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 ELECTRONICS & COMMUNICATION ENGINEERING

19ECB231 – DIGITAL ELECTRONICS

II YEAR/ III SEMESTER

UNIT 3 – SEQUENTIAL CIRCUITS

TOPIC – FLIP FLOP –SR ,D FLIP FLOP

FLIP FLOP

A flip flop is an electronic circuit with two stable states that can be used to store binary data. The stored data can be changed by applying varying inputs. Flip-flops and latches are fundamental building blocks of digital electronics systems used in computers, communications, and many other types of systems.
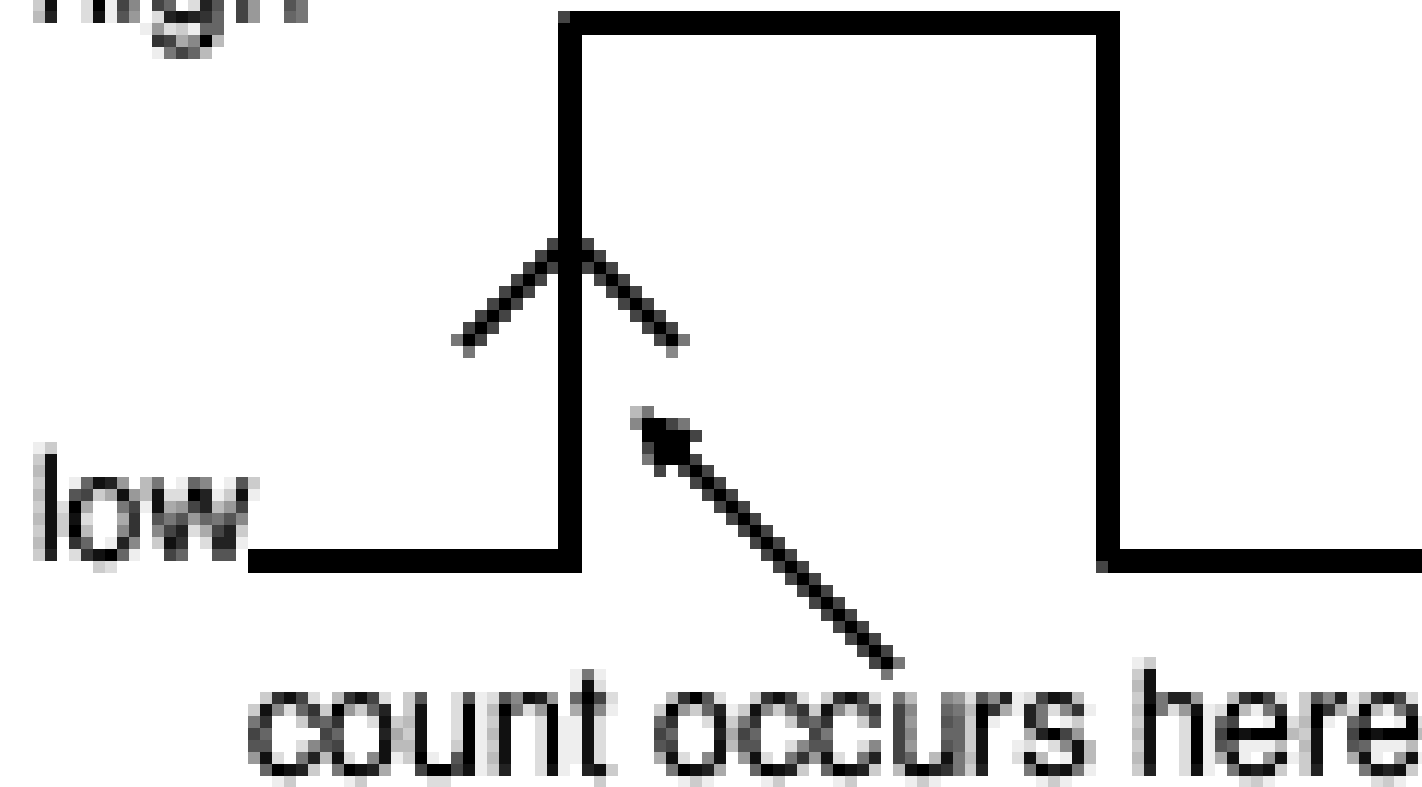
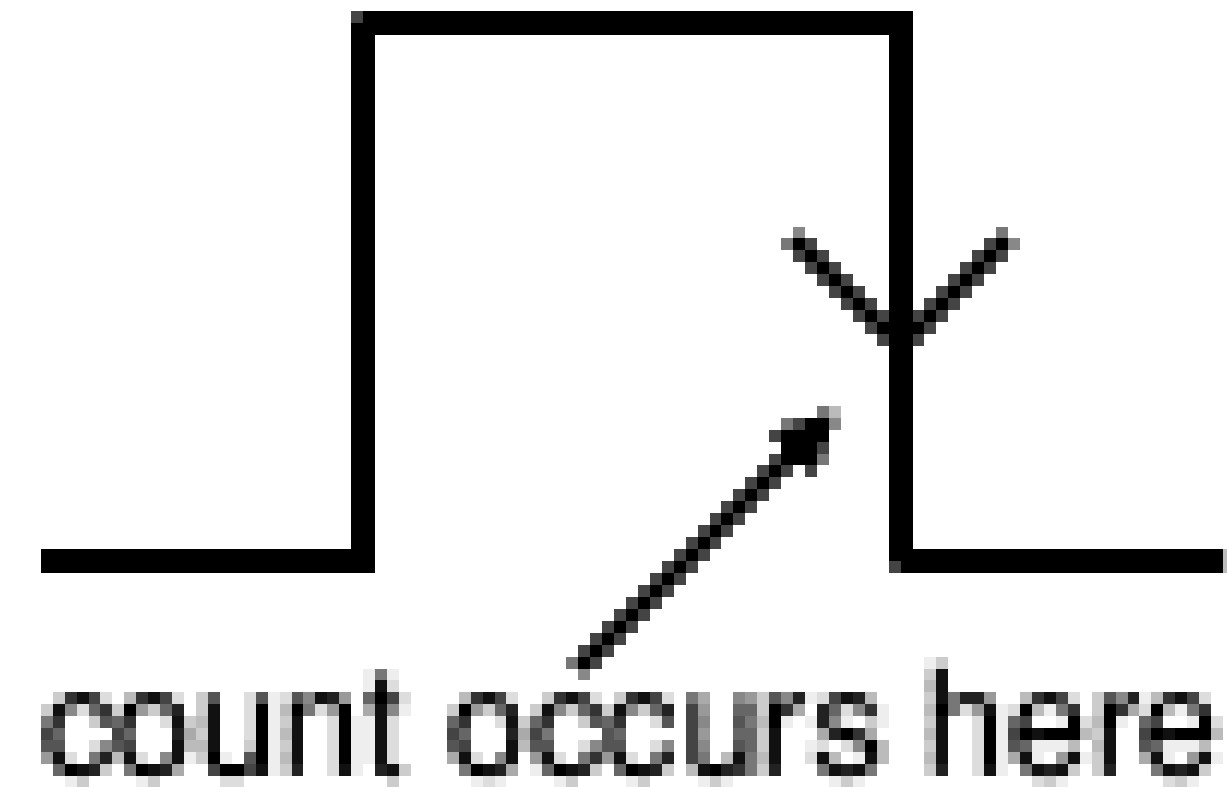Latches/ DIGITAL ELECTRONICS/K.SURIYA /AP/ECE/SNSCT

Latches/ DIGITAL ELECTRONICS/K.SURIYA /AP/ECE/SNSCT

Level Triggering	Edge Triggering
1. It is of two types – High level triggering – Low level triggering	1. It is of two types : – Positive edge triggering – Negative edge triggering
2. The latch or flip-flop circuits which change their outputs only corresponding to active high or low levels are called as level triggered latches or flip-flops.	2. Those flip-flops which change their outputs only corresponding to the positive or negative edge of the clock input are called as edge triggered flip-flops.

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TYPES OF FLIP FLOP

1.SR FF

     R=Reset and S=Set

2.D FF

     D means Delay

3.T FF

     T means Toggle

4.JK FF

SR FLIP FLOP

Symbol: SR Flip-flop
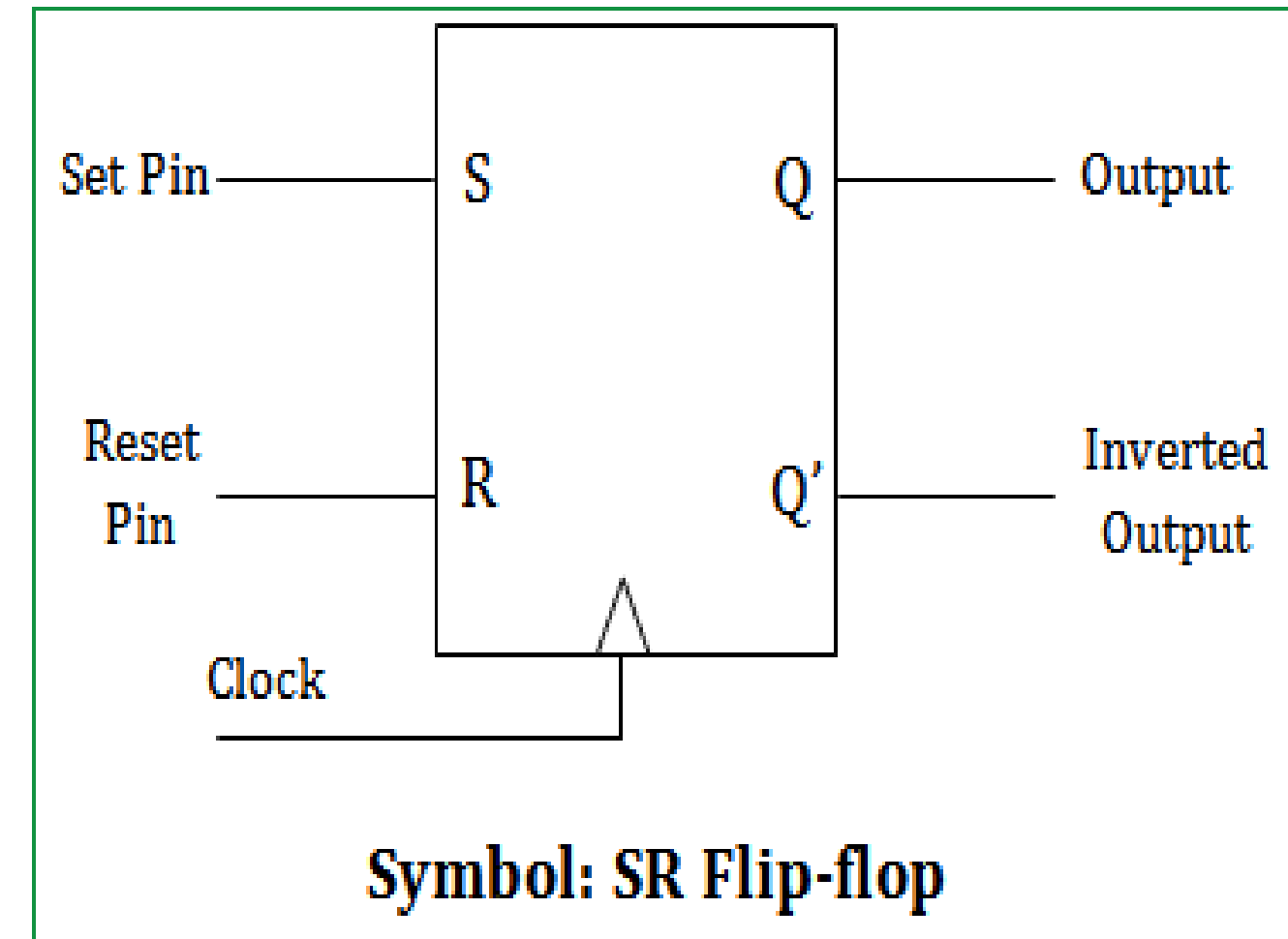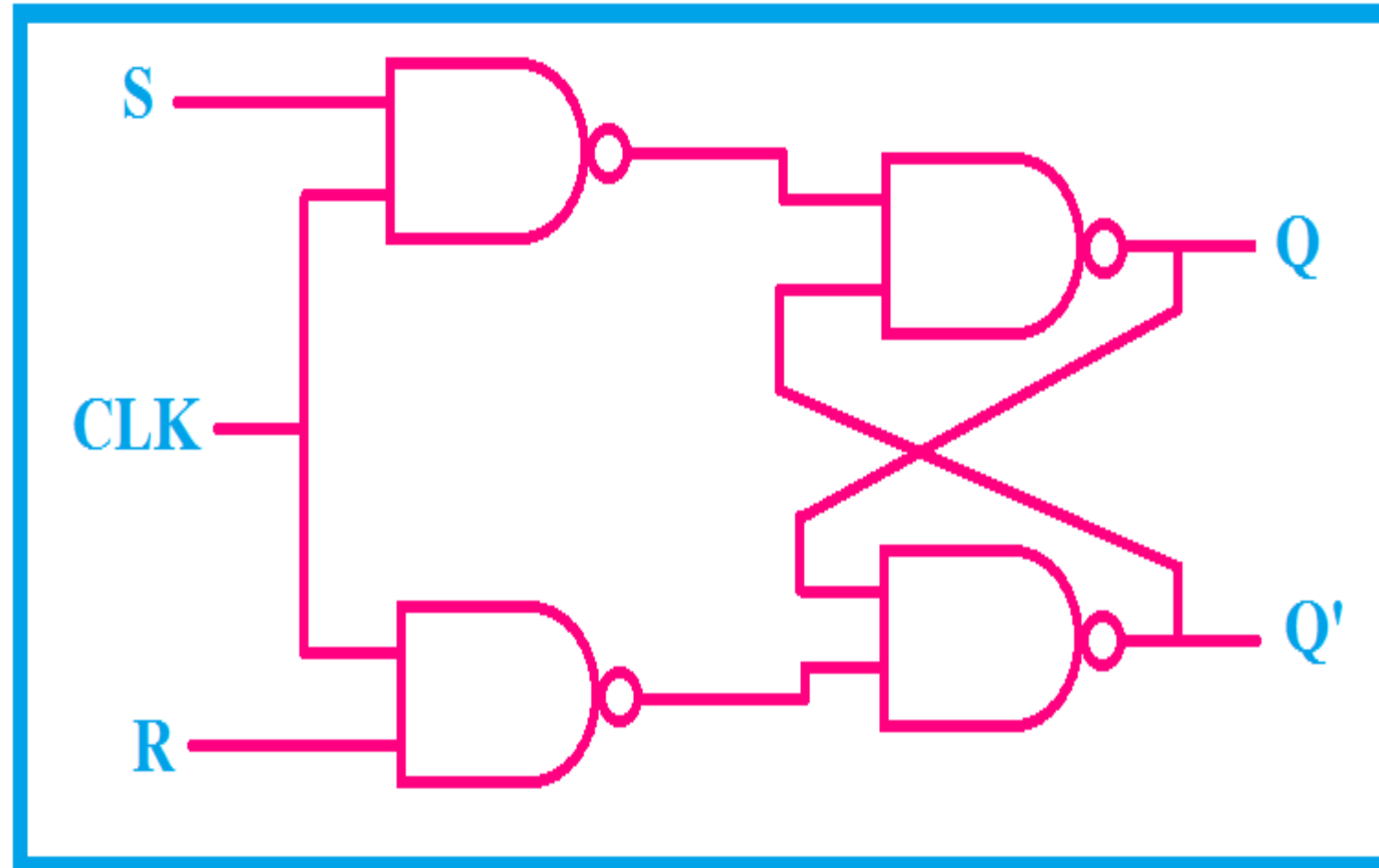
SR FLIP FLOP –TRUTH TABLE

Fig. 6.7

S	R	Q_n	Q_{n+1}	State
0	0	0	0	No change (NC)
0	0	1	1	
0	1	0	0	Reset
0	1	1	0	
1	0	0	1	Set
1	0	1	1	
1	1	0	X	Indeterminate
1	1	1	X	
X	X	0	0	No change (NC)
X	X	1	1	

Characteristic Equation

S \ R Qn	00	01	11	10
0	0	1	0	0
1	1	1	X	X

$$Q_{n+1} = S + \bar{R} Q_n .$$

SR FLIP FLOP

Excitation Table

Q_n	Q_{n+1}	S	R
0	0	0	X
0	1	1	0
1	0	0	1
1	1	X	0

D FLIP FLOP

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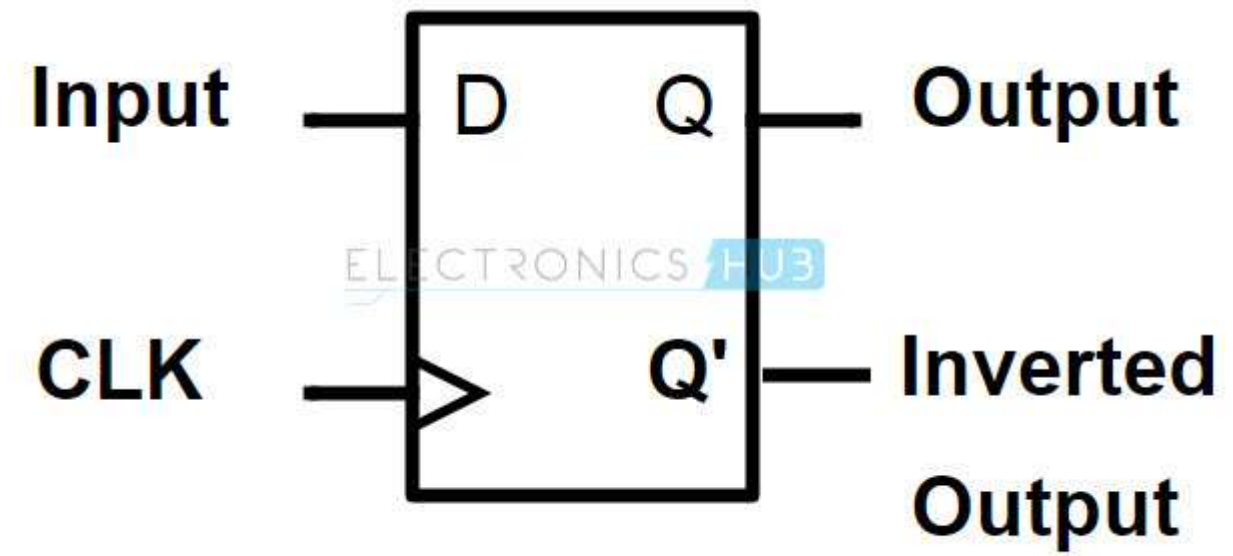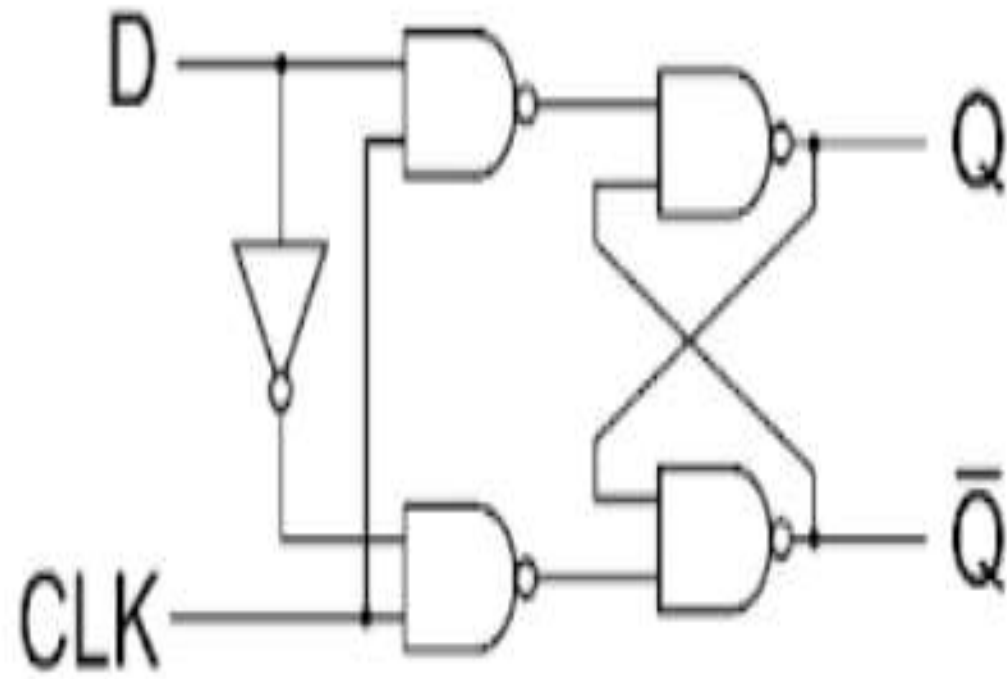
D FLIP FLOP –TRUTH TABLE

D	Qn	Qn+1
0	0	0
0	1	0
↑	1	0	1
↑	1	1	1
0	X	0	0
0	X	1	1

Characteristics Equation

$$D \backslash Q_n$$

D \ Q_n	0	1
0	0	0
1	1	1

$$\boxed{Q_{n+1} = D}$$

Excitation table

Q_n	Q_{n+1}	D
0	0	0
0	1	1
1	0	0
1	1	1

APPLICATIONS OF FLIP FLOPS:

Flip flops have a wide variety of applications. They are:

- ✓ REGISTERS

- ✓ FREQUENCY DIVIDERS

- ✓ DIGITAL COUNTERS

1. What is Latch?
2. List the types of latches.
3. Difference between level trigger and edge triggering.

THANK YOU