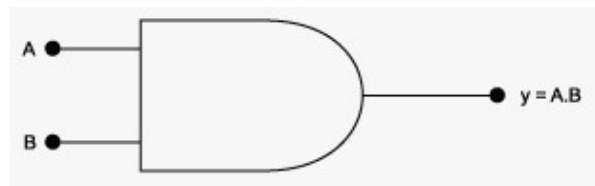


Questions:

1. Draw logic circuit and write truth table for an AND, OR and NOT gate.

**i) AND GATE**

**Circuit:**

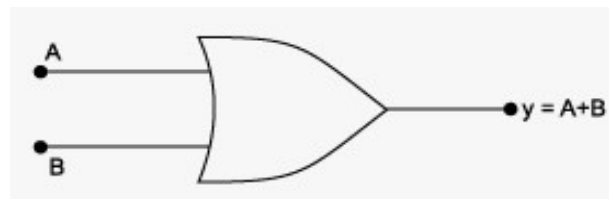


**Truth Table:**

A	B	$y = A \cdot B$
0	0	0
0	1	0
1	0	0
1	1	1

**ii) OR GATE**

**Circuit:**

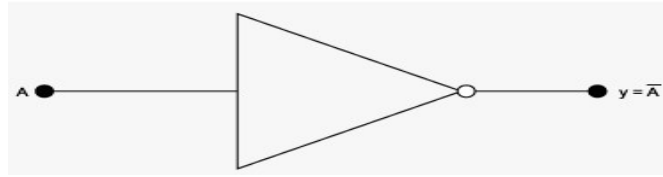


**Truth Table:**

A	B	$y = A + B$
0	0	0
0	1	1
1	0	1
1	1	1

### iii) NOT GATE

Circuit:



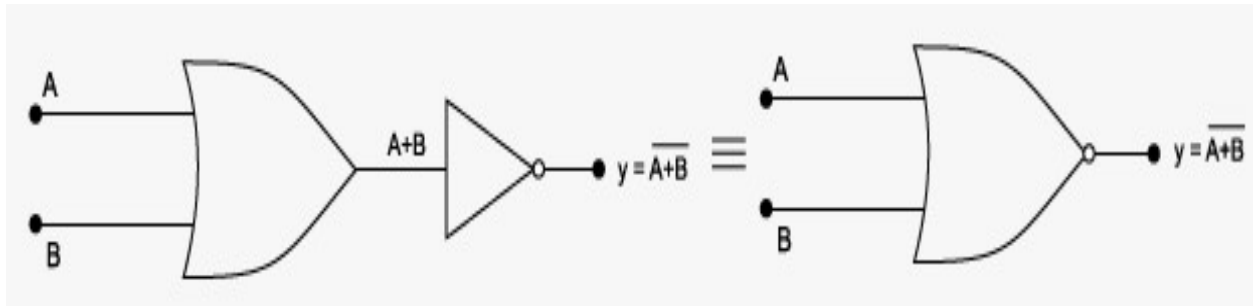
Truth Table:

A	$y = \bar{A}$
0	1
1	0

2. Draw logic circuit and write truth table for a NOR, NAND, XOR gate.

#### (i) NOR GATE:

Circuit:

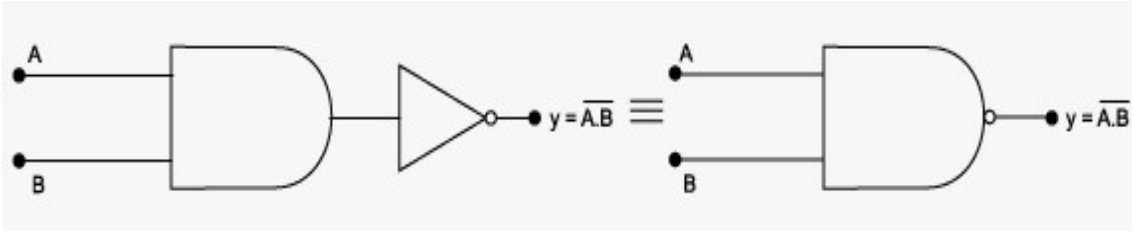


Truth Table:

A	B	A+B	$y = \overline{A+B}$
0	0	0	1
0	1	1	0
1	0	1	0
1	1	1	0

## (ii) NAND GATE:

Circuit:

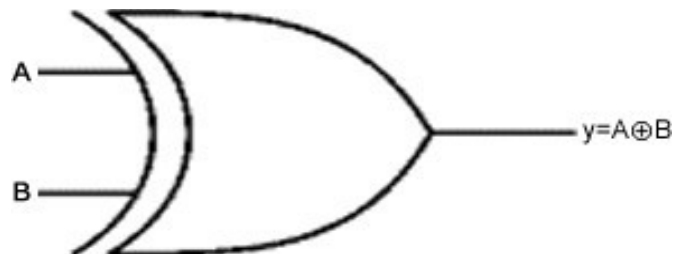


Truth Table:

A	B	$y = \overline{A \cdot B}$
0	0	1
0	1	1
1	0	1
1	1	0

## (ii) XOR GATE:

Circuit:



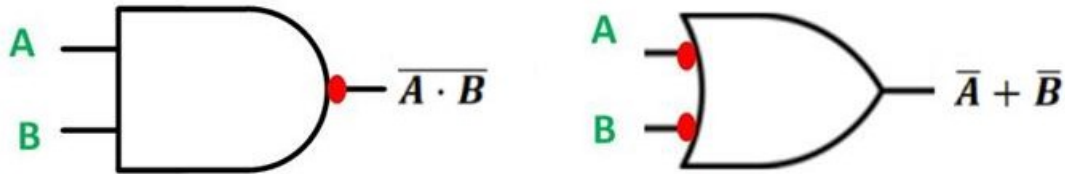
Truth Table:

A	B	$y = A \oplus B$
0	0	0
0	1	1
1	0	1
1	1	0

3. Draw logic circuit and write truth table for a De-Morgan's Theorem.

### De-Morgan's First Theorem:

Circuit:



Truth Table:

A	B	$(A \cdot B)'$	$A' + B'$
0	0	1	1
0	1	1	1
1	0	1	1
1	1	0	0

### De-Morgan's Second Theorem:

Circuit:

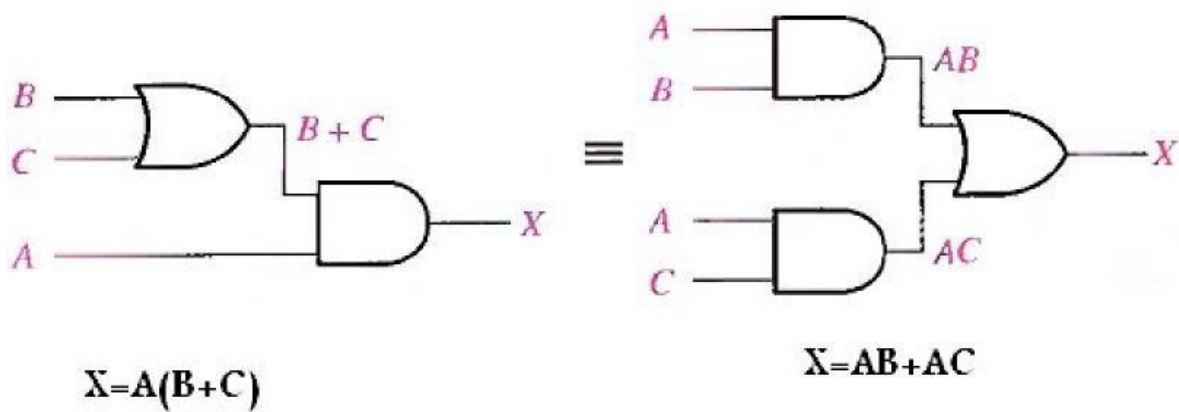


Truth Table:

A	B	$(A + B)'$	$A' \cdot B'$
0	0	1	1
0	1	0	0
1	0	0	0
1	1	0	0

4. Draw logic circuit and write truth table for a Distributive Law.

Circuit:



Truth Table:

A	B	C	B+C	A(B+C)	AB	AC	AB+AC
0	0	0	0	0	0	0	0
0	0	1	1	0	0	0	0
0	1	0	1	0	0	0	0
0	1	1	1	0	0	0	0
1	0	0	0	0	0	0	0
1	0	1	1	1	0	1	1
1	1	0	1	1	1	0	1
1	1	1	1	1	1	1	1

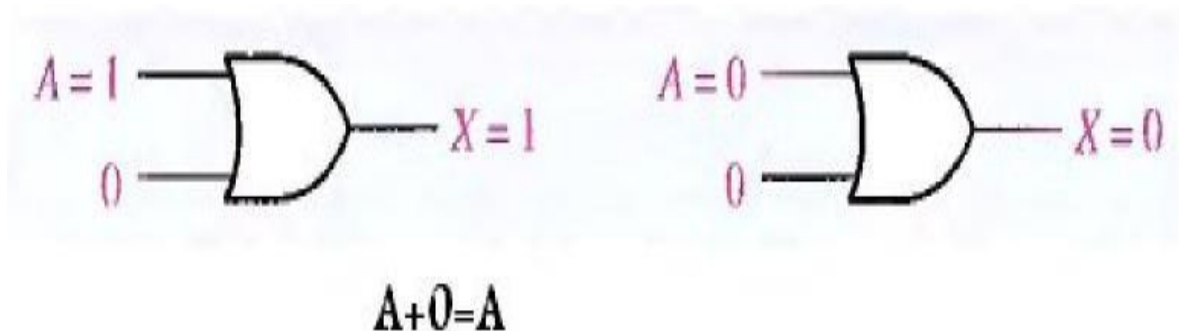
5. Draw logic circuit and write truth table for following.

i.  $A + 0 = A$

ii.  $A + 1 = 1$

i.  $A + 0 = A$

Circuit:

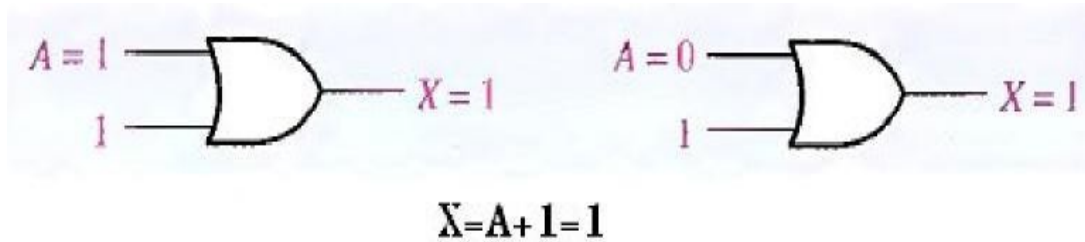


**Truth Table:**

A	B	A+B
0	0	0
1	0	1

ii.  $A + 1 = 1$

**Circuit:**



**Truth Table:**

A	B	A+B
0	1	1
1	1	1

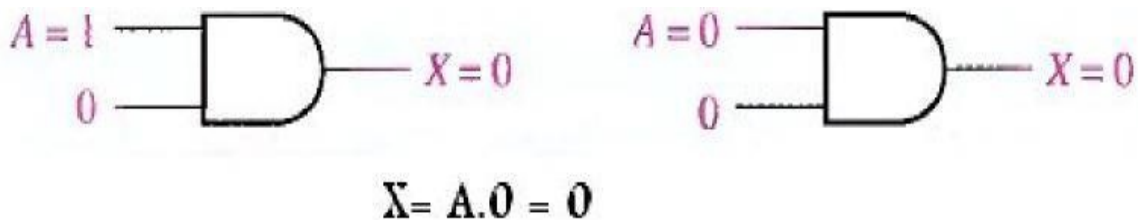
6. Draw logic circuit and write truth table for following.

i.  $A \cdot 0 = 0$

ii.  $A \cdot 1 = A$

i.  $A \cdot 0 = 0$

**Circuit:**

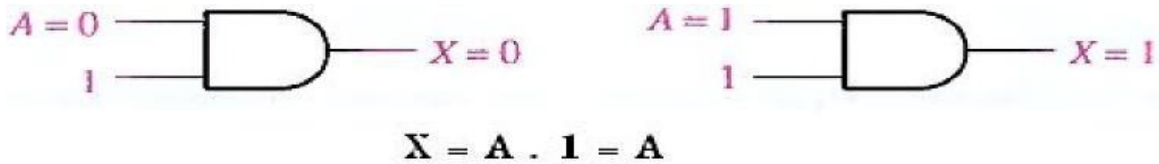


**Truth Table:**

A	B	A•B
0	0	0
1	0	0

ii.  $A \cdot 1 = A$

Circuit:



Truth Table:

A	B	$A \cdot B$
0	1	0
1	1	1

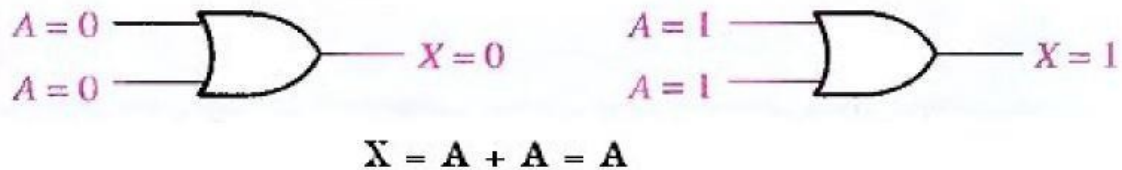
7. Draw logic circuit and write truth table for following.

i.  $A + A = A$

ii.  $A + A' = 1$

i.  $A + A = A$

Circuit:

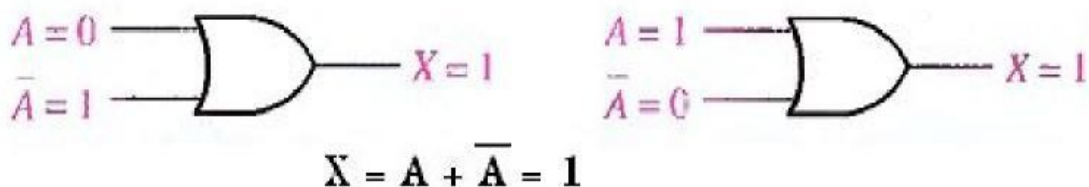


Truth Table:

A	A	$A + A$
1	1	1
0	0	0

ii.  $A + A' = 1$

Circuit:



**Truth Table:**

A	A'	A+A'
0	1	0
1	0	1

8. Draw logic circuit and write truth table for following.

i.  $A \cdot A = A$

ii.  $A \cdot A' = 0$

i.  $A \cdot A = A$

**Circuit:**



$A \cdot A = A$



**Truth Table:**

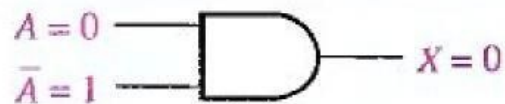
A	A	$A \cdot A$
0	0	0
1	1	1

ii.  $A \cdot A' = 0$

**Circuit:**



$A \cdot \bar{A} = 0$



**Truth Table:**

A	A	$A \cdot A'$
0	1	0
1	0	0



9. Draw logic circuit and write truth table for following.

$$A + A'B = A + B$$

A	B	$\bar{A}B$	$A + \bar{A}B$	$A + B$
0	0	0	0	0
0	1	1	1	1
1	0	0	1	1
1	1	0	1	1

↑ equal ↑

10. Draw logic circuit and write truth table for following.

$$(A + B)(A + C) = A + BC$$

A	B	C	$A + B$	$A + C$	$(A + B)(A + C)$	$BC$	$A + BC$
0	0	0	0	0	0	0	0
0	0	1	0	1	0	0	0
0	1	0	1	0	0	0	0
0	1	1	1	1	1	1	1
1	0	0	1	1	1	0	1
1	0	1	1	1	1	0	1
1	1	0	1	1	1	0	1
1	1	1	1	1	1	1	1

↑ equal ↑