EXPERIMENT 5 :-

COMBINATIONAL CIRCUITS

Page No. :
Date : / /

A) AIM :- TO PERFORM THE ADDITION OF TWO BIT NUMBERS USING HALF ADDER.

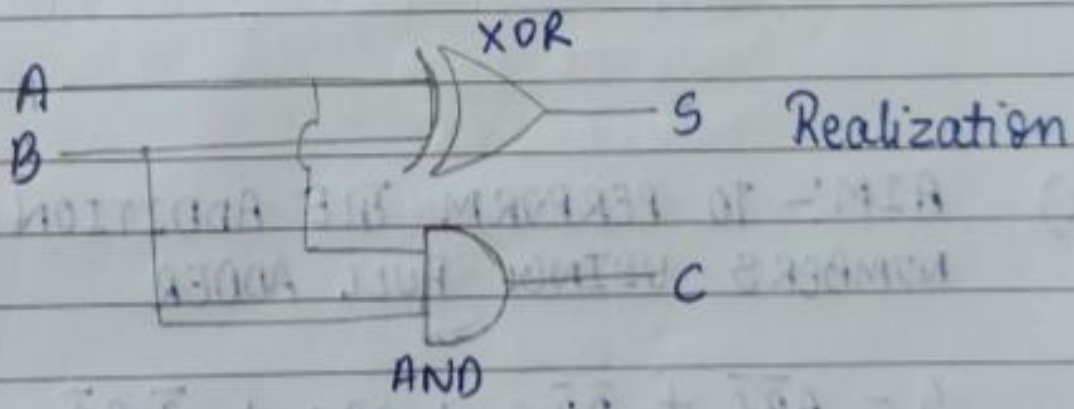
TRUTH TABLE :-

INPUTS		OUTPUTS	
A	B	S	C
0	0	0	0
1	0	1	0
0	1	1	0
1	1	0	1

Boolean Exp :-

SUM (S) = $A \cdot \bar{B} + \bar{A} \cdot B$

CARRY (C) = $A \cdot B$



Realization

B) AIM :- TO PERFORM THE SUBTRACTION OF TWO BIT NUMBERS USING HALF SUBTRACTOR

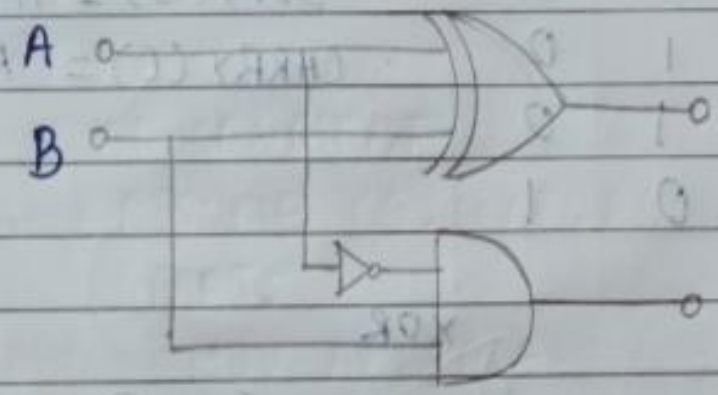
Boolean Expression :-

$D = A'B + AB' = A \oplus B$

$B_0 = A'B$

TRUTH TABLE :-

A	B	BORROW	DIFFERENCE
0	0	0	0
0	1	1	1
1	0	0	1
1	1	0	0



Realization

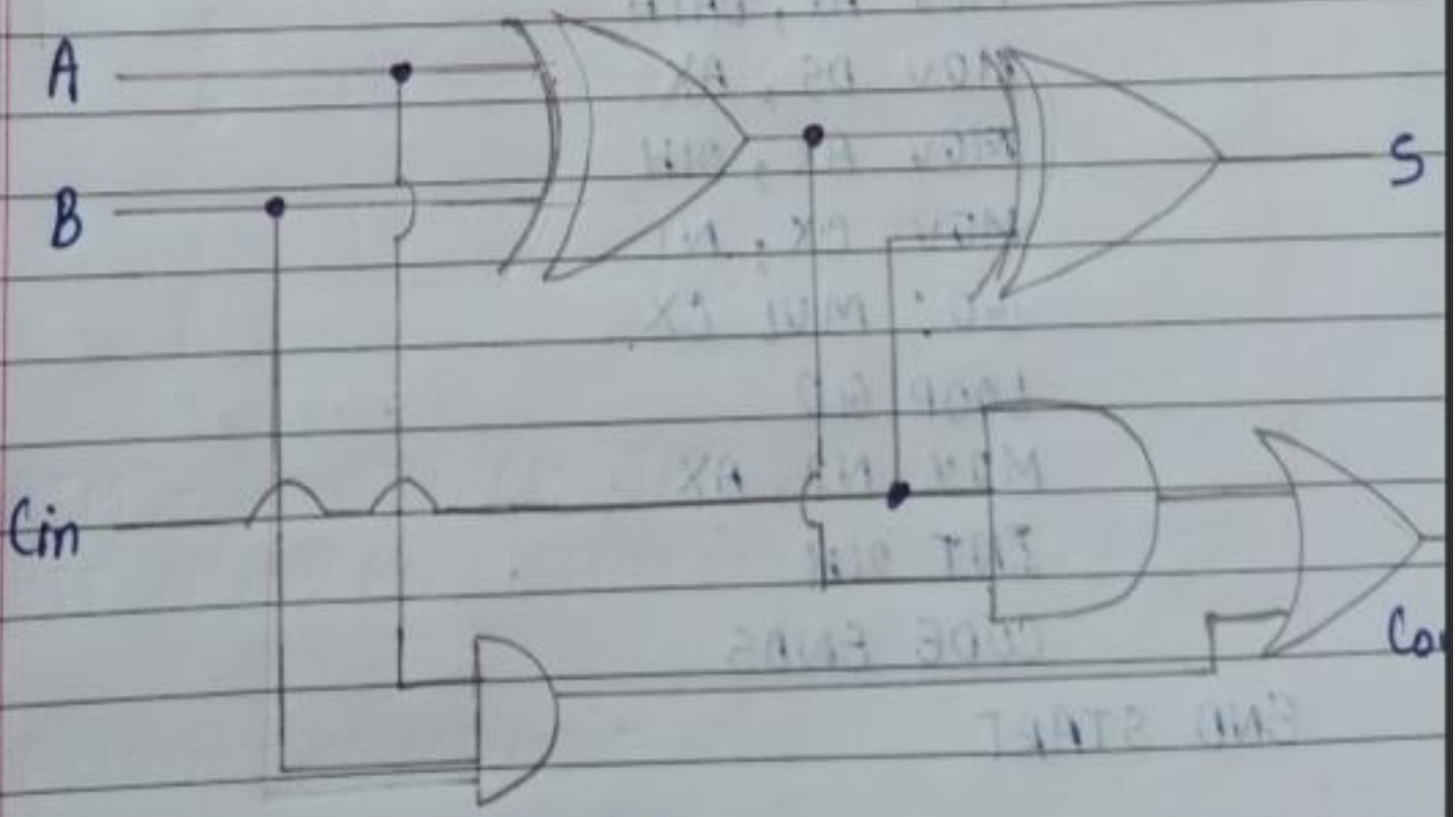
c) AIM :- TO PERFORM THE ADDITION OF THREE BII NUMBERS USING FULL ADDER

$$S = A\bar{B}\bar{C} + \bar{A}\bar{B}C + ABC + \bar{A}B\bar{C}$$
$$= C(\bar{A}B + A\bar{B}) + \bar{C}(\bar{A}B + A\bar{B})$$
$$= C(\overline{A \oplus B}) + \bar{C}(A \oplus B) = A \oplus B \oplus C$$

$$C_{out} = \bar{A}BC + A\bar{B}C + AB\bar{C} + ABC$$
$$= (A \oplus B) \cdot C + AB$$

TRUTH TABLE

INPUTS			OUTPUT	
A	B	Cin	S	Co
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1



Full Adder

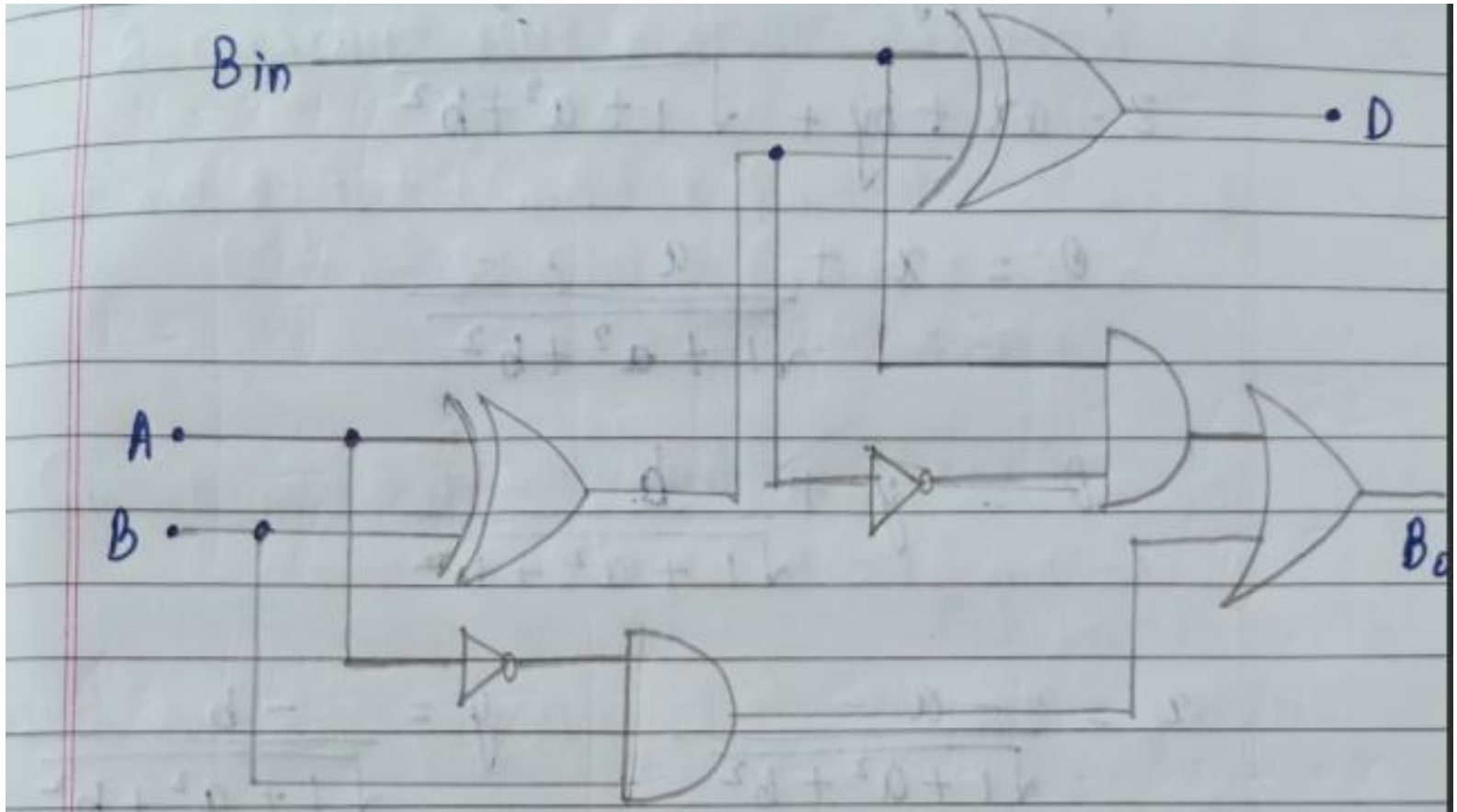
D) AIM :- TO FIND THE SUBTRACTION OF THREE BIT NUMBERS USING FULL SUBTRACTOR

$$D_1 = A'(B'B_{in} + BB_{in}') + A(B'B_{in}' + BB_{in})$$
$$= A'(B \oplus B_{in}) + A(B \oplus B_{in})'$$
$$= A \oplus B \oplus B_{in}$$

$$B_o = A'B'B_{in} + ABB_{in} + A'B(B_{in} + B_{in}')$$
$$= B_{in}(A \oplus B') + A'B$$

TRUTH TABLE :-

INPUT			OUTPUT	
A	B	Bin	D	Bout
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1



HALF SUBTRACTOR.

→ RESULT :-

The required operations are performed.