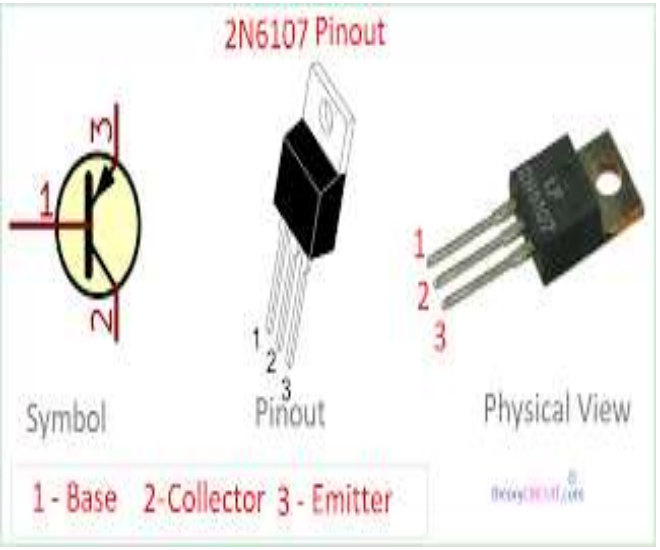
SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)
COIMBATORE-35
Accredited by NBA-AICTE and Accredited by NAAC – UGC with A++ Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

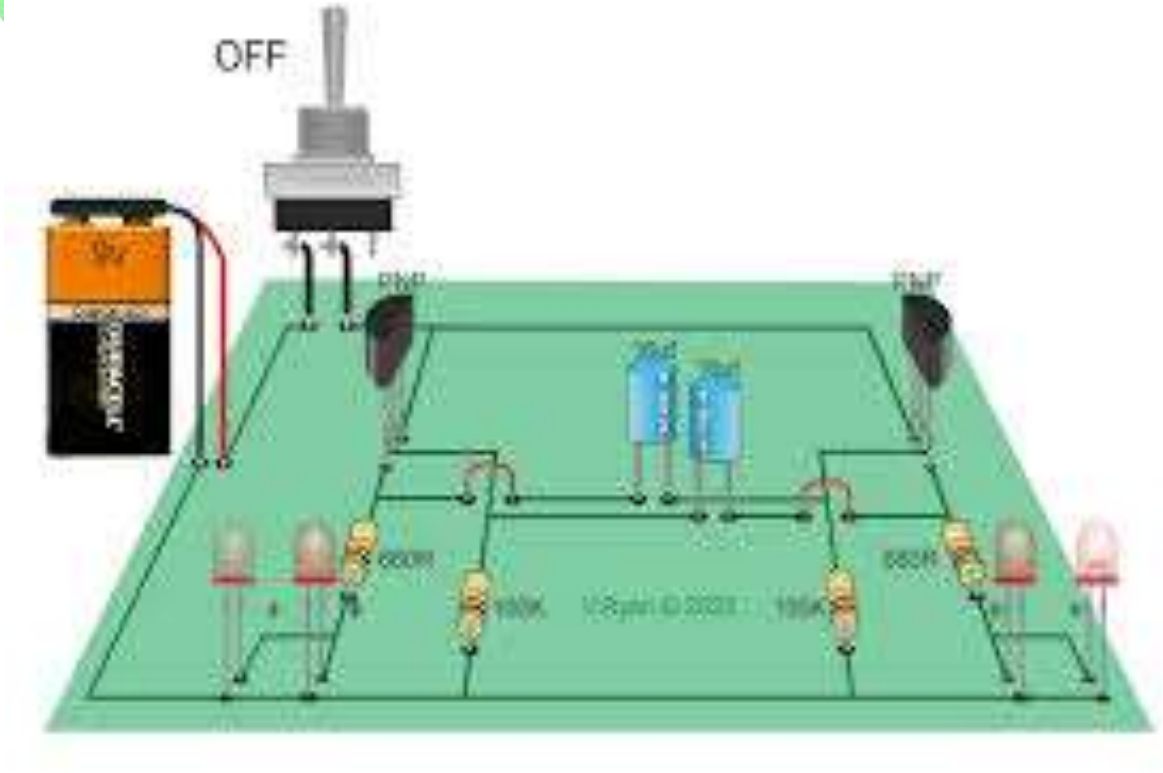
23EET104 / ANALOG ELECTRONICS CIRCUITS
I YEAR / II SEMESTER

UNIT-IV: MULTIVIBRATOR



INTRODUCTION, TYPES

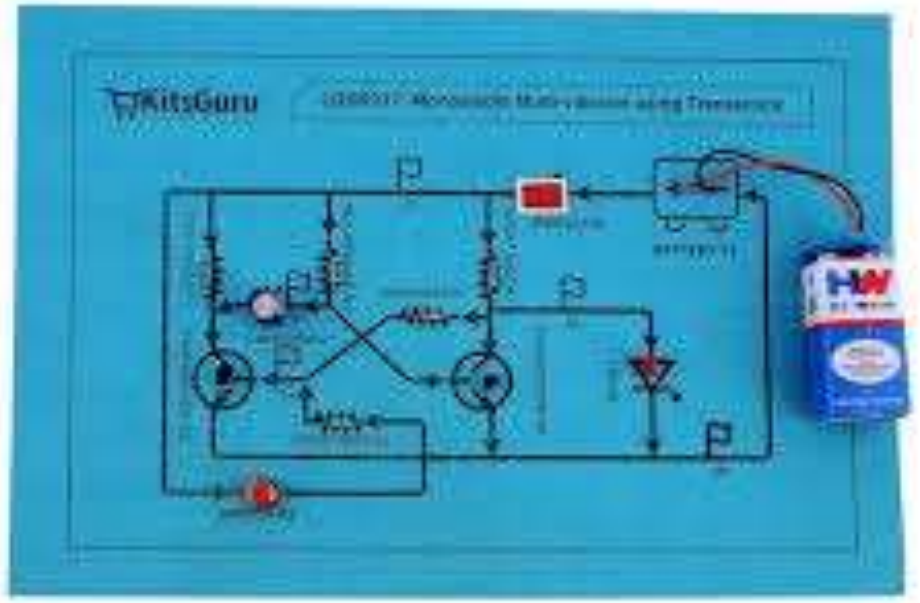
What we study?



1. Define multivibrator
2. Classification of Basic multivibrator
3. Understand the Basic Concept of multivibrator
4. Get Knowledge About the Condition for Oscillator
5. Application of multivibrator

What we study?

- **A multivibrator is an electronic circuit that is used to implement two state systems like oscillators, timers and flip-flops.**
- It is characterized by two amplifying devices (transistors or other devices) cross-coupled by resistors or capacitors



Invention of Multivibrator

Henri Abraham and Eugene Bloch described the first multivibrator circuit in 1920, also called a plate-coupled multivibrator.

It was made from vacuum tubes and its harmonics are being used to calibrate a wavemeter .

CLASSIFICATION OF MULTIVIBRATOR

There are three types of multivibrator circuits depending on the circuit operation:

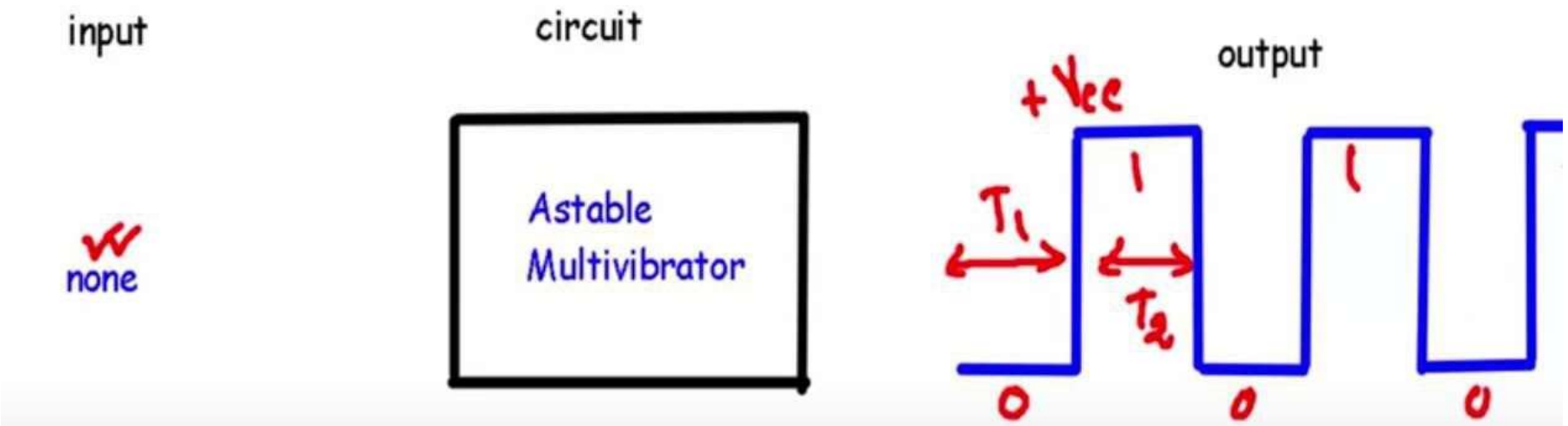
Astable – neither state is stable.

Monostable - one of the states is stable, but the other is not.

Bistable – it remains in either state indefinitely.

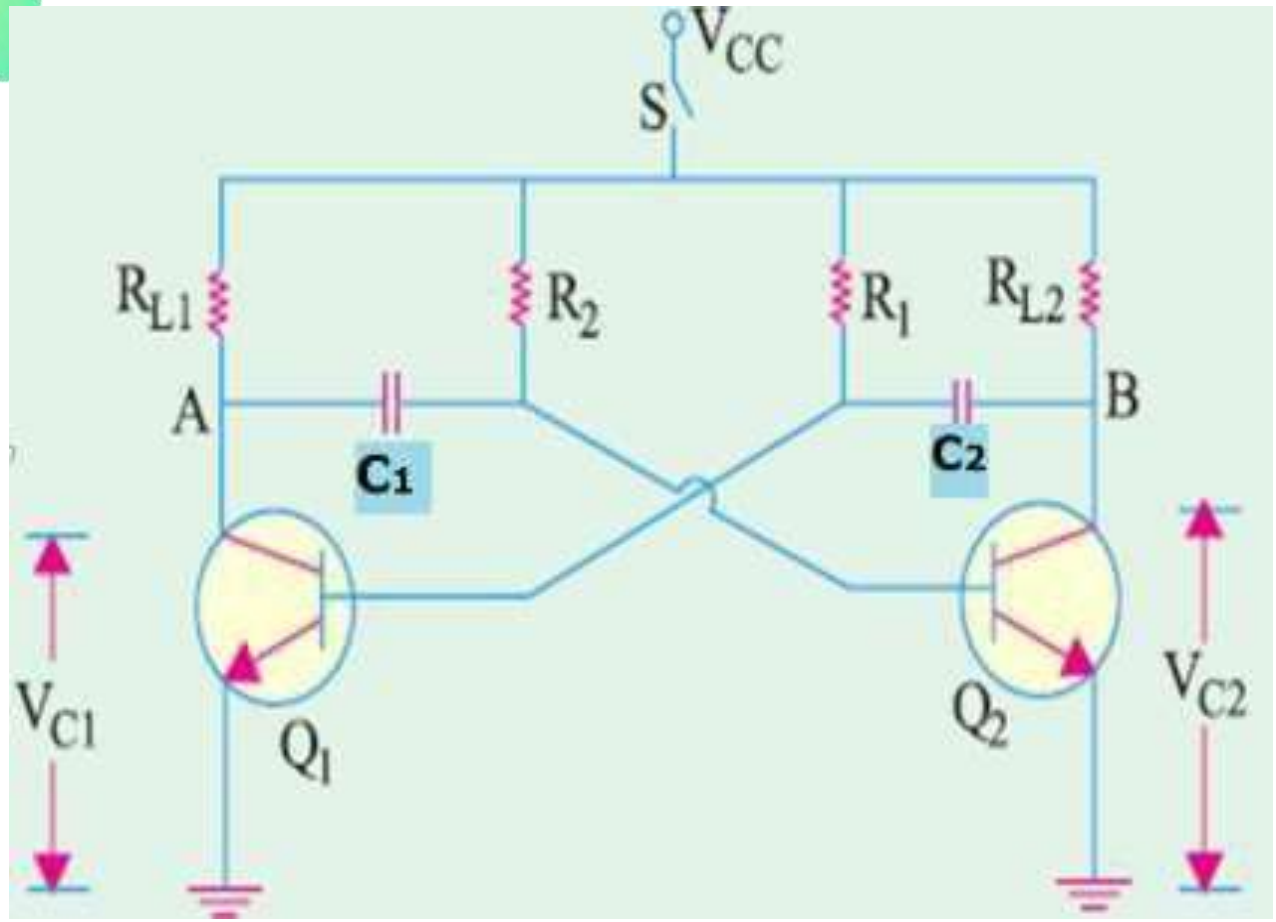
ASTABLE MULTIVIBRATOR

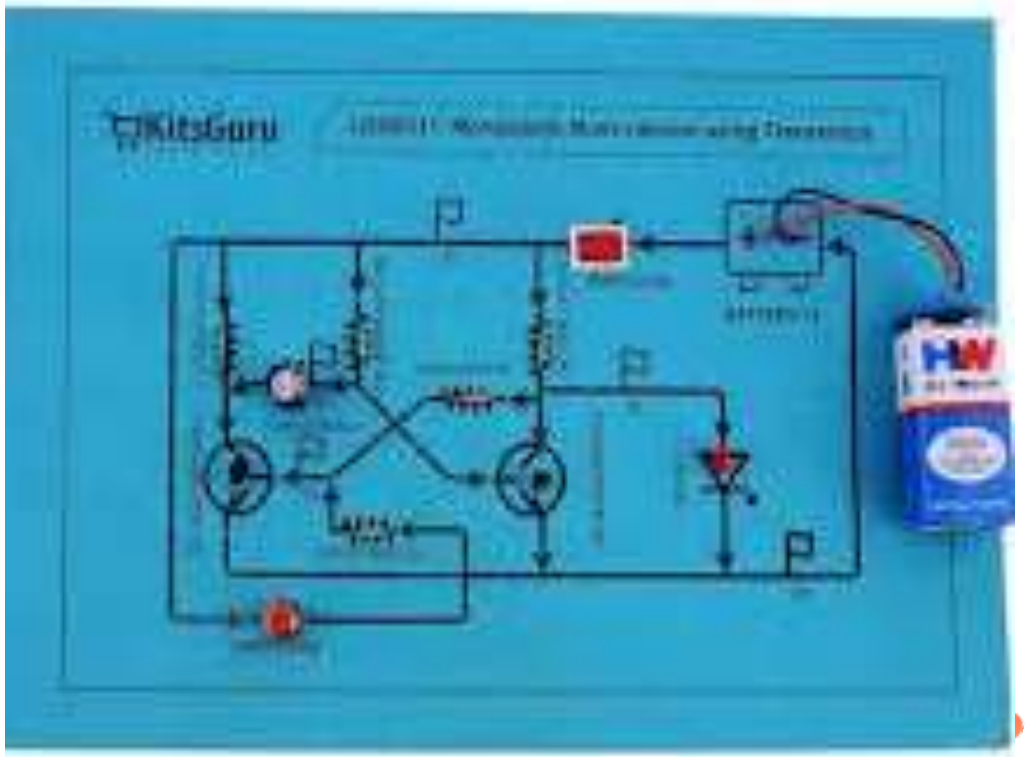
A Multivibrator that generates square waveform without using external triggering pulse is known as Astable multivibrator. It also known as **Free-running Multivibrator .**



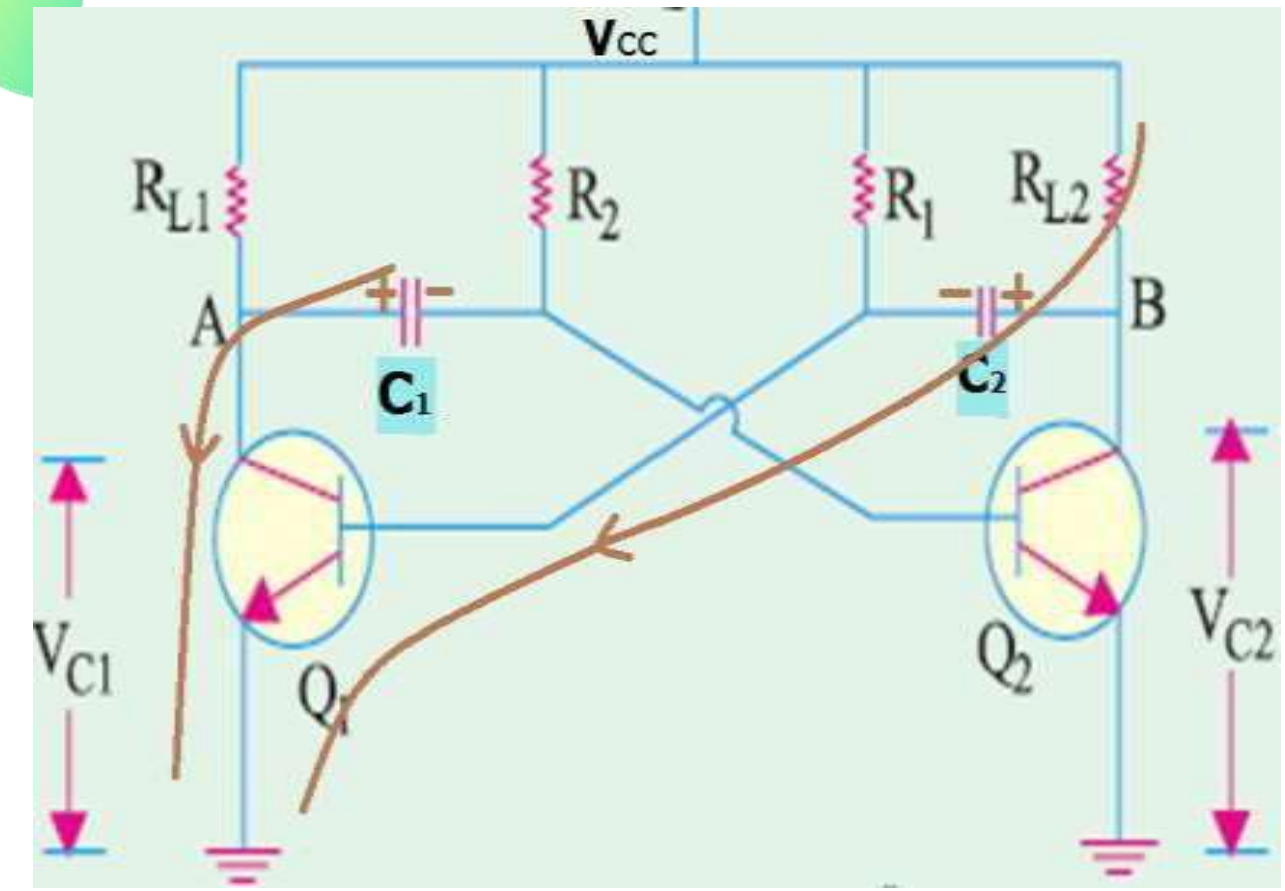
ASTABLE MULTIVIBRATOR

This astable circuit consists of two transistors, a cross coupled
Feedback network, and two capacitors and four resistors.

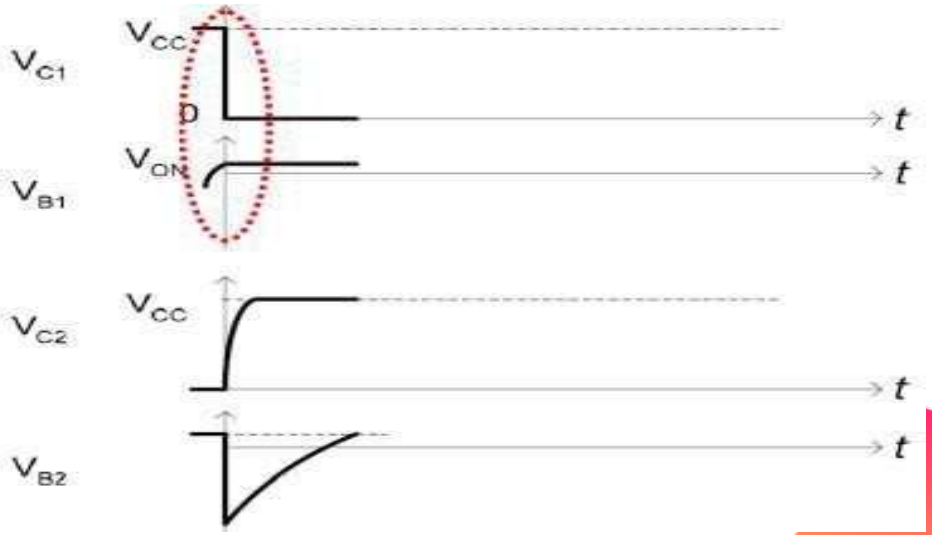




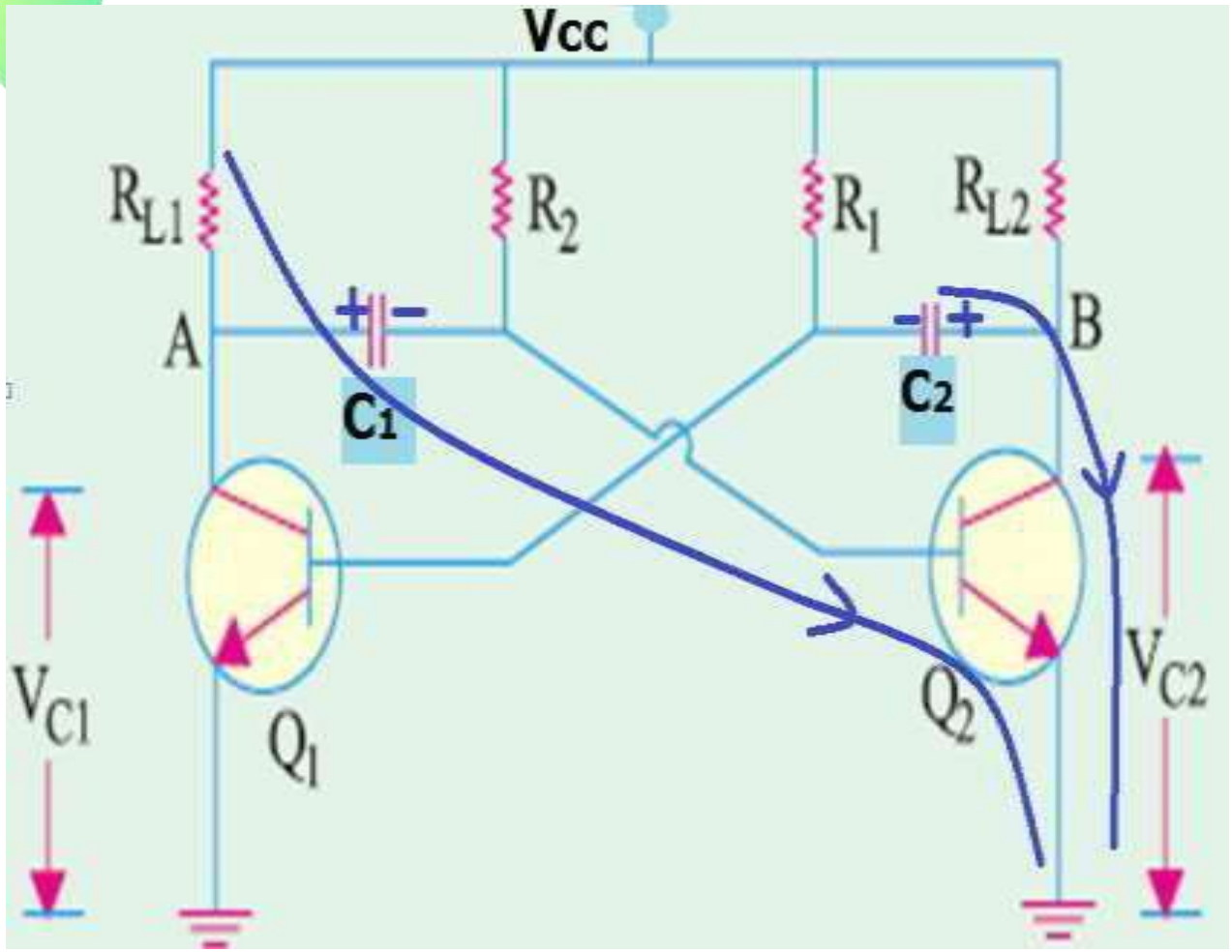
ASTABLE MULTIVIBRATOR



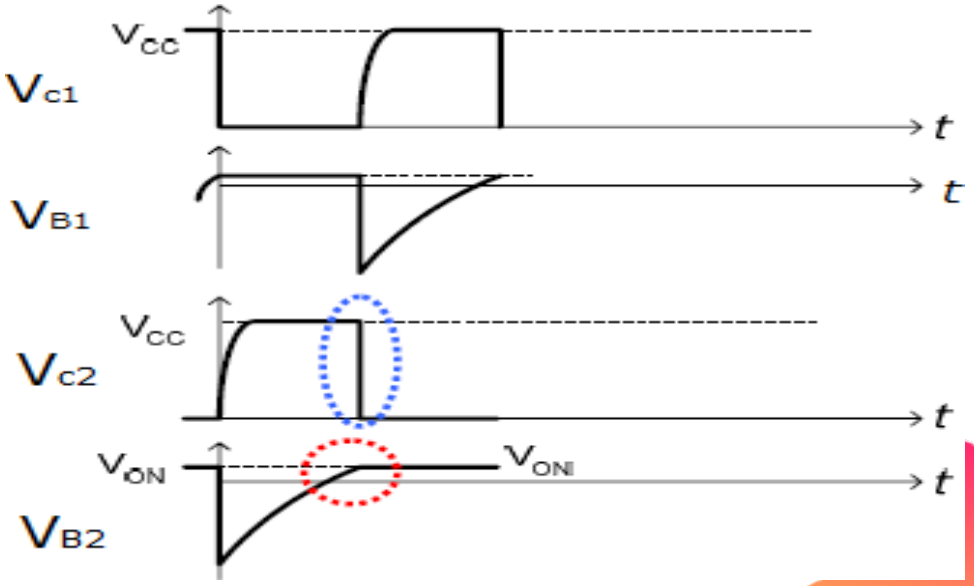
Consider Q1 is ON and Q2 is OFF:
V_{CC} drops across RL 1.
Hence, $V_{C1} = 0$ and point A is at ground potential and $V_{c2}=V_{cc}$.
C_1 discharging and C_2 charging.



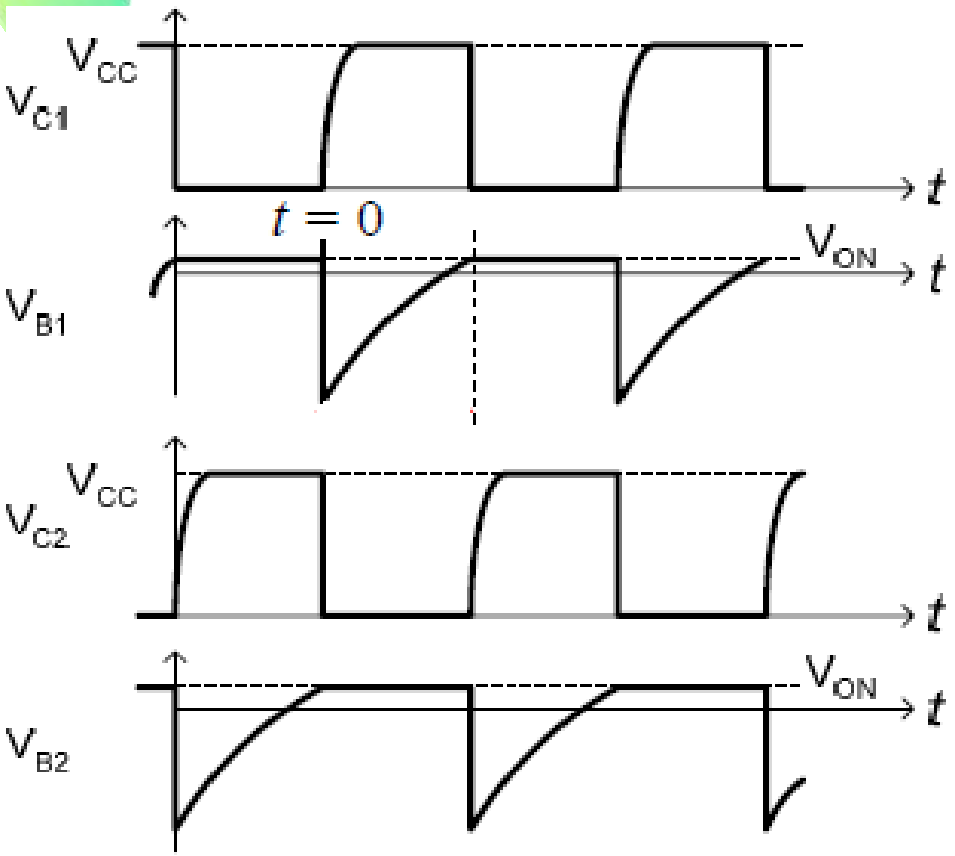
ASTABLE MULTIVIBRATOR

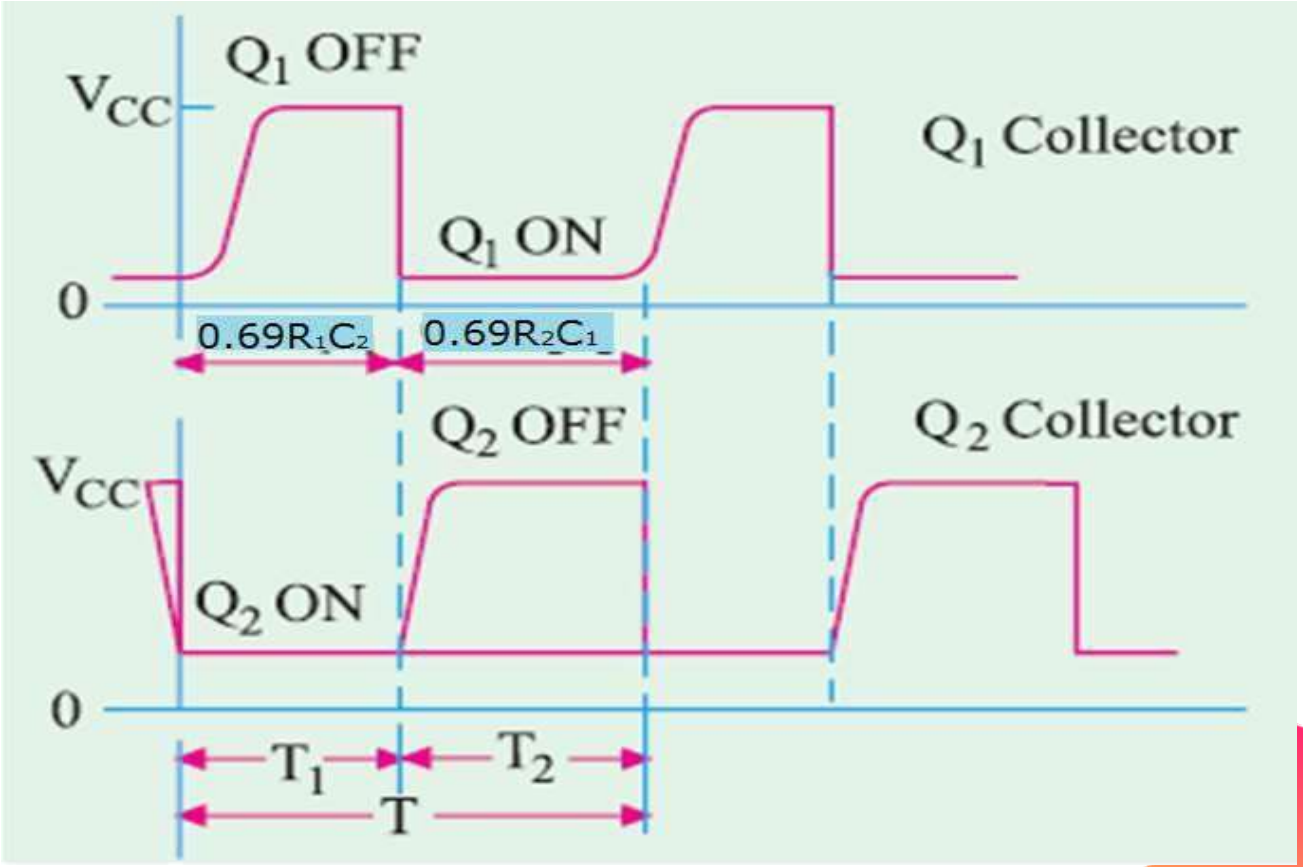


Consider Q2 is ON and Q1 is OFF:
V_{CC} drops across $R_{L\,2}$.
Hence, $V_{C2} = 0$ and point B is at ground potential and Vc1 = Vcc.
C_2 discharging and C_1 charging.



ASTABLE MULTIVIBRATOR





Frequency of Oscillation, Application

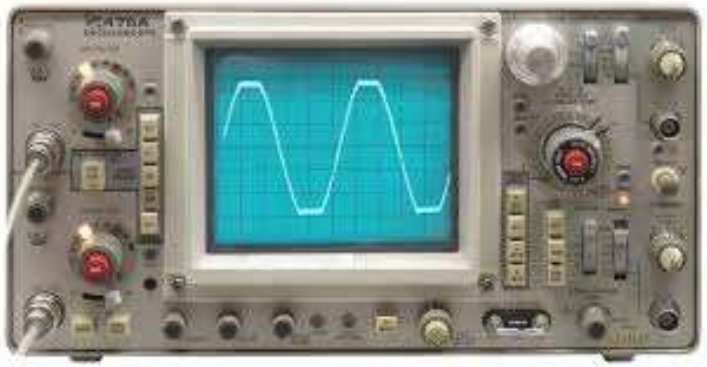
It can be proved that off-time for Q_1 *is* $T_1 = 0.69\ R_1C_2$ *and that for* Q_2 *is* $T_2 = 0.69\ R_2C_1$.

Hence, total time-period of the wave is $T = T_1 + T_2 = 0.69\ (R_1C_2 + R_2C_1)$

If *R1 = R2 = R and C1 = C2 = C i.e. the two stages* are symmetrical, then $T = 1.38\ RC$

It is given by the reciprocal of time period,

$$f = \frac{1}{T} = \frac{1}{1.38\,RC} = \frac{0.7}{RC}$$



APPLICATION

Application

•Used in applications where low clock frequency - clock pulse train is required.

- Relaxation oscillators, which are parts of vehicle indicator lights, early oscilloscopes and television receivers.

•Timing signals.

...THANK YOU