



SNS COLLEGE OF TECHNOLOGY

Kurumbapalayam (Po), Coimbatore – 641 107

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE NAME : 19ECB201-ANALOG ELECTRONIC CIRCUITS

II YEAR /III SEMESTER

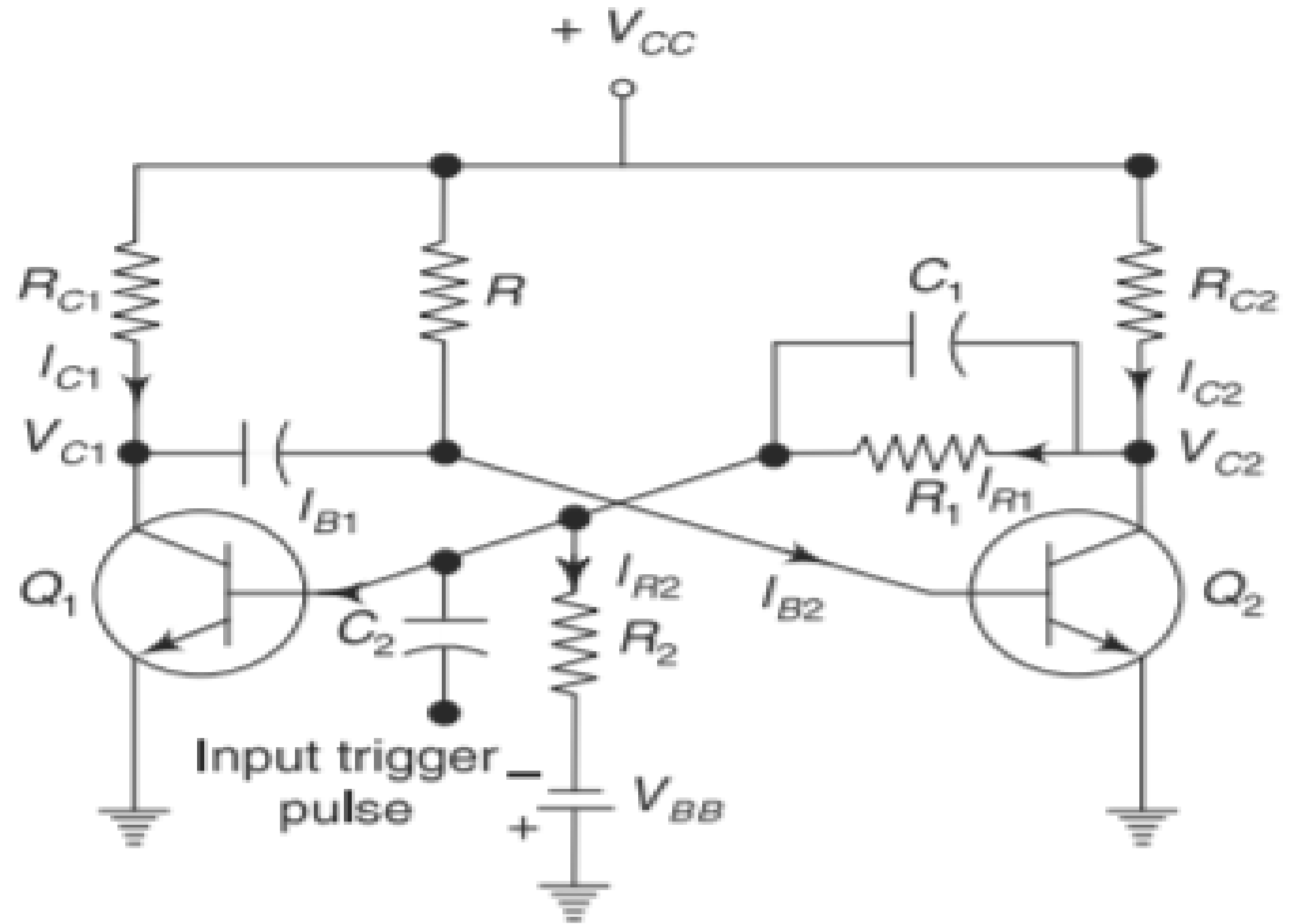
Unit 4- OSCILLATORS & MULTIVIBRATOR CIRCUITS

Topic 8 : Monostable multivibrator



Monostable Multivibrator

- Monostable multivibrator has one stable state and one quasi-stable state.
- It is also known as one-shot multivibrator or univibrator.

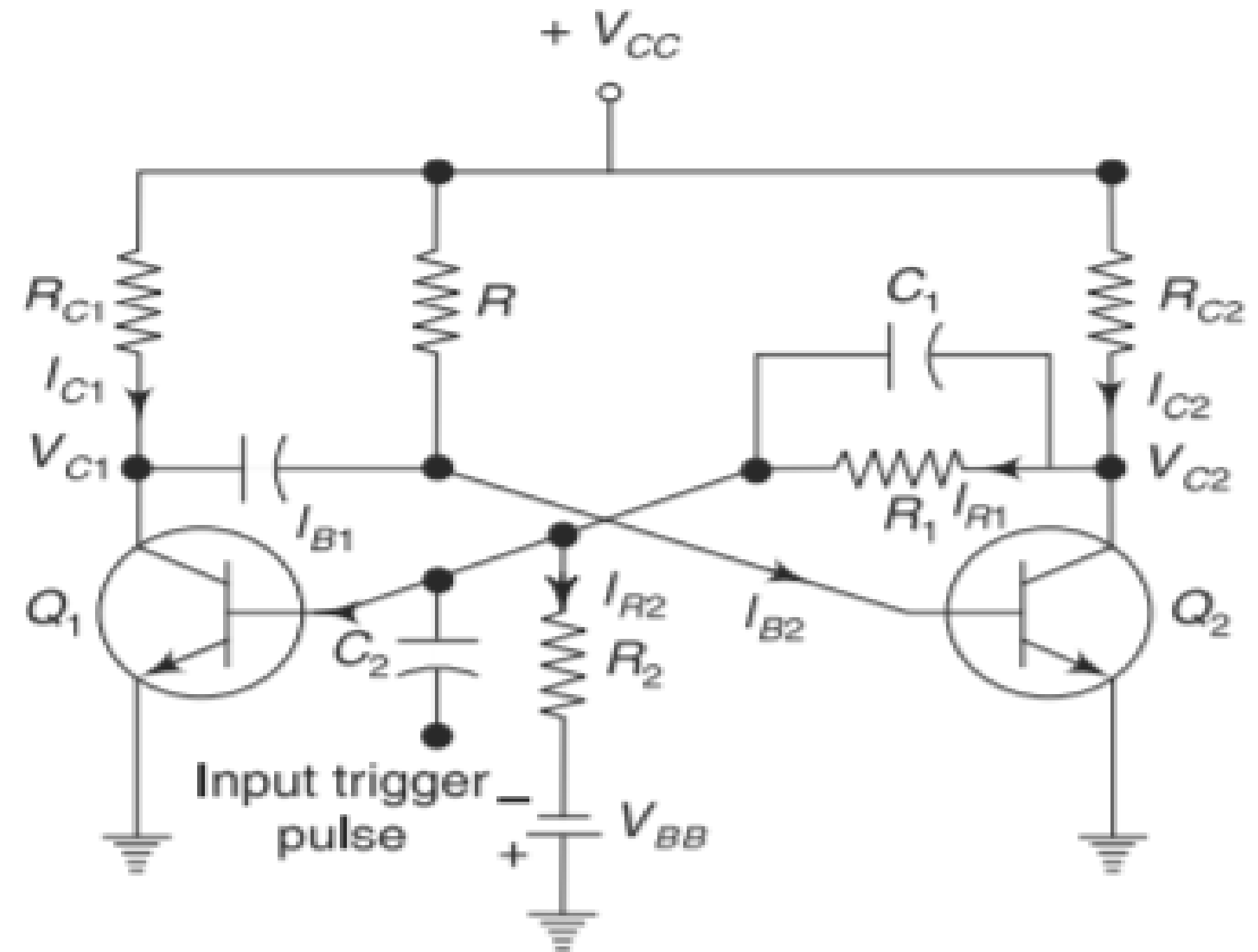




Monostable Multivibrator



- It remains in its stable state until an input pulse triggers it into its quasistable state for a time duration determined by the discharging an RC circuit and the circuit returns to its original stable state automatically.

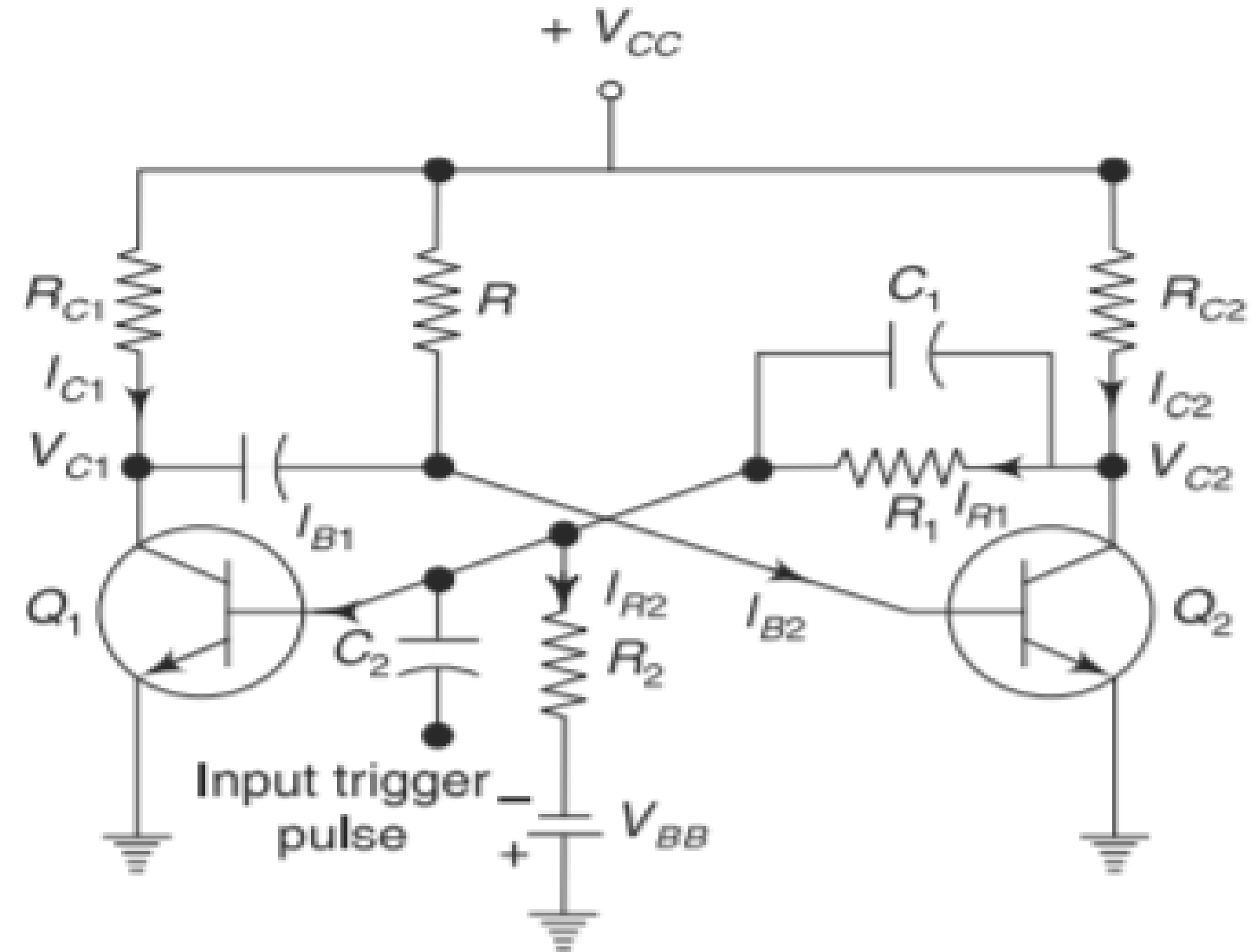




Monostable Multivibrator



- It remains there until the next trigger pulse is applied.
- Thus, a monostable multivibrator cannot generate square waves of its own like an astable multivibrator.
- Only external trigger pulses will cause it to generate the rectangular waves.





Monostable Multivibrator



- It consists of two identical transistors Q1 and Q2 with equal collector resistances of RC1 and RC2.
- The output of Q2 is coupled to the input at the base of Q1 through a resistive attenuator in which C1 is a small speed up capacitor to speed up the transition.
- The values of R2 and $-V_{BB}$ are chosen so as to reverse bias Q1 and keep it in the OFF state.
- The collector supply $+V_{CC}$ and R will forward bias Q2 and keep it in the ON state. Actually, this is the stable state for the circuit.



Monostable Multivibrator

- When a positive trigger pulse of short duration and sufficient magnitude is applied to the base of Q1 through C2, transistor Q1 starts conducting and thereby decreasing the voltage at its collector VC1 which is coupled to the base of Q2 through capacitor C.
- This decreases the forward bias on Q2 and its collector current decreases.
- The increasing positive potential on the collector of Q2 is applied to the base of Q1 through R1.
- This further increases the base potential of Q1 and Q1 is quickly driven to saturation and Q2 to cut-off.

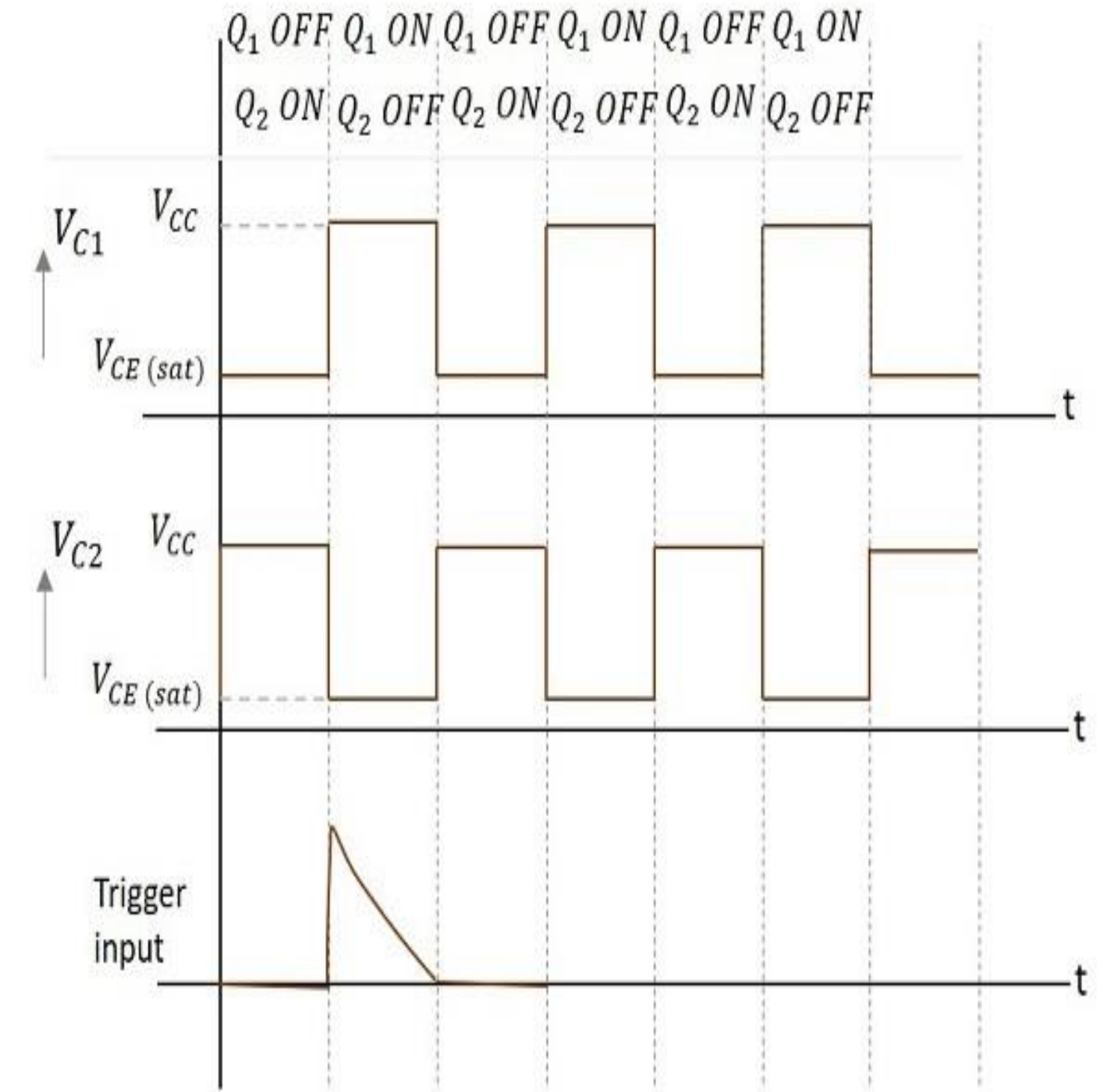
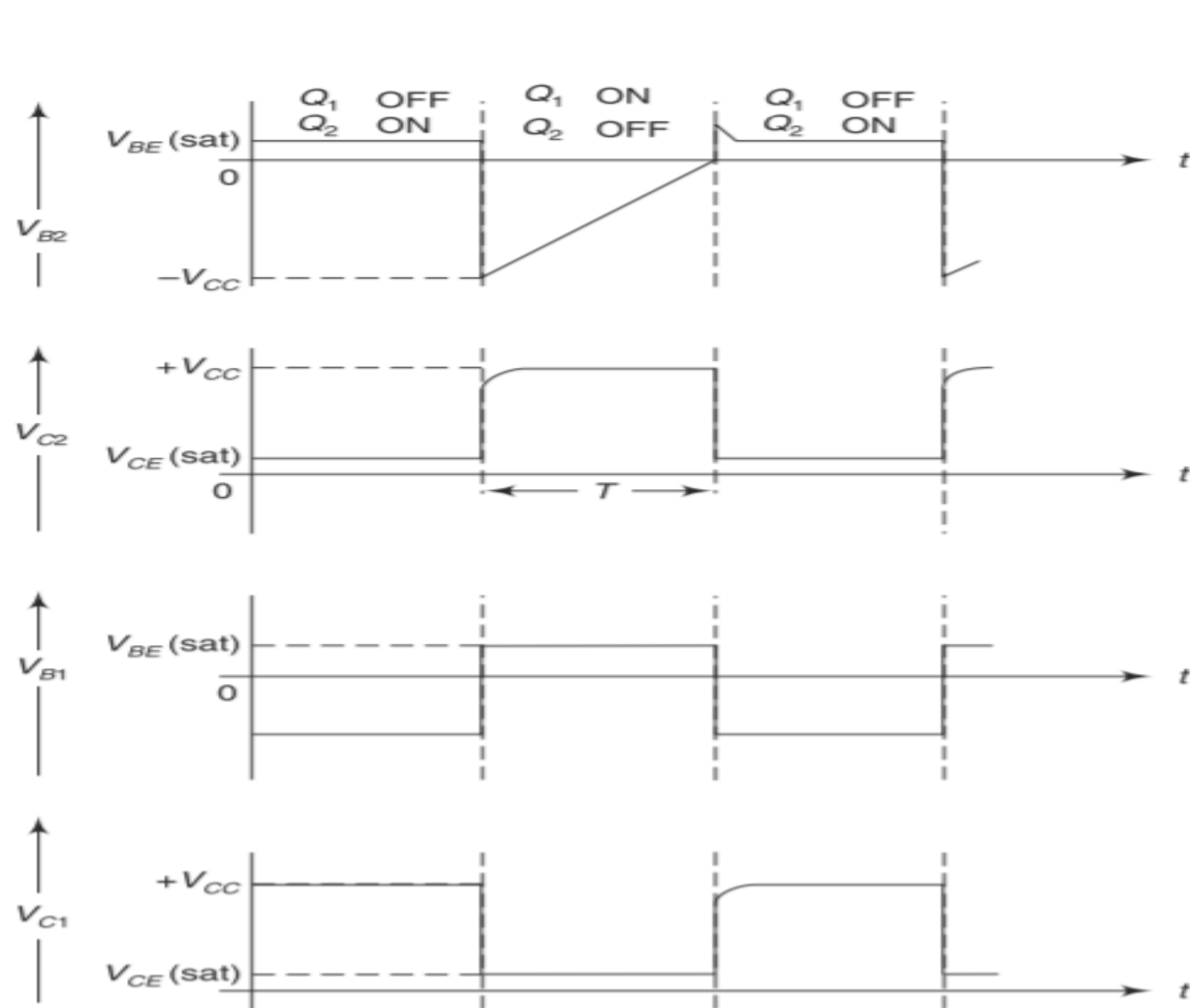


Monostable Multivibrator

- The capacitor C is charged to approximately $+V_{CC}$, through the path V_{CC} , R and Q1.
- As the capacitor C discharges, the base of Q2 is forward biased and collector current starts to flow into Q2.
- Thus Q2 is quickly driven to saturation and Q1 is cut-off.
- This is the stable state for the circuit and remains in this condition until another trigger pulse causes the circuit to switch over the states.



Input and Output Waveforms





Applications



1. The monostable multivibrator is used to function as an adjustable pulse width generator.
2. It is used to generate uniform width pulses from a variable width input pulse train.
3. It is used to generate clean and sharp pulses from the distorted pulses.
4. It is used as a time delay unit since it produces a transition at a fixed time after the trigger signal.



Triggering Methods For Monostable Multivibrator



- Let us assume that Q1 is OFF and Q2 is ON in a collector coupled monostable multivibrator.
- When a positive going spike (triggering pulse) is given to the base of Q1 via a coupling capacitor, Q1 turns ON which causes Q2 to turn OFF.



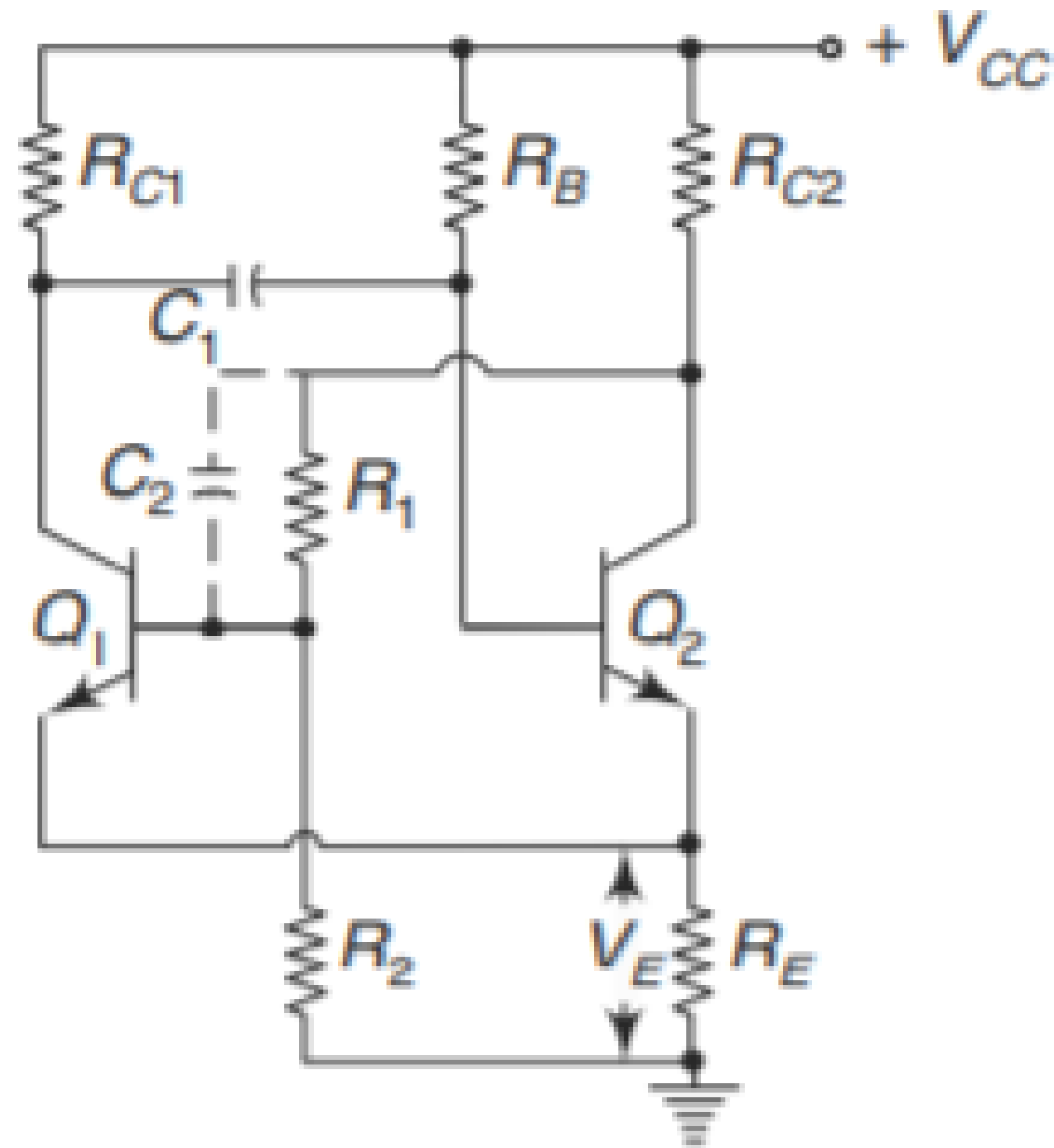
Triggering Methods For Monostable Multivibrator



- Otherwise, when a negative going spike is given to the base of Q2 via a coupling capacitor, Q2 turns OFF which causes Q1 to turn ON.
- Positive going triggering pulse is preferred because triggering by a negative going spike at the base of Q2 requires a larger input current than triggering by a positive going spike at the base of Q1.



Emitter Coupled Monostable Multivibrator





Assessment 1



What are the triggering methods for monostable multivibrator?





Assessment 2



List the applications of monostable multivibrator?





References



Electronic Devices and Circuits By Salivahanan

Thank You