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Q 1)

Problem statement: To study the working of NAND gate.

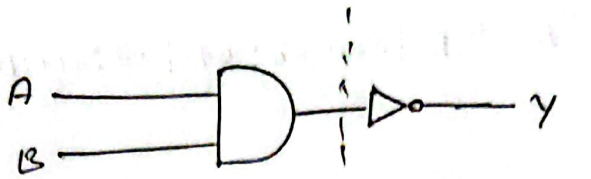
Theory: The NAND gate or Not-AND gate is the combination of two basic logic gates, the AND gate and the NOT gate connected in series. The NAND gate and NOR gate are classified as "Universal gates" since the combination of these gates can be used to accomplish any of the basic operations.

- The output of a NAND gate is high when either of the inputs is high or if both the inputs are low.
- The logic NAND function is given by the Boolean expression.
  ⇒ $Y = \overline{A.B}$
- Here A, B are the inputs and Y is the output.

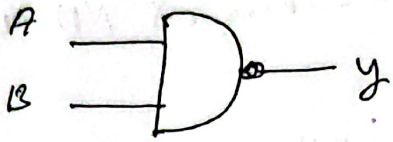
Symbol and truth table of NAND gate.

The symbol of the NAND gate is represented as a combination of AND gate and NOT gate.

$Y = \overline{A.B}$



AND gate | NOT gate



NAND gate

The truth table of a NAND gate is given below

truth table		
A	B	Y ($\overline{A.B}$)
0	0	1
0	1	1
1	0	1
1	1	0

The output of a NAND gate is high when either of the inputs is high or if both the inputs are low. In other words, the output is always high and goes low only when both the inputs are high.