

PRACTICAL-2

AIM: To Verify Demorgan's theorem using Truth Table and Logic Diagram

- To verify Demorgan's theorem using truth table and logic diagram :

i). Boolean Expression :-

a). First Law :

$$\overline{A \cdot B} = \overline{A} + \overline{B}$$

b). Second Law :

$$\overline{A+B} = \overline{A} \cdot \overline{B}$$

ii). Truth Table :-

a). First Law :

A	B	$A \cdot B$	$\overline{A \cdot B}$	$\overline{A}$	$\overline{B}$	$\overline{A} + \overline{B}$
0	0	0	1	1	1	1
0	1	0	1	1	0	1
1	0	0	1	0	1	1
1	1	1	0	0	0	0

b). Second Law :

A	B	$A+B$	$\overline{A+B}$	$\overline{A}$	$\overline{B}$	$\overline{A} \cdot \overline{B}$
0	0	0	1	1	1	1
0	1	1	0	1	0	0
1	0	1	0	0	1	0
1	1	1	0	0	0	0

### iii). Logic Circuit Diagram :-

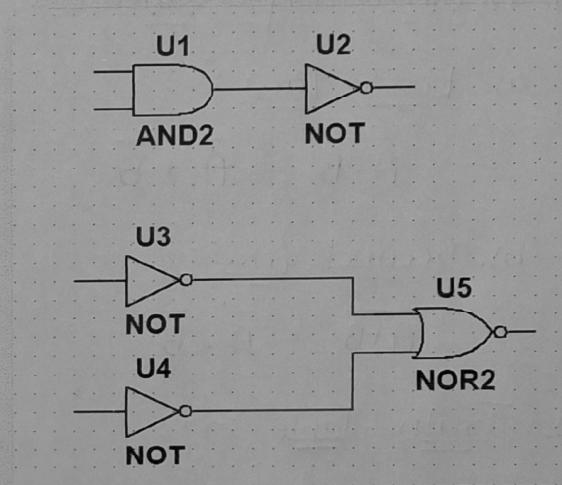
#### a). First Law Logic Circuit :

- Left : AND gate followed by a NOT gate for  $\overline{A \cdot B}$ .
- Right : Two NOT gate followed by an OR gate for  $\overline{A + B}$ .

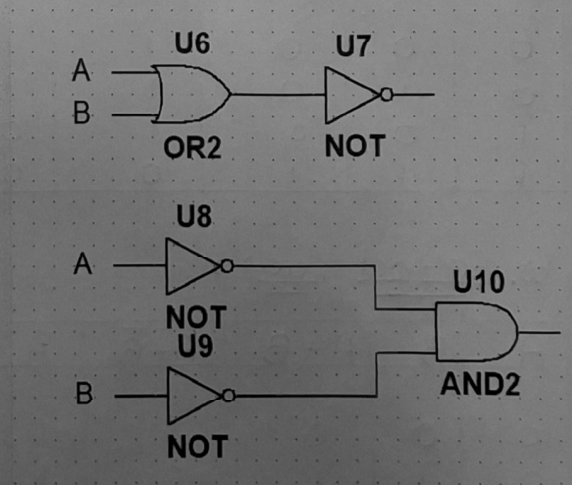
#### b). Second Law Logic Circuit :

- Left : OR gate followed by a NOT gate for  $\overline{A + B}$ .
- Right : Two NOT gates followed by an AND gate for  $\overline{A} \cdot \overline{B}$ .

#### a). First Law Logic Circuit :-



#### b). Second Law Logic Circuit :-



### Conclusion :-

- By comparing the truth table results and the outputs from the logic circuits, we verify that both De Morgan's laws hold true.