**Experiment No.4**

# MONOSTABLE MULTIVIBRATOR

**Aim:**-To design and implement a monostable multivibrator.

**Components and Equipments:-** Transistors, Resistors, Capacitors, CRO, Groove Board, function generator, Diode, DC power supply.

**Circuit Diagram:-**

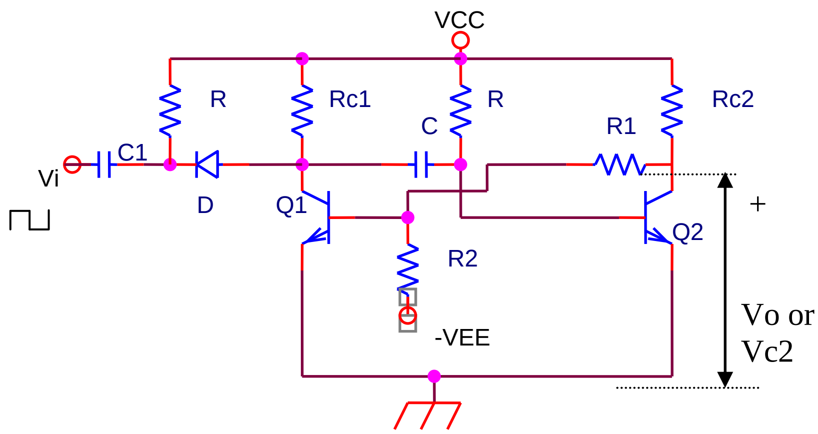



**Fig4.1: Monostable Multivibrator**

**Design:-**

**The stable state:**

1) Q1 is OFF and Q2 is ON
2) $R_{c2} = V_{CC}-V_{CEsat}/I_c$

   $V_{B1} = -V_{bb}R_1/R_1+R_2 + V_{CEsat}\, R_2/R_1+R_2 = V_f$

   In order that Q1 be off, we require that $|V_f| < 0$(Si) or $|V_f| < 0.1V$(Ge)

   $R = V_{CC}-V_{BEsat}/I_{b2}$ when Q2 is in saturation $I_{b2} \geq I_c/h_{fe}$.

**The quasi stable state:**

3) Q1 is ON and Q2 is OFF

   $R_{c1} = R_{c2}$

   Assume 10% of Ic is flowing in $R_2$

   $I_2 = I_c/10$, $V_{r2} = V_{b1}+V_{EE}$

$R_2 = Vr2/I_2$

$I_1 = I_{b1}+I_2$

When Q2 is OFF

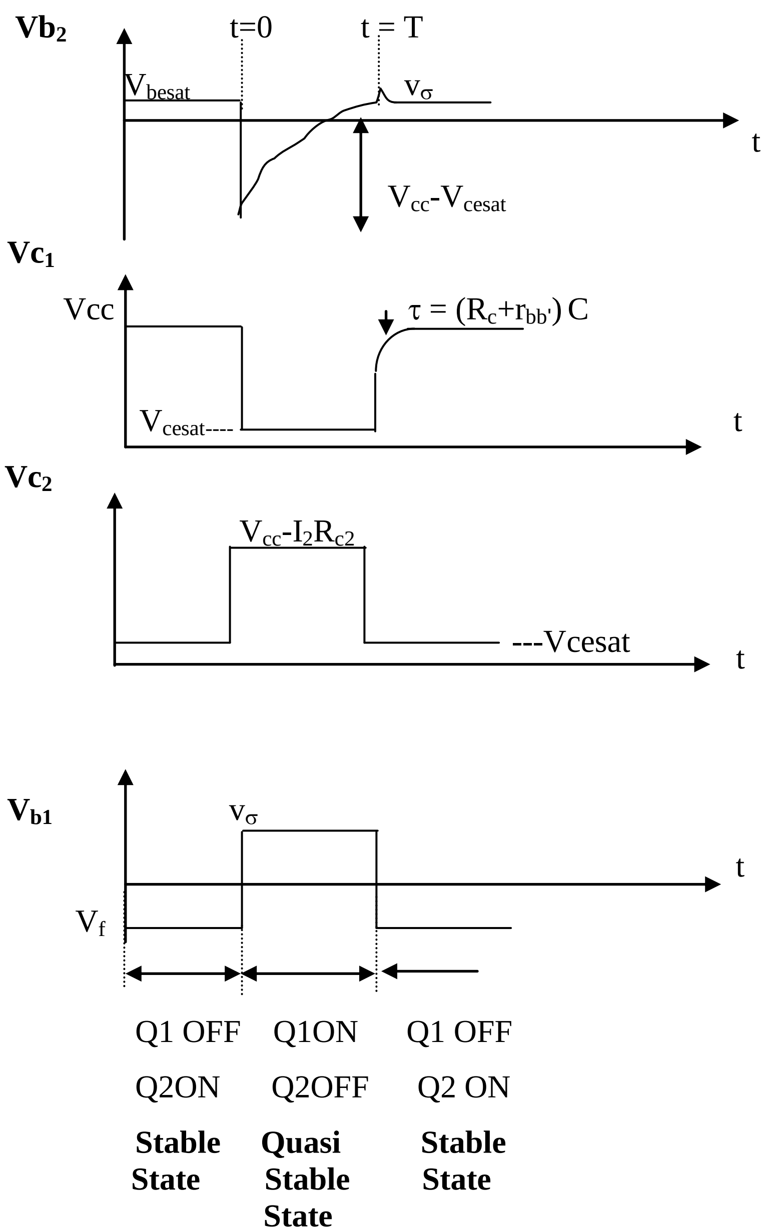
$R_{c2} + R_1 = Vce\text{-}V_{besat}/I_1$

$R_1 = Vcc\text{-}V_{besat}/I_1 - Rc_2$

$T = RC \ln (Vcc + IcRc - V\sigma)/Vcc - Vr$

$C= T/ (R_*\ln (Vcc+IcRc-V\sigma)/Vcc-Vr).$

**<u>O/P waveforms</u>**:-



**Procedure:-**

- Construct the Monostable Multivibrator circuit in fig4.1. using the component values determined in design.
- Measure and record dc voltage levels at the base, emitter and collector terminals of each transistor.
- Add the triggering circuit and apply a square wave input to Cc.
- Observe the waveform at the collector and base of each transistor and record in a form that shows all waveforms time referenced to the input. Also, note the waveform amplitudes and the pulse and space widths.

**Observations:-**

**Before trigger (i.e., t<0)**

Vc1 = ______V Vb1 = _______V

Vc2 = ______V Vb2 = _______V

**After trigger (0<t<T)**

Vc1 = ______V Vb1 = _______V

Vc2 = ______V Vb2 = _______V

**After quasi stable state duration (t>T)**

Vc1 = ______V Vb1 = _______V

Vc2 = ______V Vb2 = _______V

**Analysis:-**

- Discuss the dc voltage levels measured throughout the Monostable circuit and compare to the voltage levels in design.
- Explain the waveform obtained from the Monostable circuit and discuss the effect of doubling the capacitor value.