EXPT NO. 9 :
STUDY OF S-R FLIP FLOP

Objective :

To study the S-R flip flop.

Equipments :

Logic Circuit Simulator Pro.

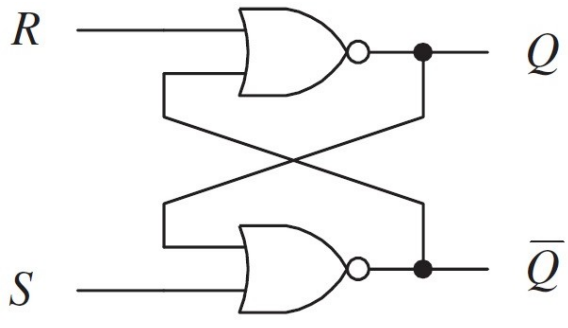
Theory :

S-R Flip Flop :

A flip-flop circuit can be constructed from two NAND gates or two NOR gates. These flip-flops are shown in Figure 2 and Figure 3. Each flip-flop has two outputs, Q and Q' and two inputs, set and reset. This type of flip-flop is referred to as an SR flip-flop or SR latch. The Flip-flop in Figure 2 has two useful states. When Q=1 and Q'=0, it is in the set state (or 1-state). When Q=0 and Q'=1, it is in the clear state (or 0-state). The outputs Q and Q' are complements of each other and are referred to as the normal and complement outputs respectively. The binary state of the flip-flop is taken to be the value of the normal output When a 1 is applied to both the set and reset inputs of the flip-flop in Figure 2, both Q and Q' outputs go to O. This condition violates the fact that both outputs are complements of each other. In normal operation this condition must be avoided by making sure that 1's are not applied to both inputs simultaneously.

TRUTH TABLE

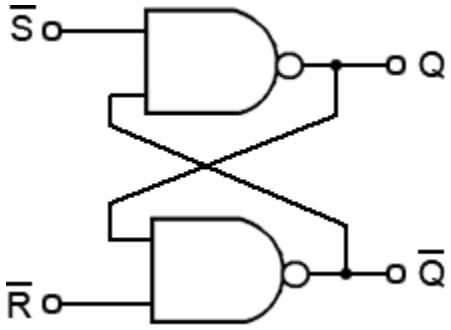
S	R	Q	Q'
1	0	1	0
0	0	1	0
0	1	0	1
0	0	0	1
1	1	0	0



The NAND basic flip-flop circuit in Figure 3(a) operates with inputs normally at 1 unless the state of the flip-flop has to be changed. A 0 applied momentarily to the set input causes Q to go to 1 and Q' to go to 0. putting the flip-flop in the set state. When both inputs go to both outputs go to 1. This condition should be avoided in normal operation.

TRUTH TABLE

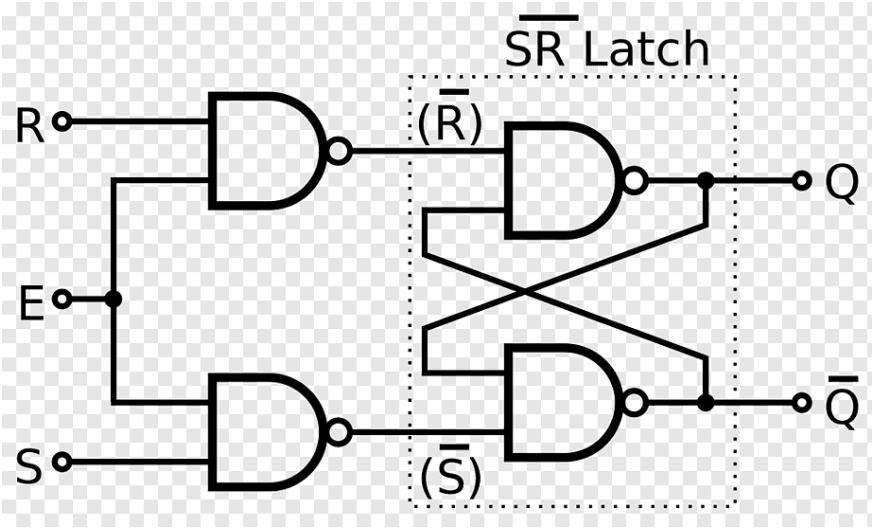
S	R	Q	Q’
1	0	0	0
1	1	0	1
0	1	1	0
1	1	1	0
0	0	1	1



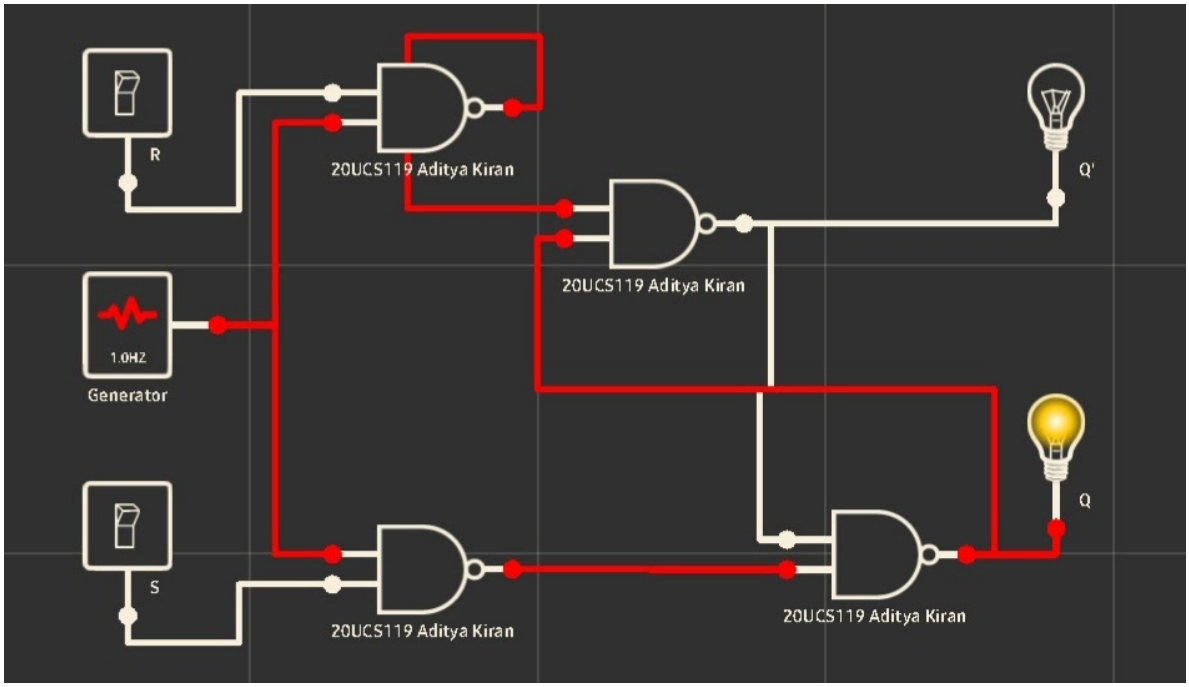
Procedure :

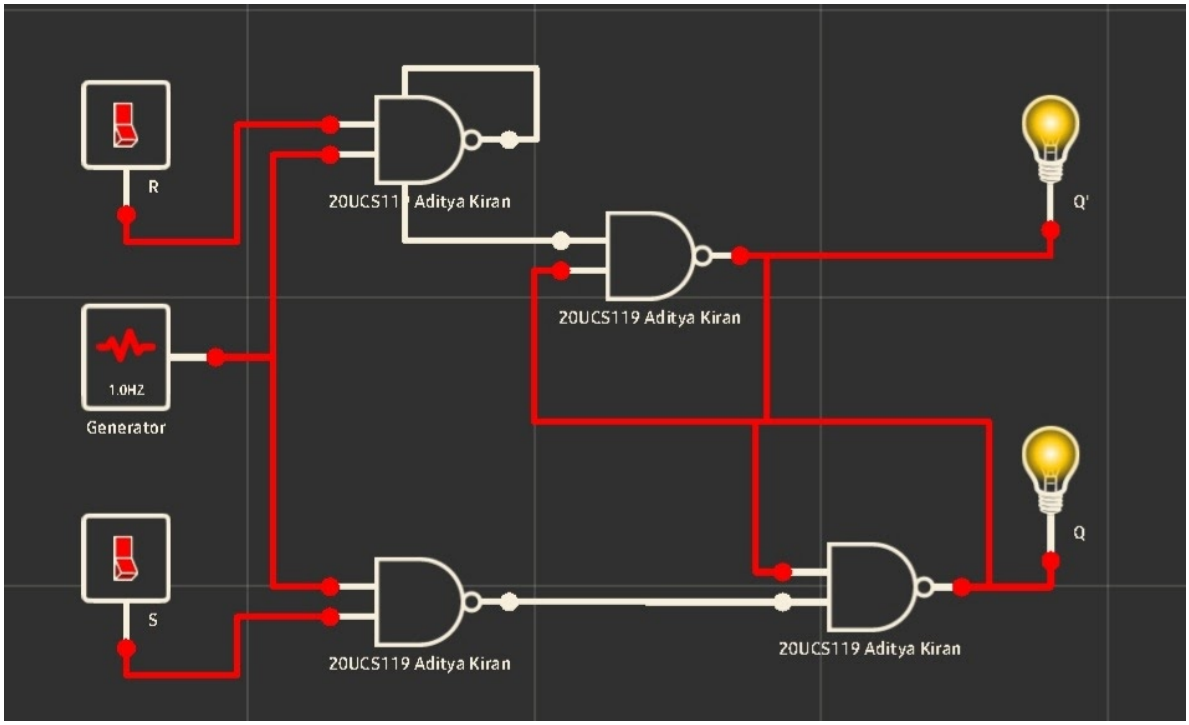
- Do the connection as per block diagram shown below and switch ON the power supply.
- Apply proper logic inputs to the S-R flip flop and observe the output on LEDs.
- Verify the function table of S-R Flip flop.

Logic Diagram :



Circuit Diagram :





TRUTH TABLE:

S	R	Q	Q’
0	0	0	1
0	1	0	1
1	0	1	0
1	1	∞	∞

Conclusion :

From the above experiment, we verified the characteristics of S-R flip flop.