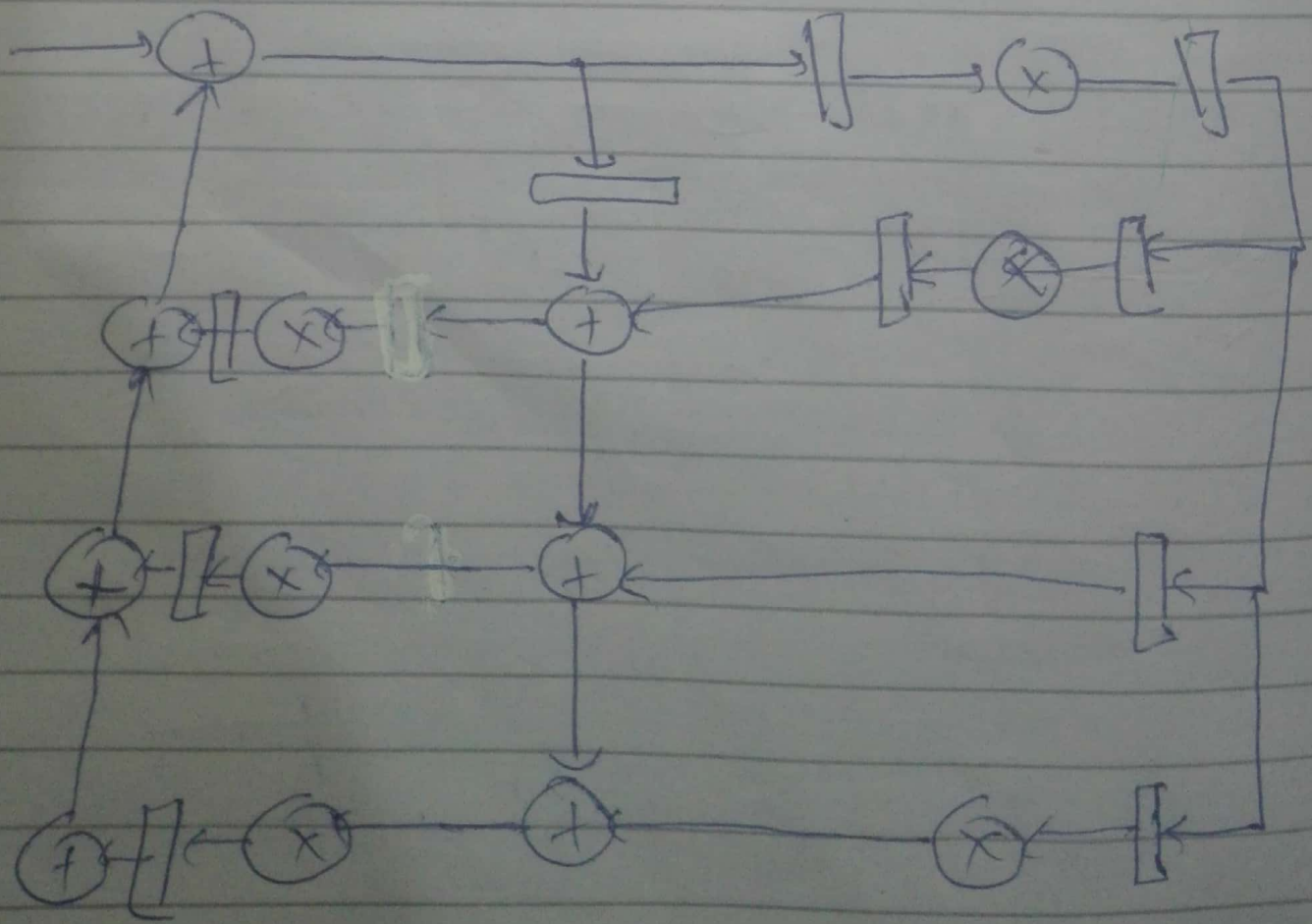


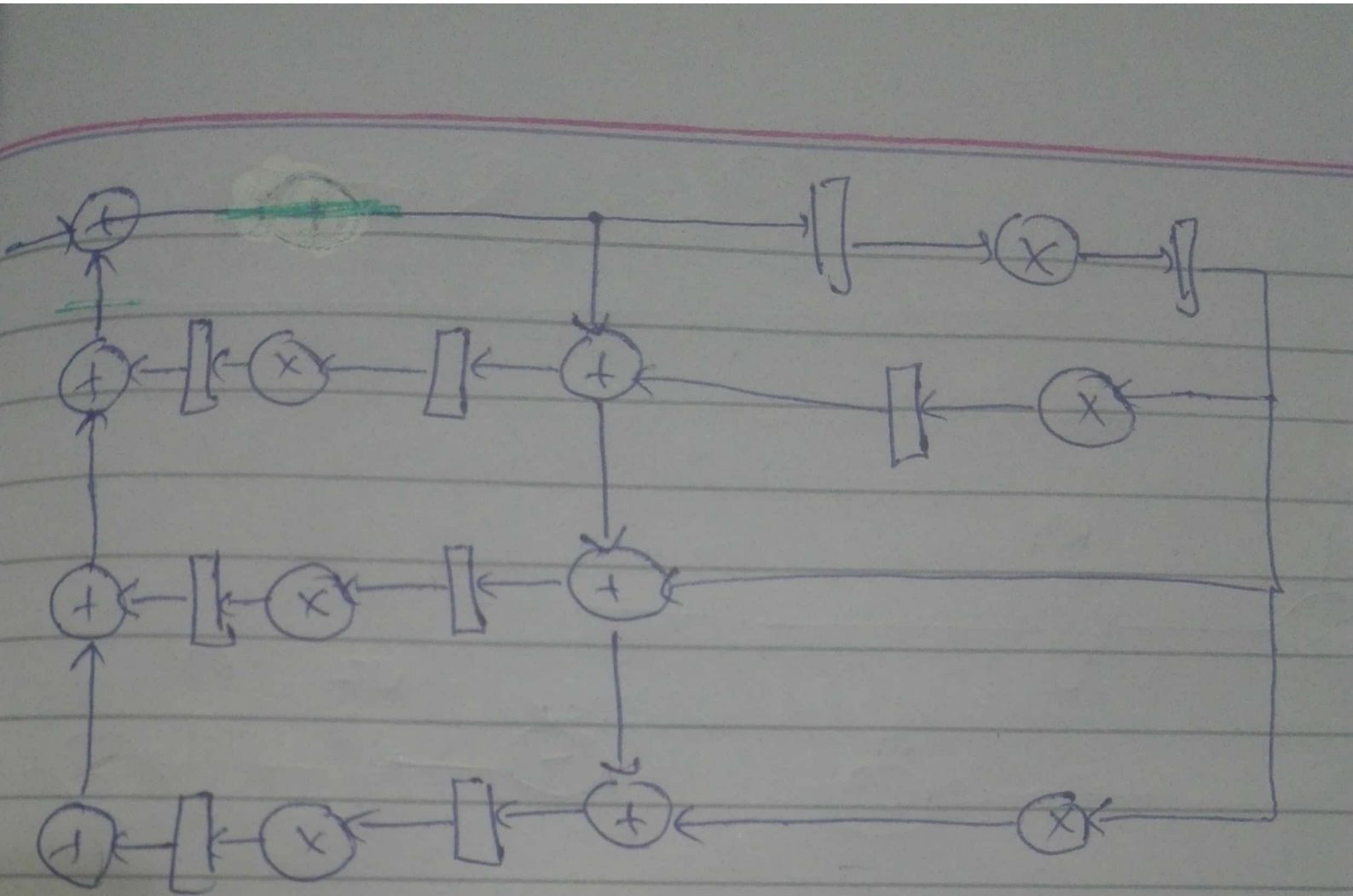

(5) & (7) are CP's.





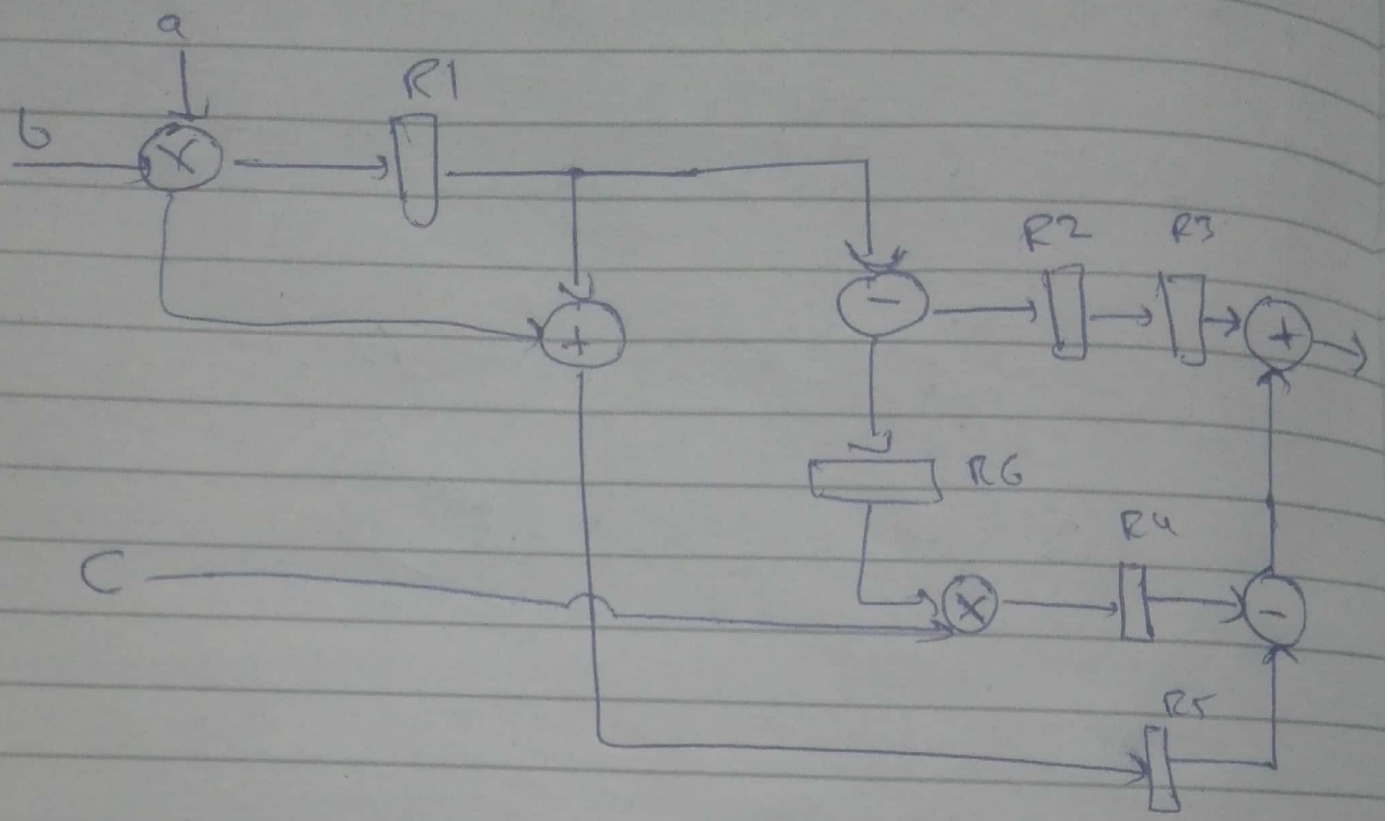
CP = 4T U

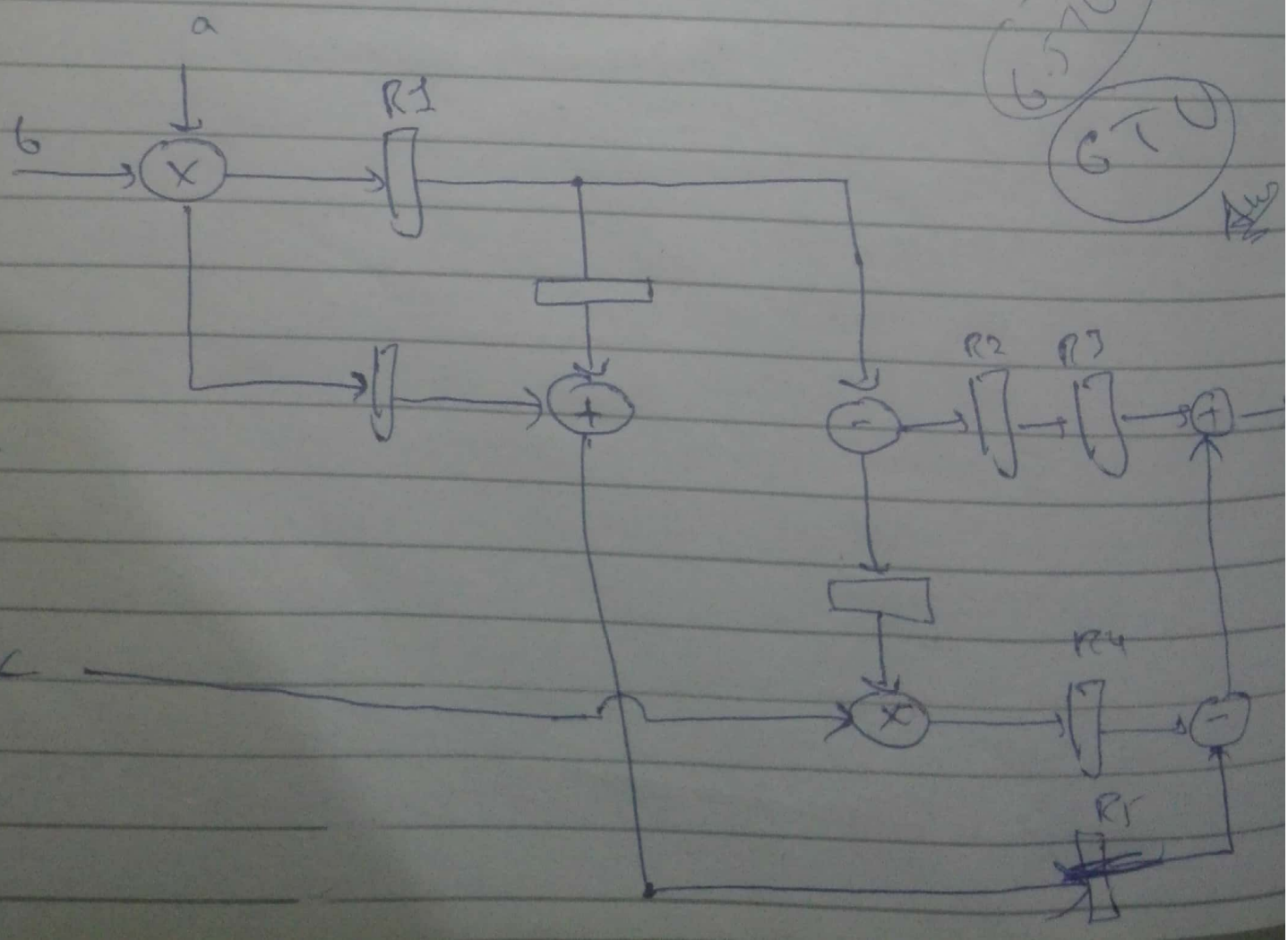




3 TU

Continuation of Q#5



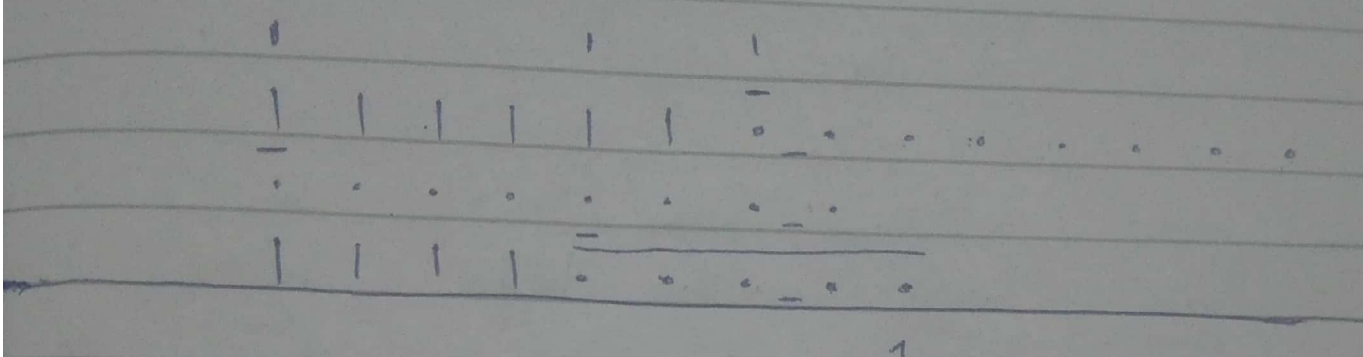



Q#10 A + B - C

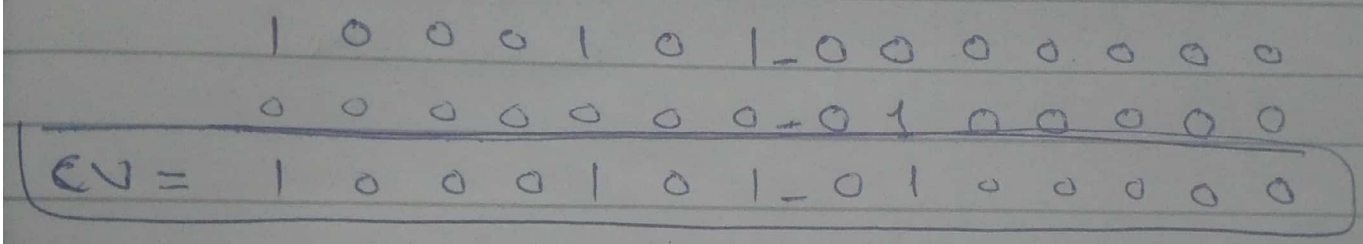
A = Q1.7

B = Q7.1

C = Q3.2



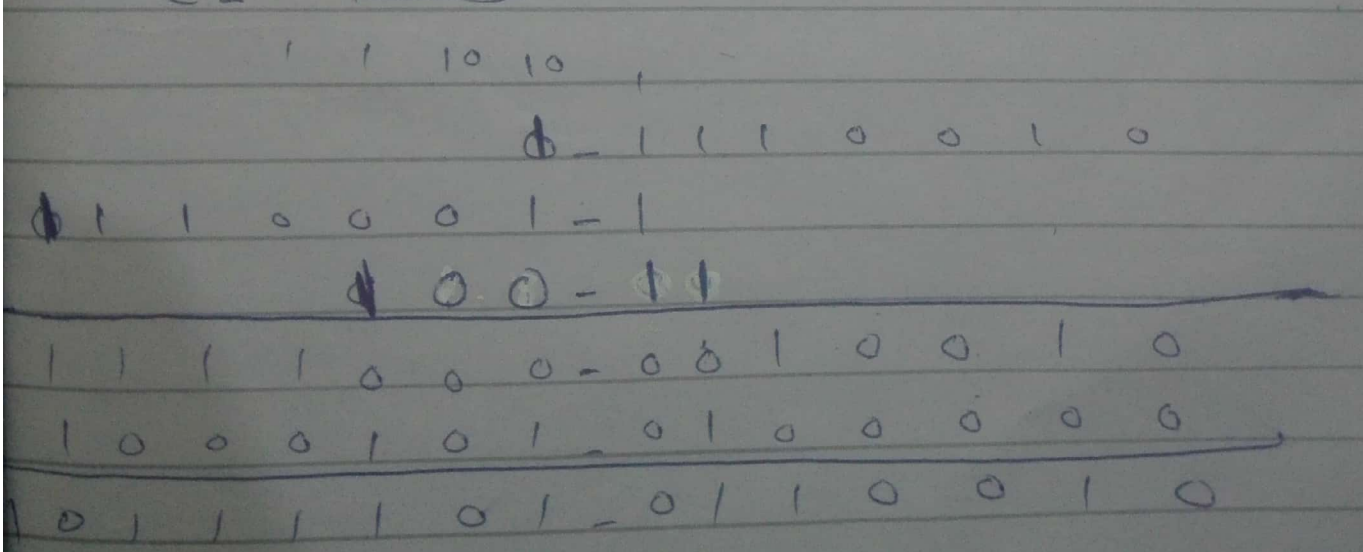
1



A =

B =

C =



Check Answer