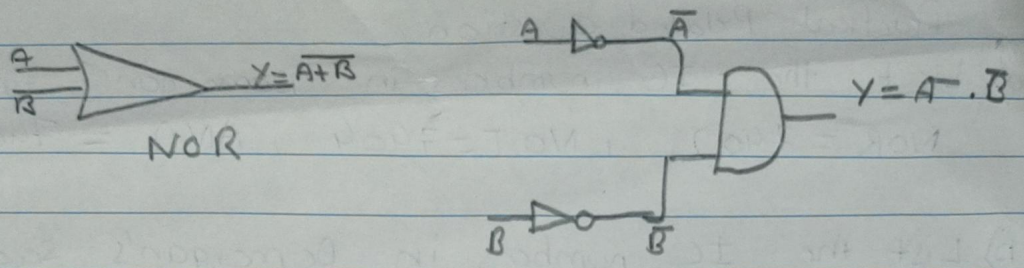
# Experiment - 2 :- Verify DeMorgan's Table

## *De - Morgan's First Theorem

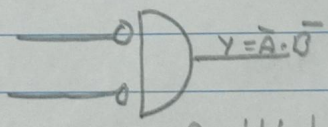
- It states that compliment of sum of variable is equal to the product of the compliment of each variable.

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




Truth Table

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

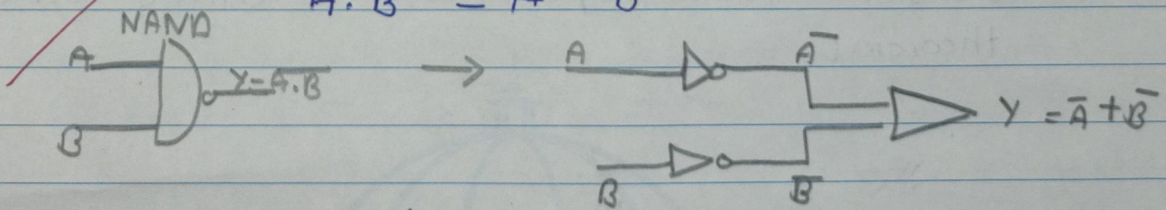



Bubbled AND

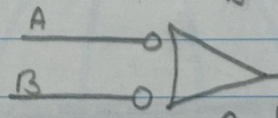
## * De - Morgan's Second Theorem

- Compliment of product of variable is equal to sum of compliment of each variable.

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




OR




Bubbled OR

| A | B | $\overline{A.B}$ | $\overline{A}$ | $\overline{B}$ | $\overline{A} + \overline{B}$ |
|---|---|---|---|---|---|
| 0 | 0 | 1 | 1 | 1 | 1 |
| 0 | 1 | 1 | 1 | 0 | 1 |
| 1 | 0 | 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 0 | 0 | 0 |

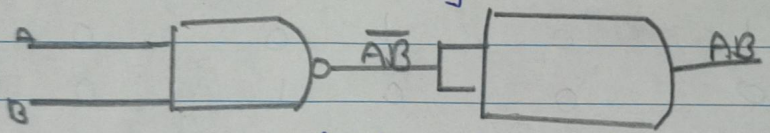
Truth Table

Practical Related Question

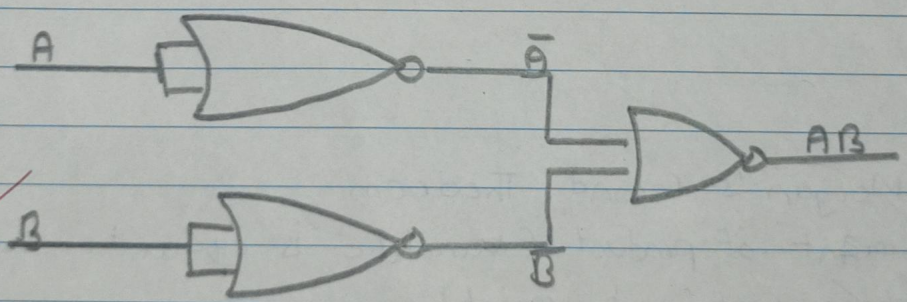
a) List the IC numbers in Demorgan's first theorem
NOR = 7402 , NOT = 7404 , AND = 7408

b) List the IC numbers in Demorgan's second theorem
NAND = 7400 , NOT = 7404 , OR = 7432

c) Draw AND gate using NAND & NOR




AND using NAND




Conclusion: In this experiment, we verified Demorgan's theorems