EC0319 : Digital Electronics Date:_____

PRACTICAL-4

AIM: To Verify Half Subtractor & Full Subtractor using Truth Table and Logic Diagram

- To verify Half subtractor and full subtractor using truth table and logic diagram :

i). Boolean Expression :-

a). Half Subtractor :

- Difference (D) : $D = A \oplus B$ (XOR operation)
- Borrow (B) : $B = \bar{A}.B$ (AND with NOT gate)

b). Full Subtractor :

- Difference (D) : $D = A \oplus B \oplus B_{in}$
- Borrow (B_out) : $B_{out} = \bar{A} \cdot B + (B \oplus A) \cdot B_{in}$

ii). Truth Table :-

a). Half Subtractor :

A	B	D	B
0	0	0	0
0	1	1	1
1	0	1	0
1	1	0	0

b). Full Subtractor :

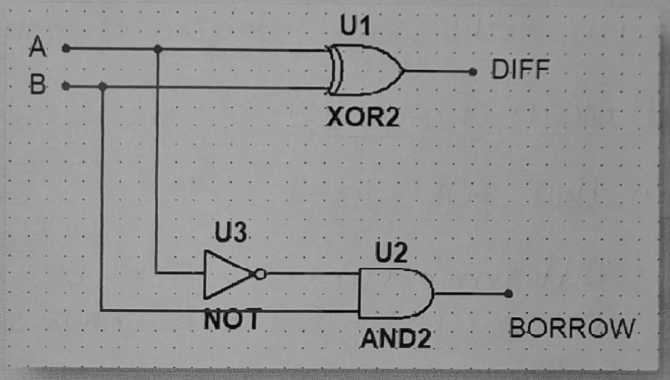
A	B	Bin	D	B-out
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0

1 1	1 1	0 1	0 1	0 1

iii). Logic Circuit Diagram :-

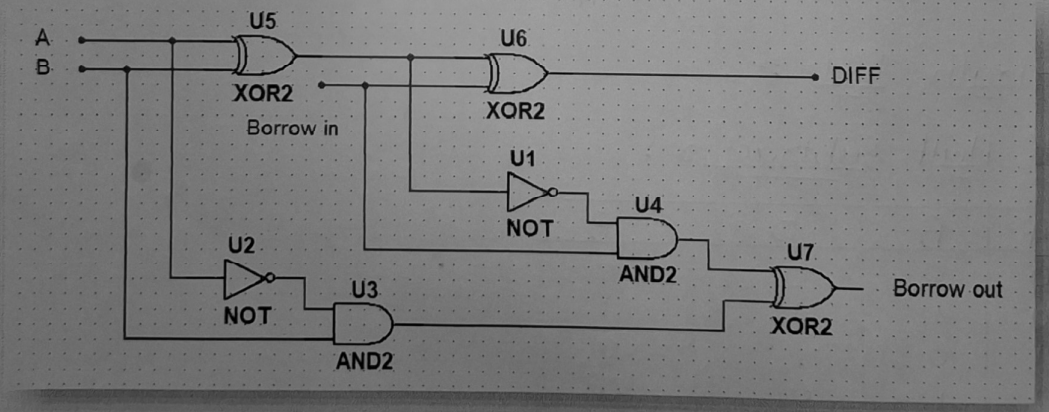
a). Half Subtractor :

- Difference (D) : Use an XOR gate for $A \oplus B$.
- Borrow (B) : Use a NOT gate to invert A and an AND gate for $\bar{A} \cdot B$.



b). Full Subtractor :

- Difference (D) : Use two XOR gates for $A \oplus B$
- Borrow (B_out) : Use two AND and one OR gate



Conclusion :-

In this experiment, we successfully verified the operations of both the half and full subtractor circuits using their respective truth tables and logic diagrams.