Name – Abhishek Pathak, Section – A
University Roll No – 2101006

Answer – 01

NAND GATE –

The NAND gate comes under the category of Universal Gates.
A NAND Gate is a logic gate that performs the reverse operation of an AND logic gate. NAND Gate has 1 output that is normally at logic high and only goes to logic low when all of its inputs are at logic high.
The logic ~~Gate~~ · NAND Gate is the reverse design of the AND Gate. ~~Through~~
The Boolean expression for NAND Gate is the complement of logical multiplication of inputs denoted by a full stop.

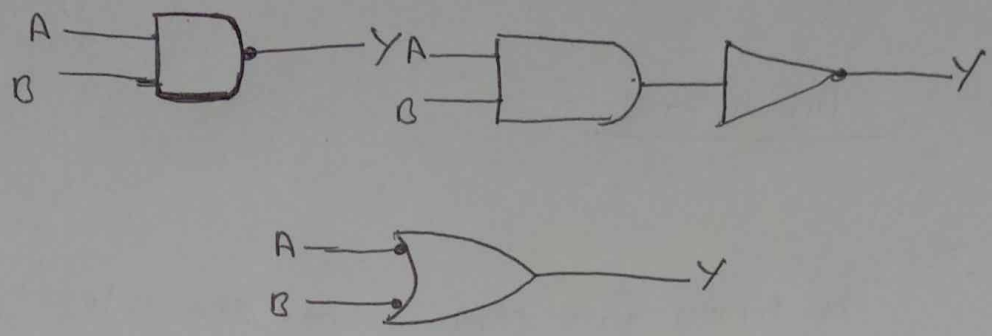
$$(A \cdot B)' = Y$$

The value of Y will be true when any one of the input is set to 0.

Symbol –

The NAND Gate is AND gate succeeded by NOT gate. Thus we can understand NAND Gate as NOT–AND gate also. A NAND Gate constitues one or more inputs with a single output. NAND Gate is represented by a symbol whose shape matches the AND gate with a circle followed

often identified as an inversion circle—



NAND Gate Truth Table—

The output of the NAND Gate is always at logic high (1) and only goes to logic low (0) when all the inputs to the NAND gate are at logic 1.

The boolean expression represented by a single dot followed by a overline over the expression to imply the NOT of NAND Gate.

NAND Gate Boolean expression for 2 inputs—

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

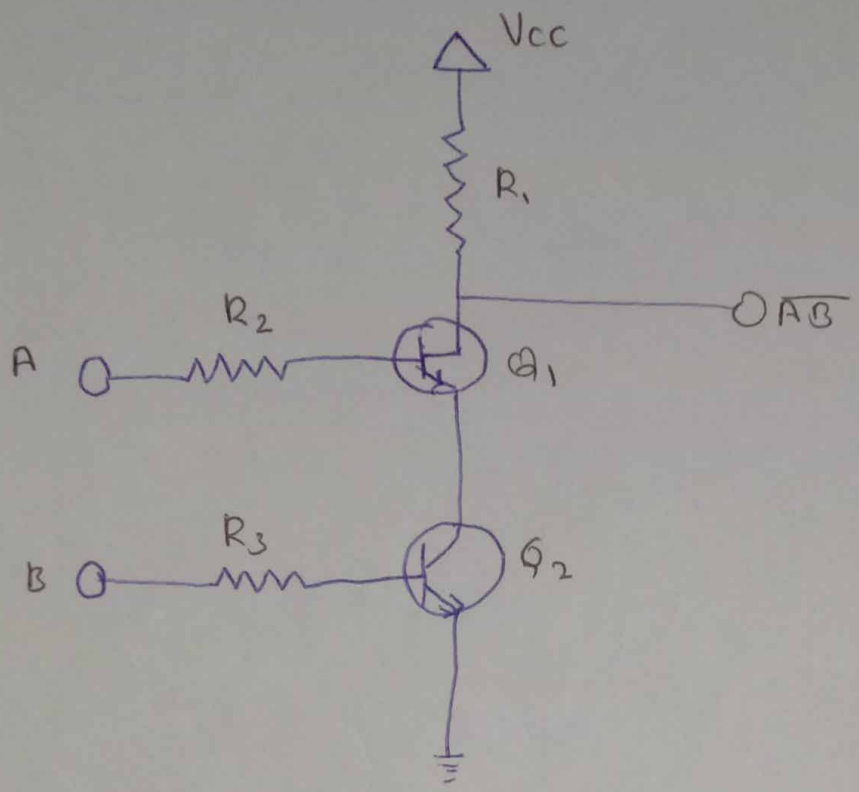
Truth- Table

Input		output
0	0	1
0	1	1
1	0	1
1	1	0

Circuit diagram—

Simple 2 i/p logic NAND Gate can be constructed using transistors connected together as

Shown below with i/p connected directly to the transistor base. Either of the transistors must be cut-off 'OFF' for output to be logic high. This means if both the i/p are at logic high making both the transistors "ON" the resultant output is low (0).



A	B	Q_1	Q_2	Output
0	0	OFF	OFF	1
0	1	OFF	ON	1
1	0	ON	OFF	1
1	1	ON	ON	0

Abhishek Pathak