SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

19ECB231 – DIGITAL ELECTRONICS

1

II YEAR/ III SEMESTER

UNIT 1 – **MINIMIZATION TECHNIQUES AND LOGIC GATES**

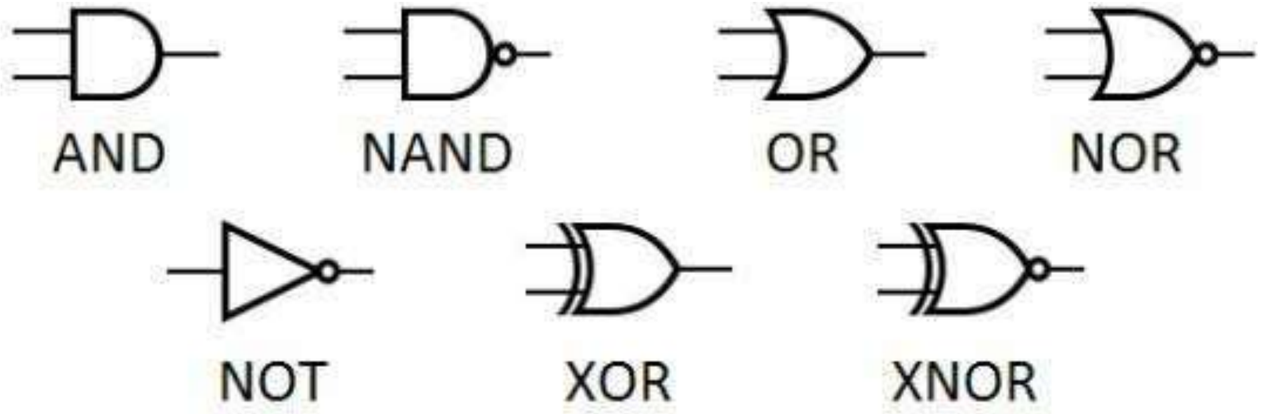
TOPIC –LOGIC GATES

LOGIC GATES

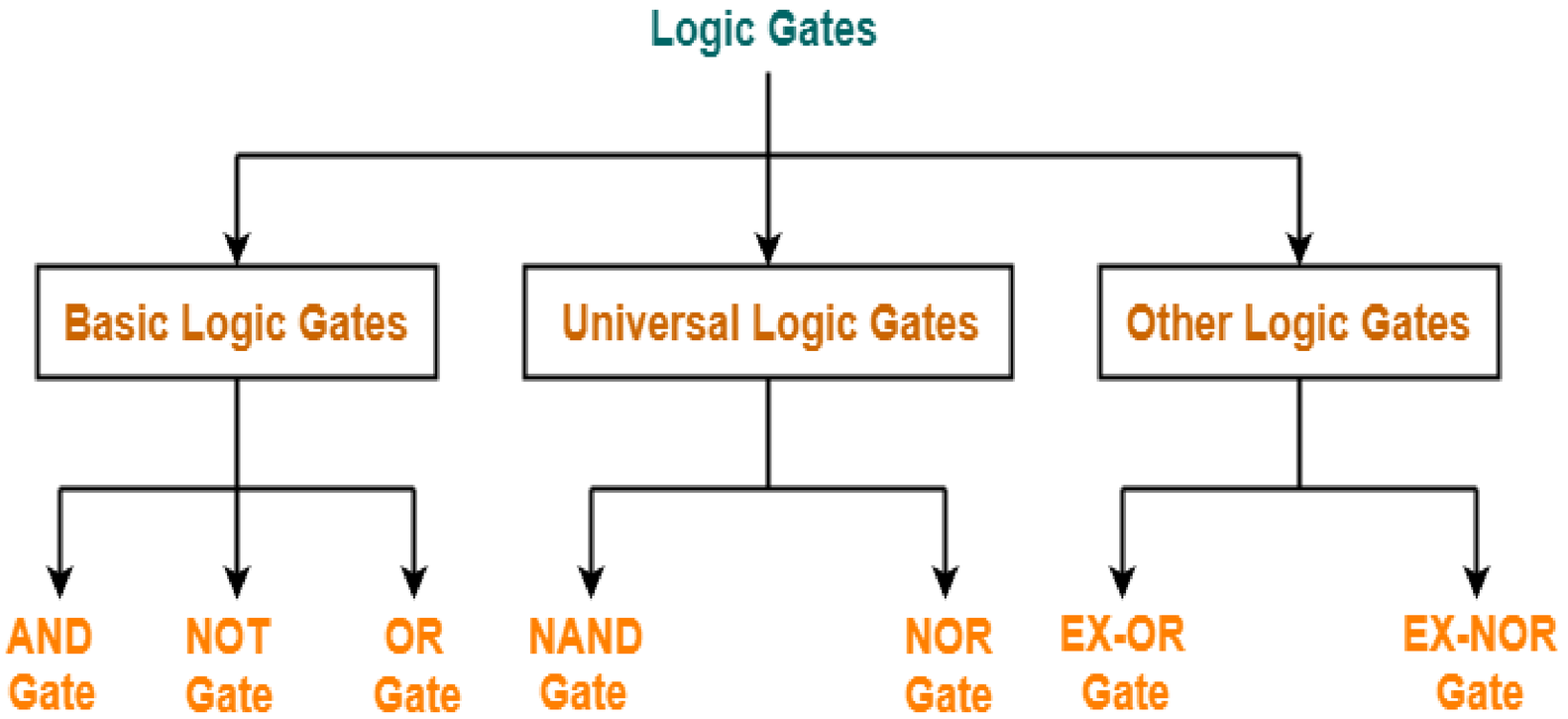
- AND
- OR
- NOT
- NAND
- NOR
- XOR
- XNOR

WHAT IS LOGIC GATE?

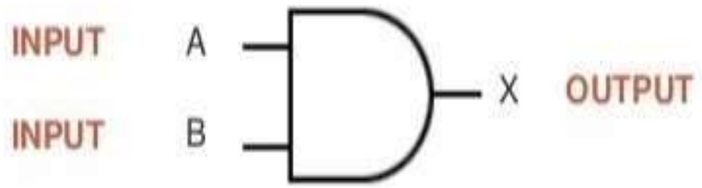
- A Logic Gate is an idealized or physical electronic device which is used for implementing a boolean function, a logical operation performed on one or more binary inputs that produce a single binary output.



CLASSIFICATION OF LOGIC GATES



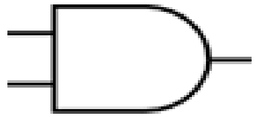
AND GATE



The output will be positive (true) when both inputs (the input one AND the input two) are positive (true).

X = A AND B

AND



INPUT		OUTPUT
A	B	
0	0	0
1	0	0
0	1	0
1	1	1

OR GATE

OR

INPUT		OUTPUT
A	B	
0	0	0
1	0	1
0	1	1
1	1	1

In Boolean Algebra the OR function is the equivalent of addition so its output state represents the addition of its inputs.

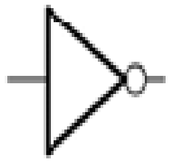
In Boolean Algebra the OR function is represented by a “plus” sign (+) so for a two input OR gate the Boolean equation is given as:

Q = A+B,

that is Q equals either A OR B.

NOT GATE

NOT



INPUT	OUTPUT
A	
0	1
1	0

The NOT function is not a decision making logic gate like that of AND or OR gates, but instead it is used to invert or complement a digital signal. In other words, its output state will always be the opposite of its input state.

NAND GATE

NAND

INPUT		OUTPUT
A	B	
0	0	1
1	0	1
0	1	1
1	1	0

- The term NAND is a contraction of NOT-AND and implies an AND function with a complemented(inverted) output.
- The output will be HIGH,when any one of the inputs is LOW and the output will be LOW when both the inputs are HIGH.
- This operation is opposite to that of AND Gate.

NOR GATE

NOR

INPUT		OUTPUT
A	B	
0	0	1
1	0	0
0	1	0
1	1	0

- The term NOR is a contraction of NOT-OR and implies an OR function with a complemented(inverted) output.
- The output will be LOW, when any one of the inputs is HIGH and the output will be HIGH when both the inputs are LOW.
- This operation is opposite to that of OR Gate.

UNIVERSAL GATES

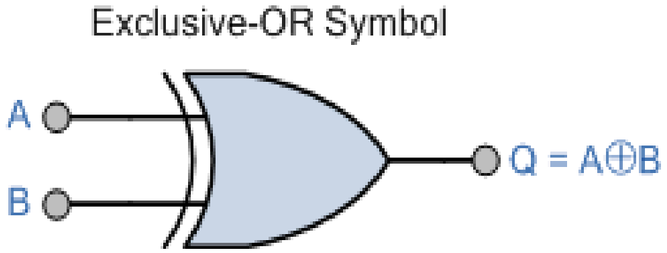
- The NAND and NOR gates are used to generate AND,OR and NOT functions.

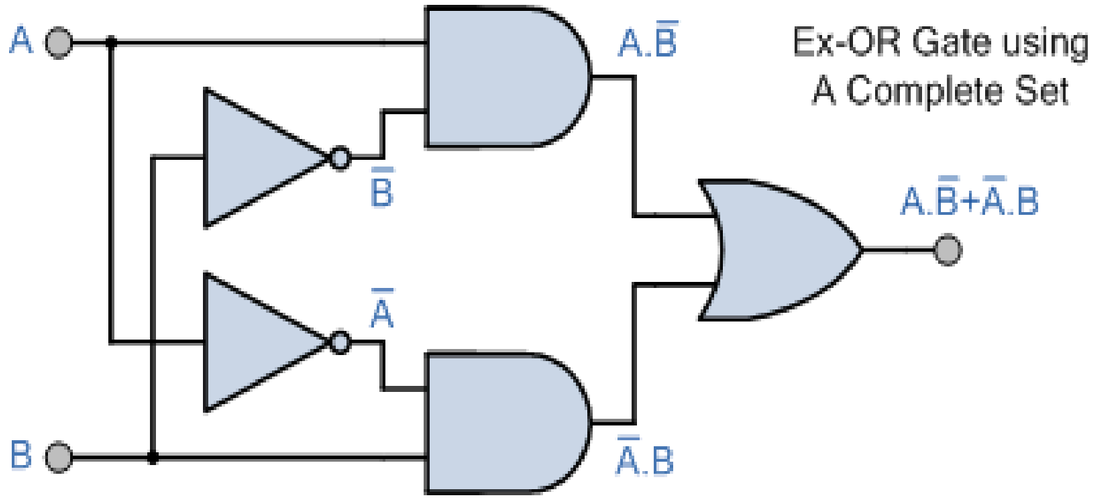
- Any logic logic function can be implemented using NAND and NOR gates. So it is called as Universal gates.

EX-OR GATE

XOR

INPUT		OUTPUT
A	B	
0	0	0
1	0	1
0	1	1
1	1	0



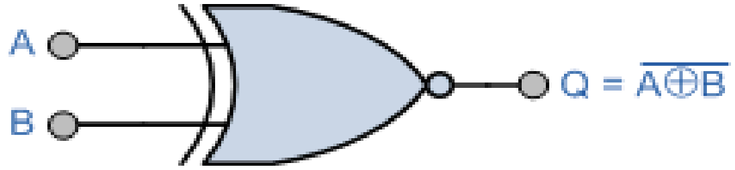


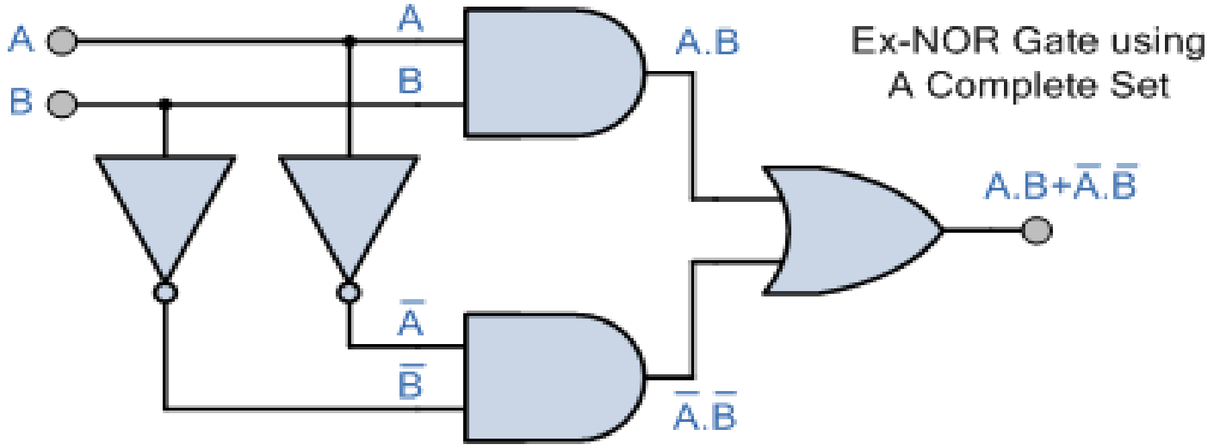
EX-NOR GATE

XNOR

INPUT		OUTPUT
A	B	
0	0	1
1	0	0
0	1	0
1	1	1

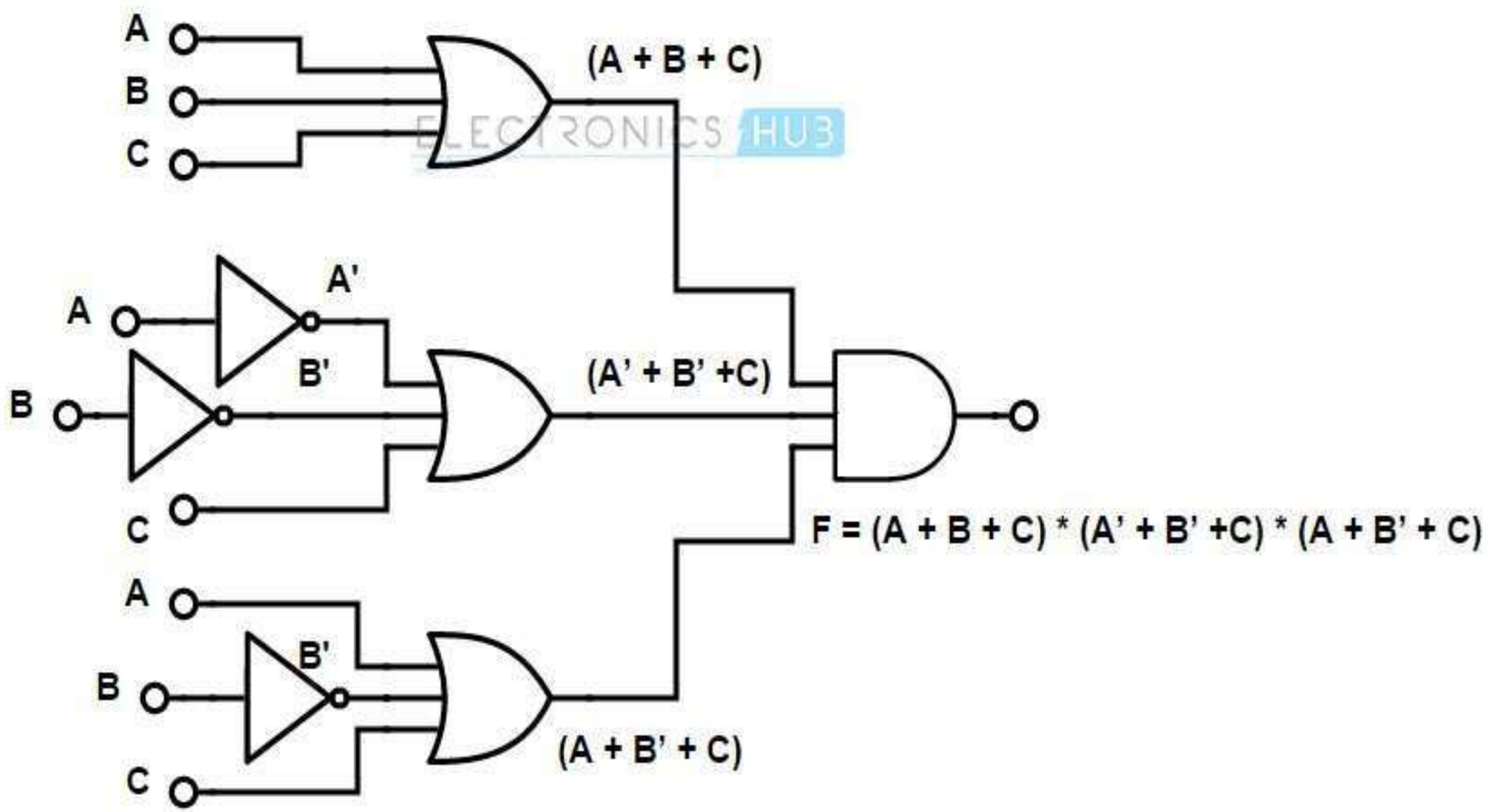
Exclusive-NOR Symbol





Ex-NOR Gate using A Complete Set

BOOLEAN EXPRESSION USING LOGIC GATES



ASSESSMENTS

1.What are universal gates?Why it is called so?

2.Draw the symbols and truth tablr of NOT gate and AND gate?

3.Draw the symbols of EXOR gate and explain its truth table.

THANK YOU