SNS COLLEGE OF TECHNOLOGY

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Department of Biomedical Engineering

Course Name: 23BMB101-Electron Devices and Circuits

I Year : II Semester

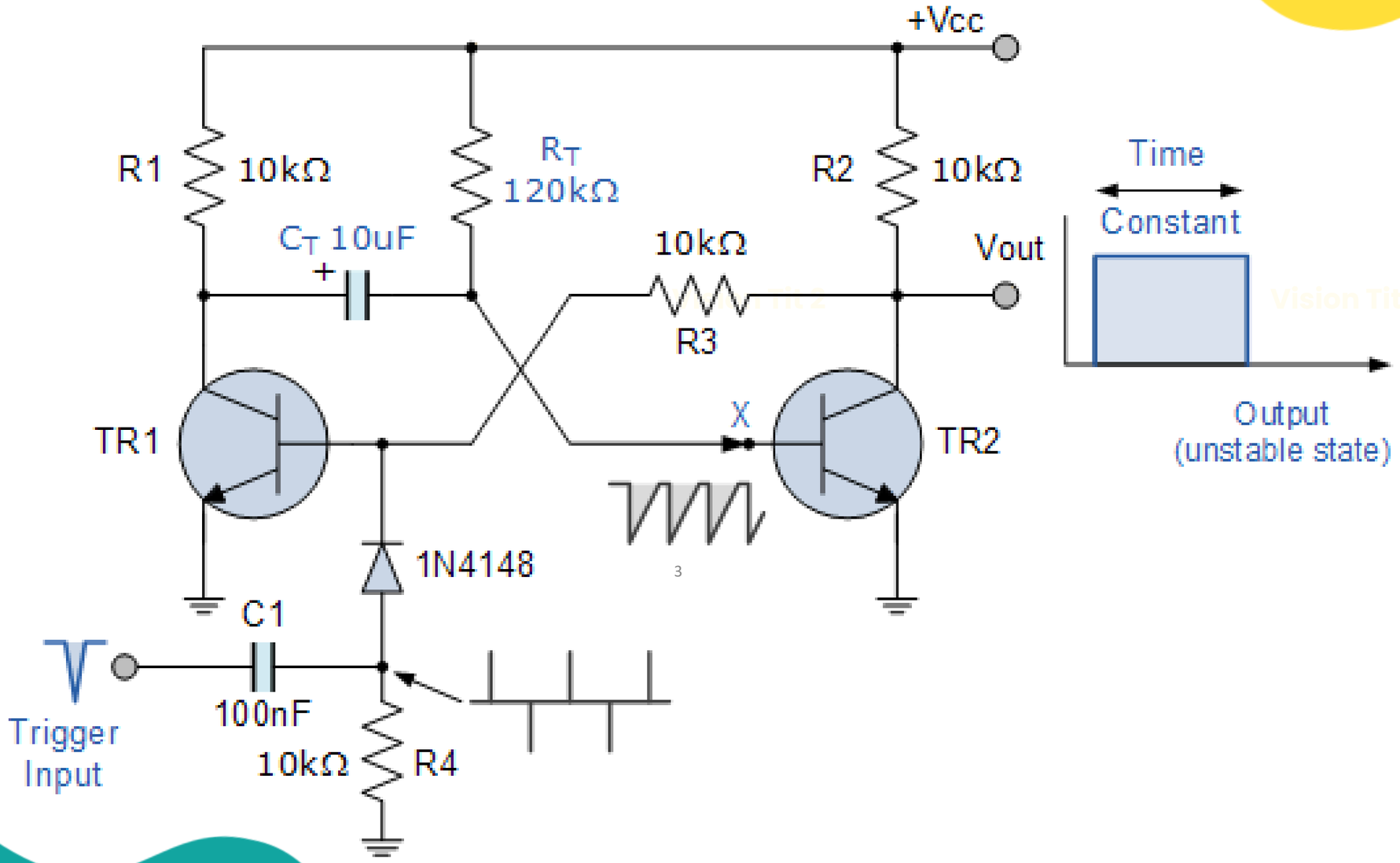
Unit IV –Power Amplifiers & Switching Circuits

Topic : Multivibrators - Monostable

INTRODUCTION

- A monostable multivibrator, as the name implies, has only one stable state. When the transistor conducts, the other remains in non-conducting state.
- A stable state is such a state where the transistor remains without being altered, unless disturbed by some external trigger pulse.
- As Monostable works on the same principle, it has another name called as One-shot Multivibrator. It is used to generate a single output pulse of a specified width, either “HIGH” or “LOW” when a suitable external trigger signal or pulse T is applied.
- The monostable multivibrator will then remain in this original stable state indefinitely until another input pulse or trigger signal is received.

Monostable Multivibrators



Monostable Multivibrator

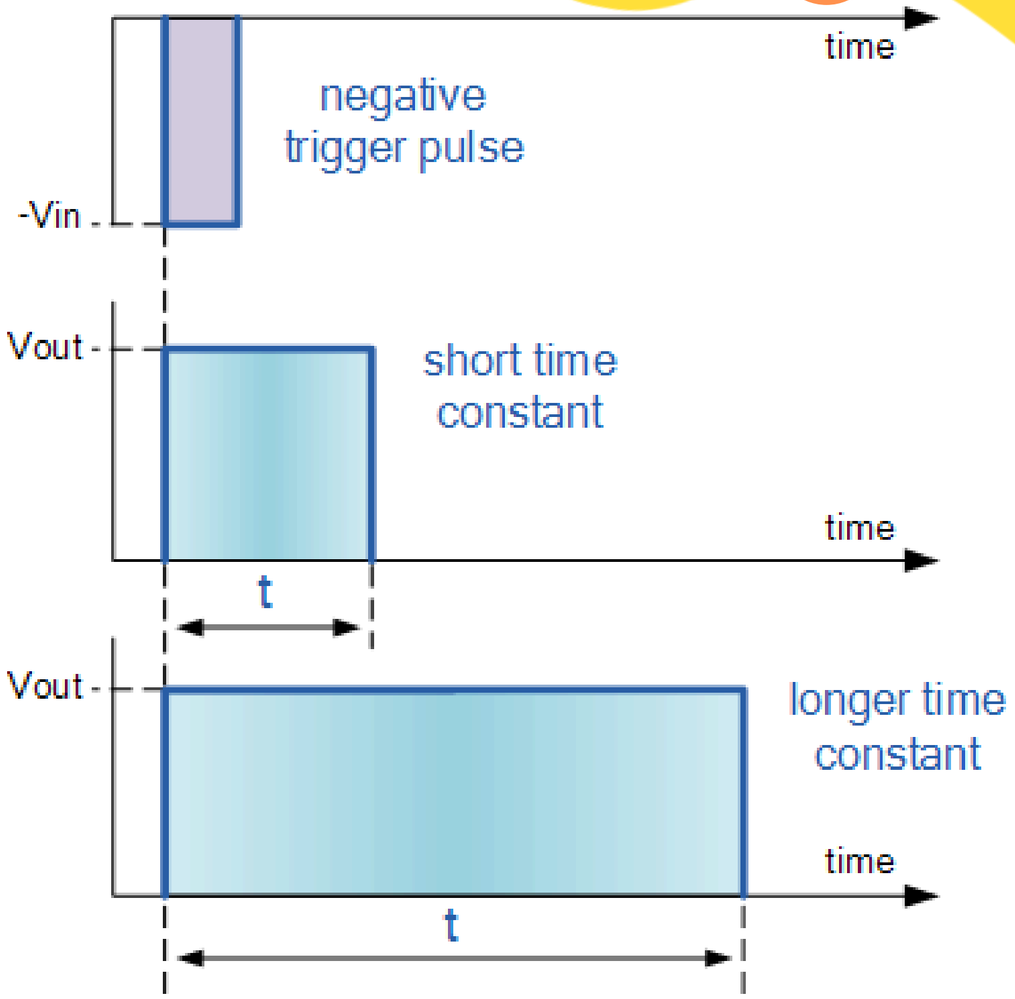
- When power is firstly applied, the base of transistor TR2 is connected to Vcc via the biasing resistor, RT thereby turning the transistor “fully-ON” and into saturation and at the same time turning TR1 “OFF” in the process. This then represents the circuits “Stable State” with zero output. The current flowing into the saturated base terminal of TR2 will therefore be equal to Ib = (Vcc – 0.7)/RT.
- If a negative trigger pulse is now applied at the input, the fast decaying edge of the pulse will pass straight through capacitor, C1 to the base of transistor, TR1 via the blocking diode turning it “ON”.
- The collector of TR1 which was previously at Vcc drops quickly to below zero volts effectively giving capacitor CT a reverse charge of -0.7v across its plates. This action results in transistor TR2 now having a minus base voltage at point X holding the transistor fully “OFF”.

Monostable Multivibrator

- When Vcc is applied, the collector current of the transistors increase.
- As no transistor characteristics are alike, one of the two transistors say Q1 has its collector current increase and thus conducts.
- This connection lets the increased negative voltage at the collector of Q1 to get applied at the base of Q2 and its collector current decreases.
- This continuous action makes the collector current of Q2 to decrease further. This current when applied to the base of Q1 makes it more negative and with the cumulative actions Q1 gets into saturation and Q2 to cut off.
- Thus the output voltage of Q1 will be VCE (sat) and Q2 will be equal to VCC.

Monostable Multivibrator

- Monostable Multivibrators can produce a very short pulse or a much longer rectangular shaped waveform whose leading edge rises in time with the externally applied trigger pulse and whose trailing edge is dependent upon the RC time constant of the feedback components used.
- The time constant of Monostable Multivibrators can be changed by varying the values of the capacitor, CT the resistor, RT or both



$$\tau = 0.7RC$$