

Realization of Gates (Diode Transistor Logic)

Presented By:

Suraj Prakash

Asst. Professor

Outline

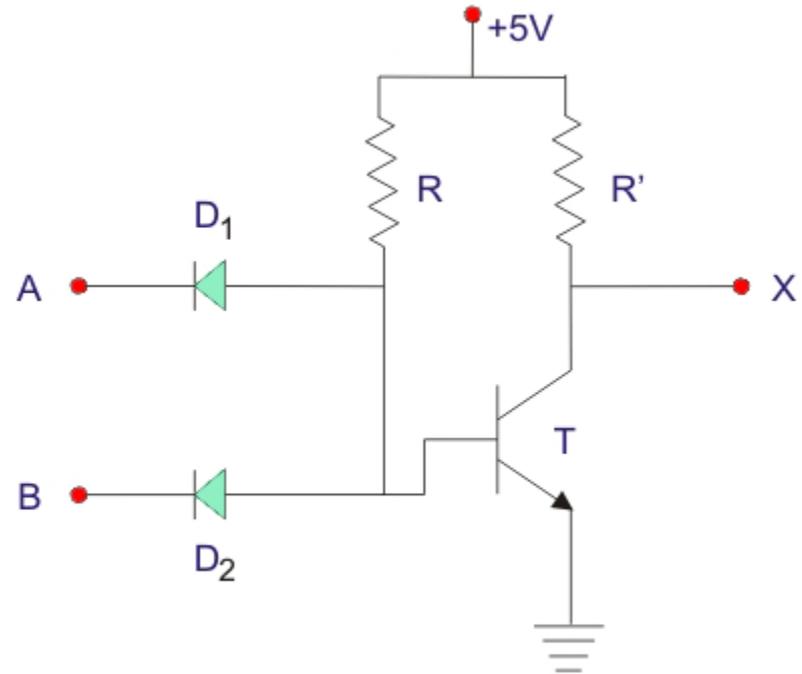
- Diode Transistor Logic
 - 2 Input NAND Gate
 - Circuit Diagram
 - Working
 - 2 Input NOR Gate

Diode Transistor NAND Gates

Circuit Diagram

Realization of two input NAND gate using diode and transistors can be done by shown circuit diagram.

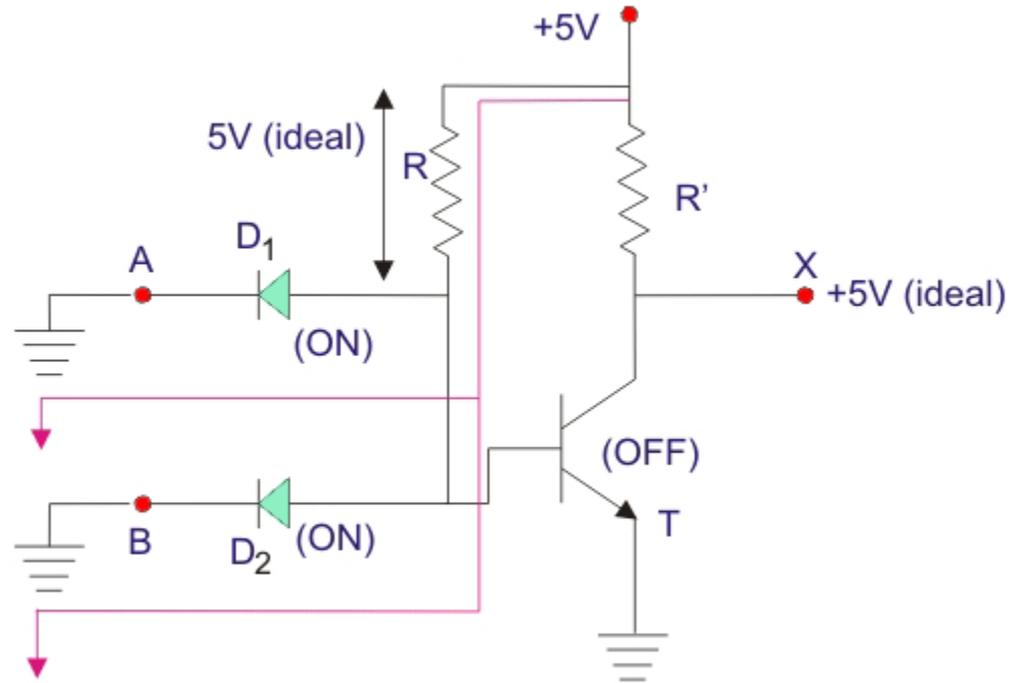
Working of this circuit as a NAND gate can be understood as follow:



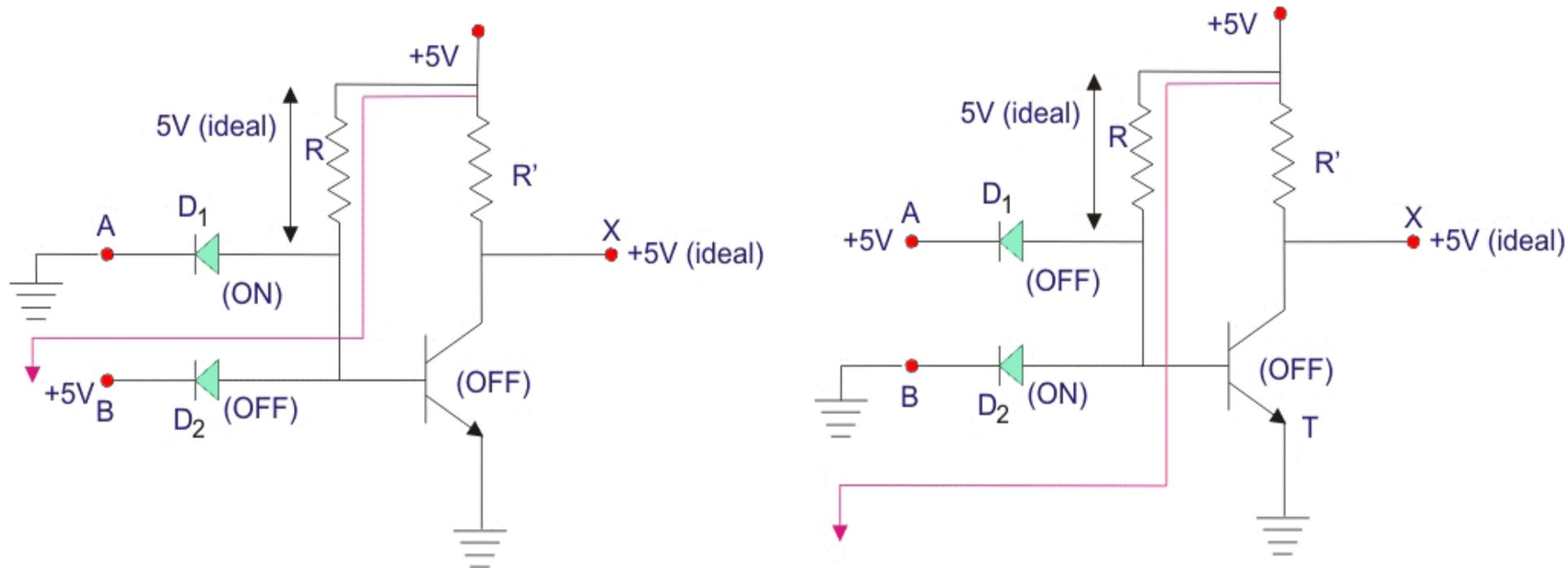
Diode Transistor NAND Gates

Working

When **both input A and B** are given with **0 V (GND)**, both of the diodes are in forward biased condition that is in ON condition. Supply voltage will get path to the ground through diode D_1 and D_2 . Entire supply voltage +5 V will ideally drop across resistor R and hence base terminal of transistor T will not get enough potential to turn ON the transistor and hence the transistor will be in OFF condition. As a result supply voltage +5 V will appear at output terminal X and hence **output X** will become **high or logical 1**.



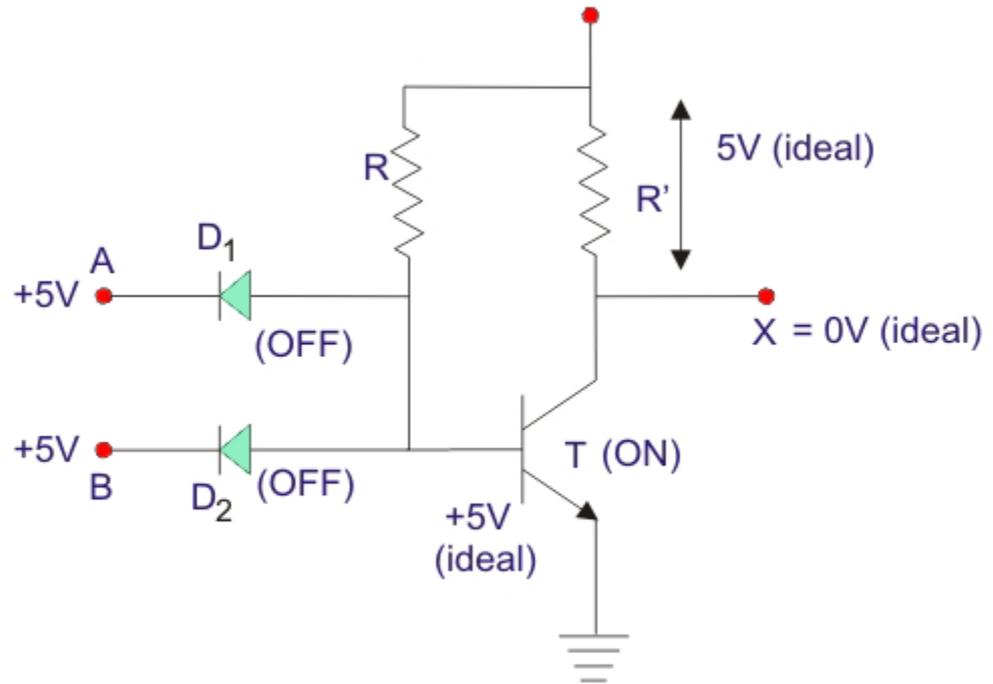
Diode Transistor NAND Gates



Now if either of diode D_1 and D_2 , is applied with 0 V, the same thing happens as in these cases also the supply voltage gets a path to the ground either of the forward biased diode. In that cases also the output will be logical high or 1.

Diode Transistor NAND Gates

When both of the inputs are given with +5 V that is logical 1, both of the diodes are in OFF condition and hence supply voltage will appear at the base terminal of the transistor T which makes it switched ON and supply voltage gets a path to the ground through this transistors. Ideally entire supply voltage +5 V will drop across resistor R' and output terminal X will get ideally zero volts and hence the output is considered as logical 0. Hence, the output is only 0 when and only when both inputs are +5 V or logical 1.



Diode Transistor NOR Gates

When both or any of the inputs are given with +5 V that is logical 1, the diode (s) becomes ON, which makes the transistor T ON and hence the supply will pass through transistor to the ground and output X will be 0.

When both of the inputs are given with 0V or GND that is logical 0, the both diodes become OFF, which makes the transistor T also OFF and hence the supply voltage that is 1 will appear at output X.

