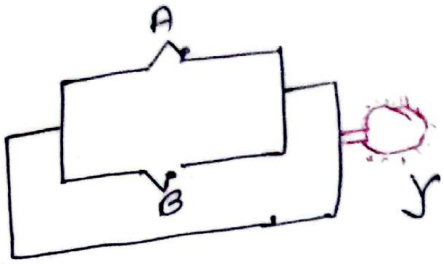
Logic Gates

(Digital signal)

ON = 1 OFF = 0

① OR gate: also called parallel switching circuit



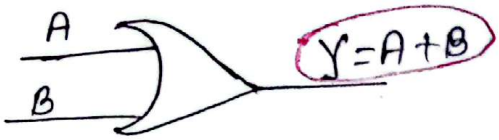
A	B	Y
1	0	1
0	1	1
1	1	1
0	0	0

Truth table

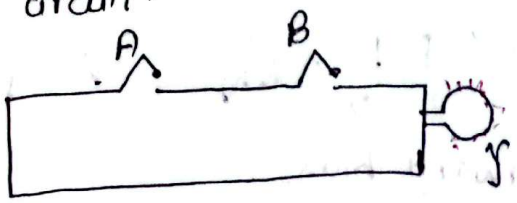
Bolean algebra

$Y = A + B$

ckt diagram



② AND gate: also called series switching circuit.



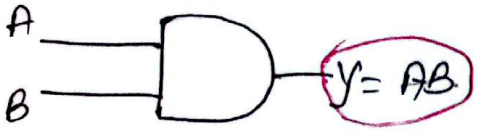
A	B	Y
1	0	0
0	1	0
1	1	1
0	0	0

Truth table

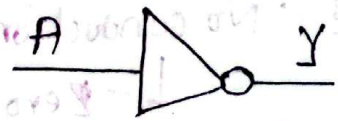
Bolean algebra

$Y = A \cdot B$

ckt diagram



③ NOT gate: 1 input & 1 output



A	Y
1	0
0	1

Truth table

Bolean algebra

$\therefore Y = \bar{A}$

Combination of gate

① **NOR gate** → also called invert gate.

OR को output लाई NOT गर्दिने

[OR + NOT] = NOR.



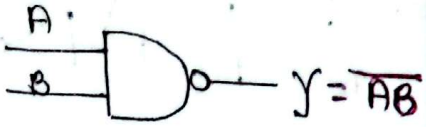
ckt diagram

A	B	Y' = A+B	Y = $\overline{A+B}$
1	0	1	0
1	1	1	0
0	1	1	0
1	0	0	1
0	0	0	1

Truth table

Bolean algebra → $Y = \overline{A+B}$

② **NAND gate:** AND को output लाई NOT गर्ने



ckt diagram

A	B	Y' = AB	Y = $\overline{AB}$
1	0	0	1
1	1	0	1
0	1	1	0
1	0	0	1
0	0	0	1

Bolean algebra → $Y = \overline{AB}$

Note: NOR and NAND gate are universal gate.

③ **XOR gate** → called exclusive or OR gate.

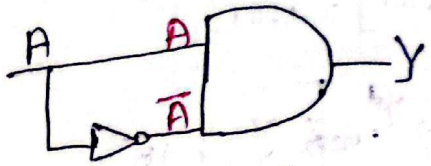
Bolean algebra → $Y = \overline{A} \cdot B + A \cdot \overline{B}$

A	B	Y
1	0	1
0	1	1
1	1	0
0	0	0

XNOR gate → exclusive NOR gate.

Boolean algebra → $Y = A \cdot B + \overline{A} \cdot \overline{B}$

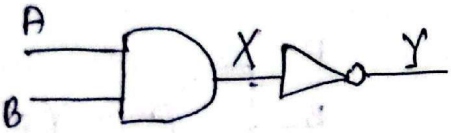
A	B	Y
0	0	1
0	1	0
1	0	0
1	1	1



→ $X = \overline{A}$

$Y = A \cdot \overline{A}$

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

Q. 

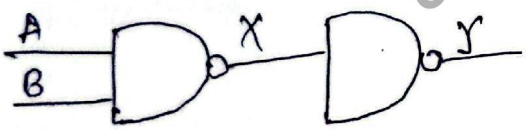
. Which gate is this?

→ $X = A \cdot B$

again, $Y = \overline{X} = \overline{A} \cdot \overline{B}$

NAND gate

abishek singh

Q. 

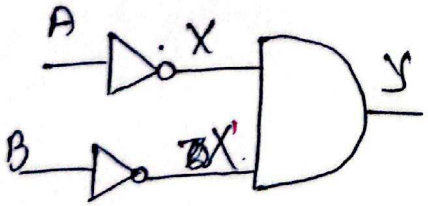
. Which gate is this?

→ $X = \overline{A} \cdot \overline{B}$

[NAND + NAND] = AND

again, $Y = \overline{X} = \overline{\overline{A} \cdot \overline{B}} = A \cdot B$

↳ AND gate

Q. 

$X = \overline{A}$

$X' = \overline{B}$

$Y = X \cdot X'$

$= \overline{A} \cdot \overline{B} =$ NAND gate ~~AND gate~~