Lab Report 01

Course Code: CSE 216

Course Title**:** Digital Logic Design Laboratory

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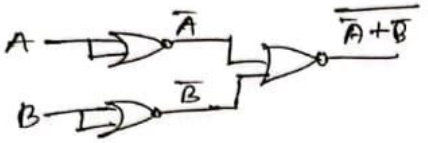
⊛ Implement using NOR gate.

NOR to NOT gate

A	Y
0	1
1	0

NOR to AND gate



$Y = \overline{\bar{A}+\bar{B}}$

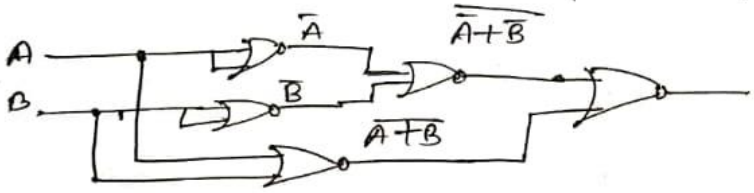
$= \bar{\bar{A}} \cdot \bar{\bar{B}}$

$= AB$ → This is the AND gate expression.

NOR to OR gate.

$= A+B$ → OR gate Expression.

X-OR gate.



$Y = \overline{\overline{\bar{A}+\bar{B}} + \overline{A+B}}$

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

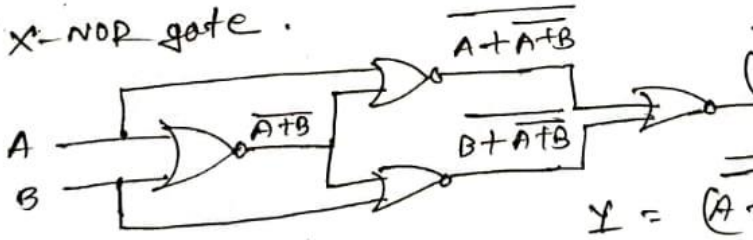
$= (\bar{A}+\bar{B}) \cdot (A+B)$

$= A\bar{A} + A\bar{B} + \bar{A}B + B\bar{B}$

$\Rightarrow \bar{A}B + A\bar{B}$

$= A \oplus B = X\text{-OR}$.

X-NOR gate.



$Y = \overline{\overline{(A+\overline{A+B})} + \overline{(B+\overline{A+B})}}$

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

$= (A+\bar{A})(A+\bar{B})(B+\bar{A}) \cdot (B+\bar{B})$

$\Rightarrow (A+\bar{B})(B+\bar{A})$

$= AB + A\bar{A} + \bar{B}B + \bar{A}\bar{B}$

$\Rightarrow \bar{A}\bar{B} + AB$

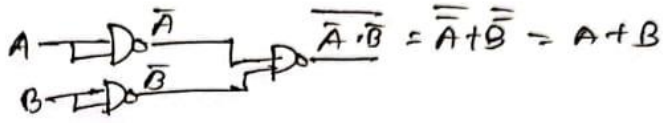
$\Rightarrow X\text{-NOR}$

⊛ Implement kind of logic gate function using NAND gate.

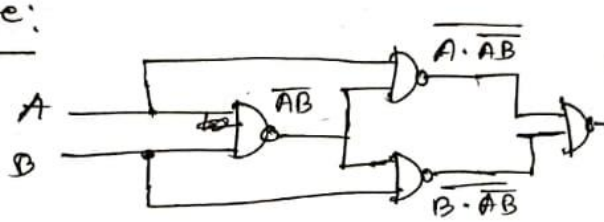
NOT gate

AND gate

OR gate:



X-OR gate:



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

$\Rightarrow \overline{\overline{A \cdot \overline{AB}}} + \overline{\overline{B \cdot \overline{AB}}}$

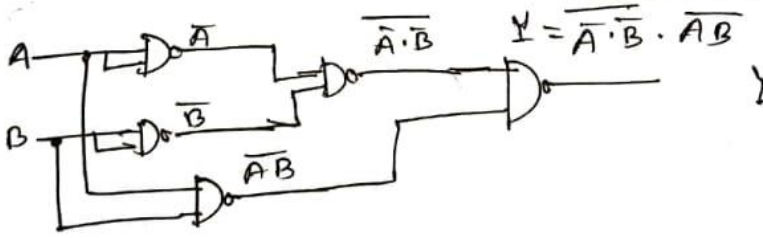
$\Rightarrow A \cdot \overline{AB} + B \cdot \overline{AB}$

$= A \cdot (\bar{A} + \bar{B}) + B \cdot (\bar{A} \cdot B)$

$= A\bar{B} + \bar{A}B$

$= \bar{A}B + A\bar{B} = A \oplus B$

X-NOR gate:



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

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

$\Rightarrow \bar{A}\bar{B} \cdot AB$

$= \overline{A \oplus B}$

= X-NOR