Modi Institute of Technology, KOTA

Date..... Experiment No. 1 Page No. 1

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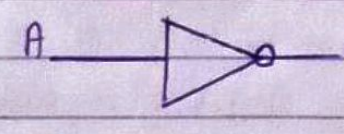
AIM: To verify the truth table of basic gate: AND, OR, NOR, NAND, Not also verify the truth table of

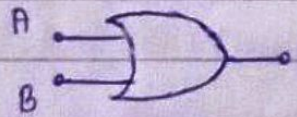
Ex:- -OR, -NOR, for (2,3,4 as an input)
(2,3,4 as an output)

Apparatus Required :- Trainer kit, power supply and connecting lids

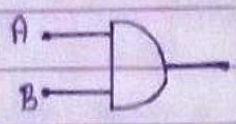
Theory:- There are ~~three~~ seven types of logical gates In which three are basic gates that are Not, OR, AND gates and two universal gates NOR, Nand two Special gates Ex-OR, Ex-NOR the basic gates do basic arthmatic operations like NOT gates does inverse of Input OR gates does addition of Input and AND gate does multiplication of Input there are some foundamentals of this gates.



In NOT gate

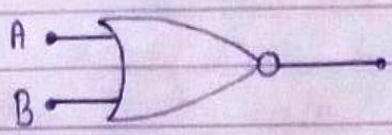


In OR gates

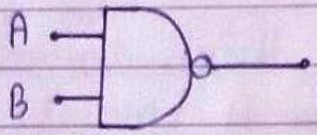


$Y = A \cdot B$ In AND gates

universal gates are in like :-

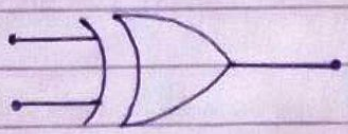


$Y = \overline{A+B}$ In NOR gates

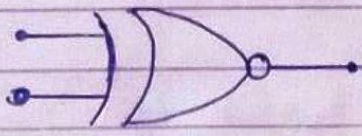


$Y = \overline{A \cdot B}$ In NAND gates

Special gates



$y = A \oplus B$ In Ex-OR Gate



$y = \overline{A \oplus B}$ In Ex-NOR Gate

* Procedure :-

(i) Verification of truth table of 'AND' Gates

(a) Connect A and B input AND gates to logic Input '0' & '0' as shown in the ~~table~~ truth table of AND gate

(b) Given as the instruments using off y toggle switch provided on the front

(3) Because the output indicator. If it glows the is that the output is in '1' and otherwise '0'

(4) verify the output for other comunication of input A and B as in the truth table for AND gate

(d) Verification of truth table of 'OR'

(1) connect A and B input of OR gate to logic input '0' and '0' is thrown in the truth table for OR Grate also.

(2) Switch on the instrument using off/ON taggle provided on the front panel

(3) the output . If it glow the Indication is that output is '1' and otherwise '0'

(4) Similarly verify the output for other combination of input 'A' and 'B)

4. Verification of truth table of Ex-OR gates

1 Connect A and B input of Ex-OR gates to logic input '0' and '0' as

for Ex-OR gates also connect output of Ex-OR gate to output indicater.

(d) Similer on the ~~interument~~ using OFF/ON toggle writer provided on the front panel.

(3) the output indicater if it glow the indicator that output is '1' and if also not glow then '0'

(4) Similarly verify the output for other combination of A and B in truth table for EX-OR gate.

(4) Verification of truth table for NOR

(a) Connect A and B of NOR gate to logic input '0' and truth table. Also connect output NOR gate to output indicator through

(b) ON the instrument using OFF/ON toggle

(c) the output if indicator glow than output is '1' and '0'

(D) verify the output for other of A and B

(5) Vrification of NAND Crate.

(i) Connect A and B input of NAND Crate to logic in putts '0' and '0' for NAND gate. Also connect output NAND gates to output indicator

(ii) on the instrument.

(iii) verify the output of other of A and B

Verification of NOT gate.

(a) Connect A input of NOT gate to logic input '0' also gate connect output of NOT gate to output indicator

(b) On the Instrument.

(c) the output Indicator

(d) Similary verify the output of other inputs

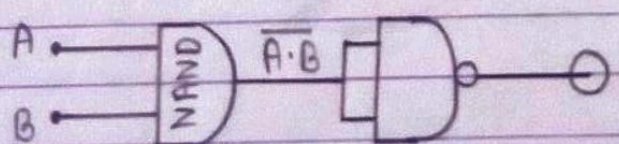
Result:- Thus are verified the truth table of logic gate.

Aim:- To verify the truth table of OR, AND NOR, EX-OR, EX-NOR utalized using NAN and NOR gates.

Apparatus Required:- trainer kit, power Supply connecting lids.

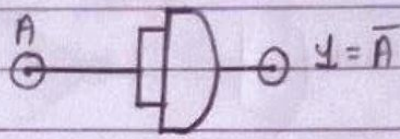
theory:- for every Boolean expression the logic circuit can be built for every logic circuit, can write a Boolean expression to Build logic circuit OR gates is used for multiplication Sign and NOT gate is used for inverse, Hence AND, OR and NOT logic gates all called basic bevilding of logic circuit. logic circuit have the property of i.e If the of logic logic circuit have the property of i.e If the no logic gates for particular are given other logic can be obtane by of these gate NAND and NOR gates the basic block. hence NAND and NOR are called universal bevilding block of logic gates.

Procedure:- Cverification of "NAND", "AND" gate

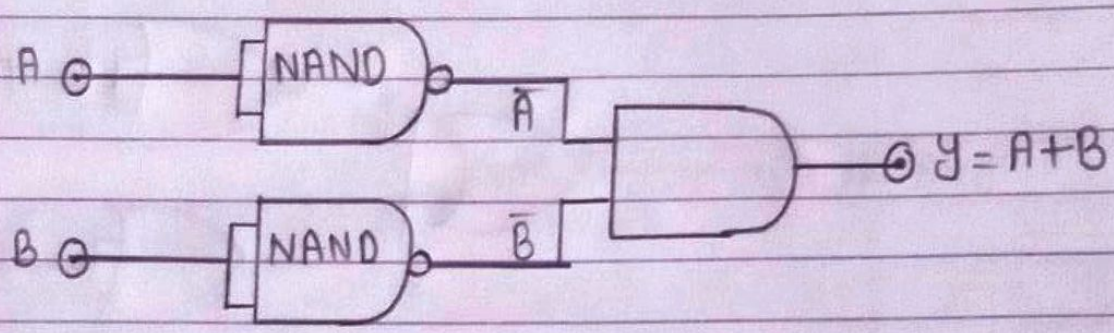


NAND as AND gates.

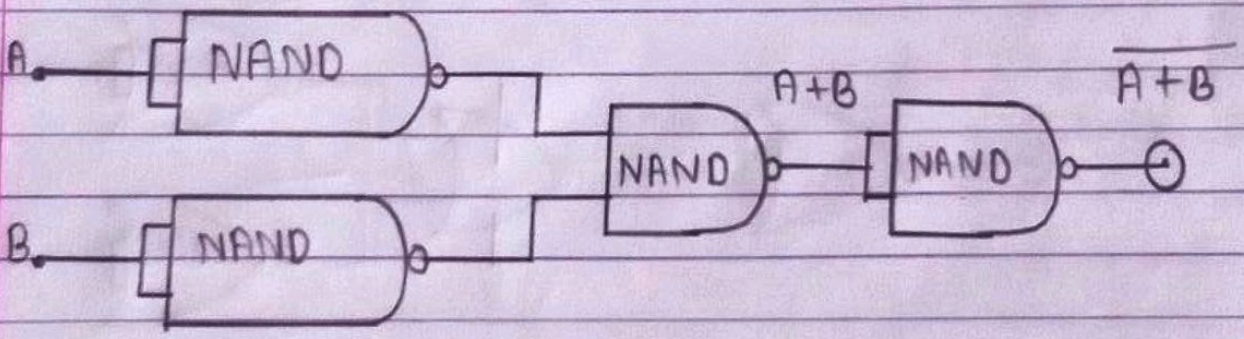
verification of "NAND" as "NOT" gate.



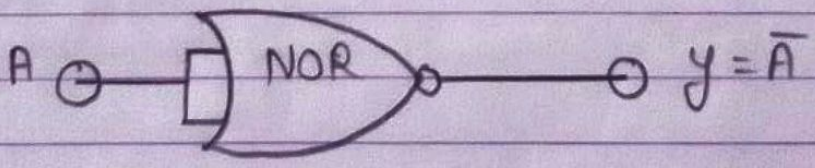
verification of "NAND" as "OR" gate



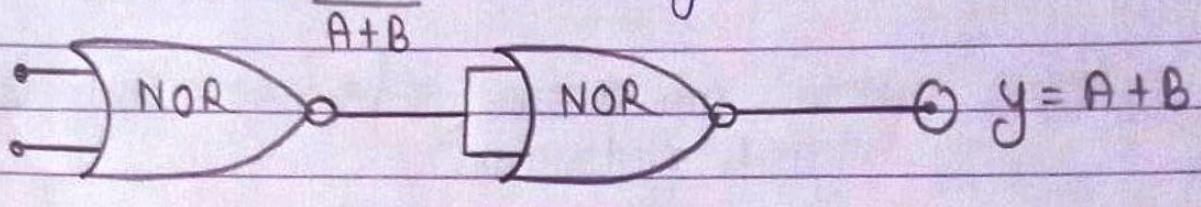
verification of "NAND" as NOR gate



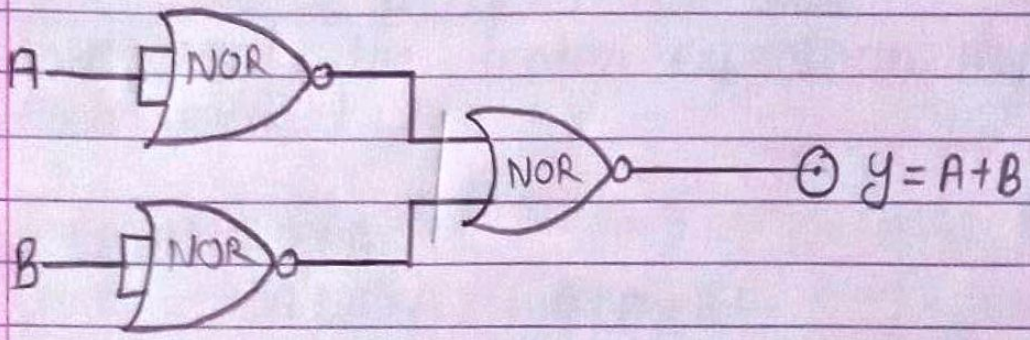
Verification of NOR as NOT gate



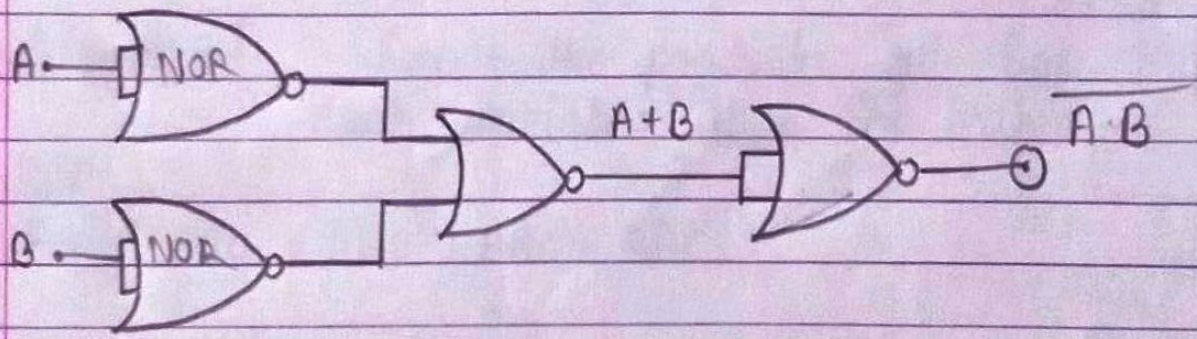
Verification of "NOR" as "OR" gate.



Verification of "NOR" as "AND" gate.



Verification of "NOR" as "NAND" gate



Result:- Thus we verified the truth table of AND, NOR, EX-OR, Ex-NOR using NAND and NOR gate.

Aim:- To an SoP and POS exp.

Apparatus required :- Trainer kit, power supply connecting leds.

Theory:-

SOP [Sum of product] → In this we represent the boolen expression by sum of each product

Eq $f(A,B) = A + \bar{B}$

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

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

$f(A,B) = AB + A\bar{B} + A\bar{B}$

Standard Sop:- the product of Sop that each variable then Sop called SOP

Eq : $A\bar{B}C + \bar{A}BC + ABC + \bar{A}\bar{B}\bar{C}$

Minterm :- term Sop product term that is logic 1 called as of Sop

Eq:- $1 = \bar{A}B + A\bar{B}$

~~$1 = [f(A,B)$~~

$1 = [f(A,B)] = m\Sigma 12$

POS (Product of Sum) :- In this technique we represent the boolen exp. by the product of each Sum form.

Eg : $y = (A+\bar{B}+C) \cdot (\bar{A}+B) \cdot (A+B+\bar{C})$

Standard POS :- The Sum item of pos that con- -ta each varible then pos.

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

Max term :- In the POS those Sum throw that value is logical '0' called as MAX term

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

$$y = [(f(A \cdot B)]$$

=

Relization of pos :- ($\because A\bar{A} = 0$)

$$f(A,B) = (A+B)(B)$$

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

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

$$f(A,B) = (A+B)(\bar{A}+B)$$

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

Result :- Thus we realize an Sop and Pos exp by lisning of logic gate.