ASTABLE MULTIVIBRATOR – USING TRANSISTORS

An astable multivibrator using transistors is an electronic circuit that generates a continuous square wave or pulse train without external triggering. It consists of two transistors connected in a way that creates a positive feedback loop. When one transistor turns on, it turns the other off, and vice versa, causing continuous switching between the two states. The timing of the square wave or pulse train is determined by the resistors and capacitors in the circuit. This circuit is commonly used in applications such as timing circuits, oscillators, and waveform generation.

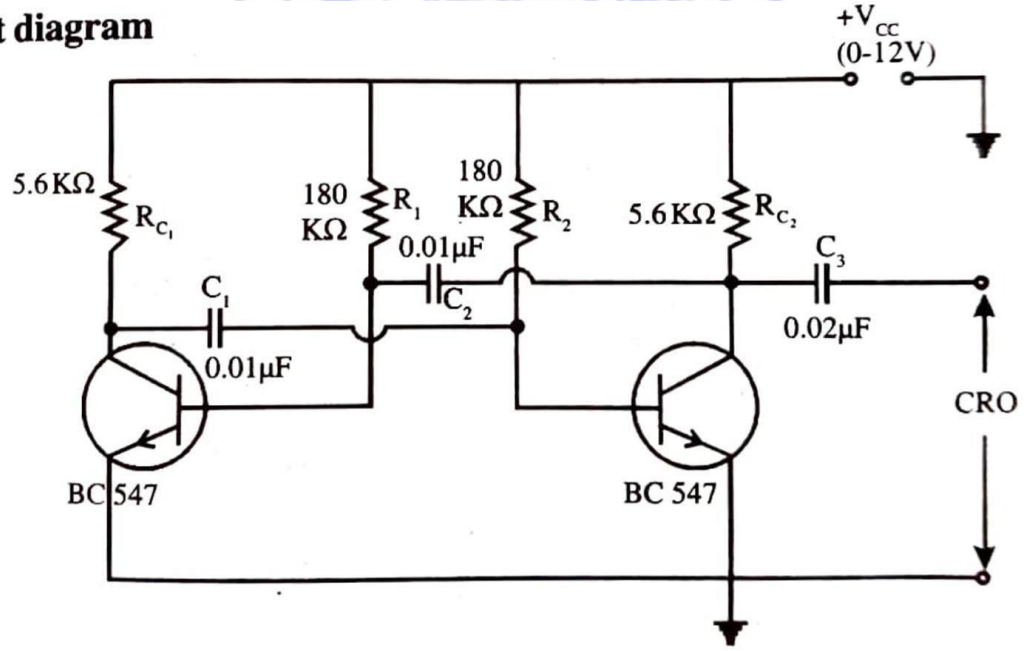
Aim

To construct astable multivibrator using transistors and to measure frequency using CRO

Astable multivibrator is a free running multivibrator. It has no stable states. Two quasistable states are there. At first, one transistor conducts (ON) other stays in OFF state for some time. After this, the second transistor is automatically turned ON and the first turned OFF. So it generates a square wave output.

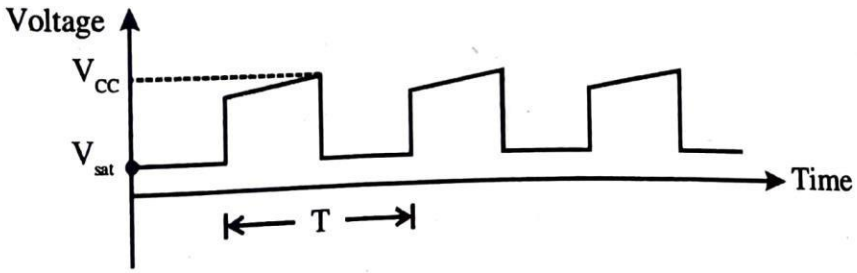
Hence both transistors are of equal nature with $\beta > 100$, $R_{C1} = R_{C2}$,$R_1 = R_2$, $C_1 = C_2$, $\beta_1 \approx \beta_2$

Circuit diagram



Frequency of oscillation f = $\frac{1}{0.693(R_1C_1 + R_2C_2)}$ Hz

Output wave form



Using CRO

$C_1 = C_2 =$ $R_1 = R_2 =$

Time/division of CRO t	Distance between two successive rises of the wave d	Period $T = d \cdot t$	Frequency $f = \frac{1}{T}$ Hz	Calculated value $f = \frac{1}{0.693(R_1C_1 + R_2C_2)}$ Hz

The experiment is repeated for three times for different values of $R_1 = R_2$ and $C_1 = C_2$ (Say 0.02μF and 82K etc.)

Result

Astable multivibrator is constructed.

Calculated value of frequency = ...Hz

Experimental value of frequency =..... Hz

It is found that experimental value is in agreement with calculated value.

Reference

- Experimental Physics – II, For Fifth & Sixth Semester, BSc Degree Programme, Dr.P. Sethumadhavan, Prof. K.C. Abraham, Prof. Meppayil Narayanan, Prof. Philipson C Philip, **Manjusha Publications**