SNS COLLEGE OF TECHNOLOGY

(AN AUTONOMOUS INSTITUTION)

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Department of Biomedical Engineering

Course Name: 23BMB101-Electron Devices and Circuits

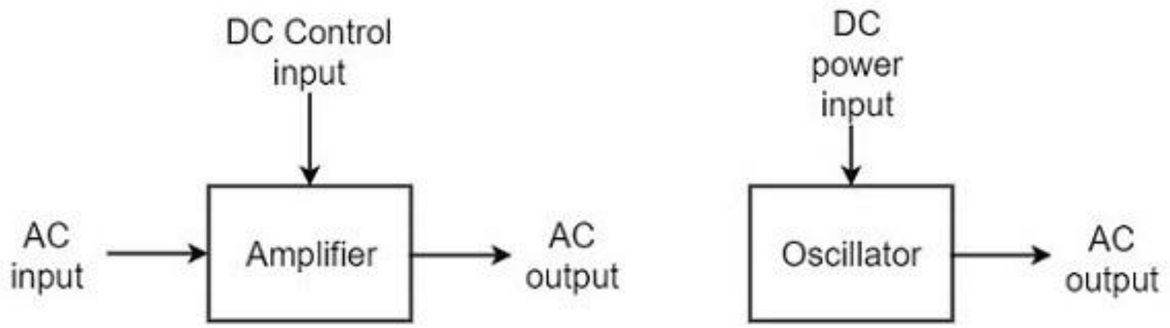
I Year : II Semester

Unit V –Feedback Amplifiers and Oscillators

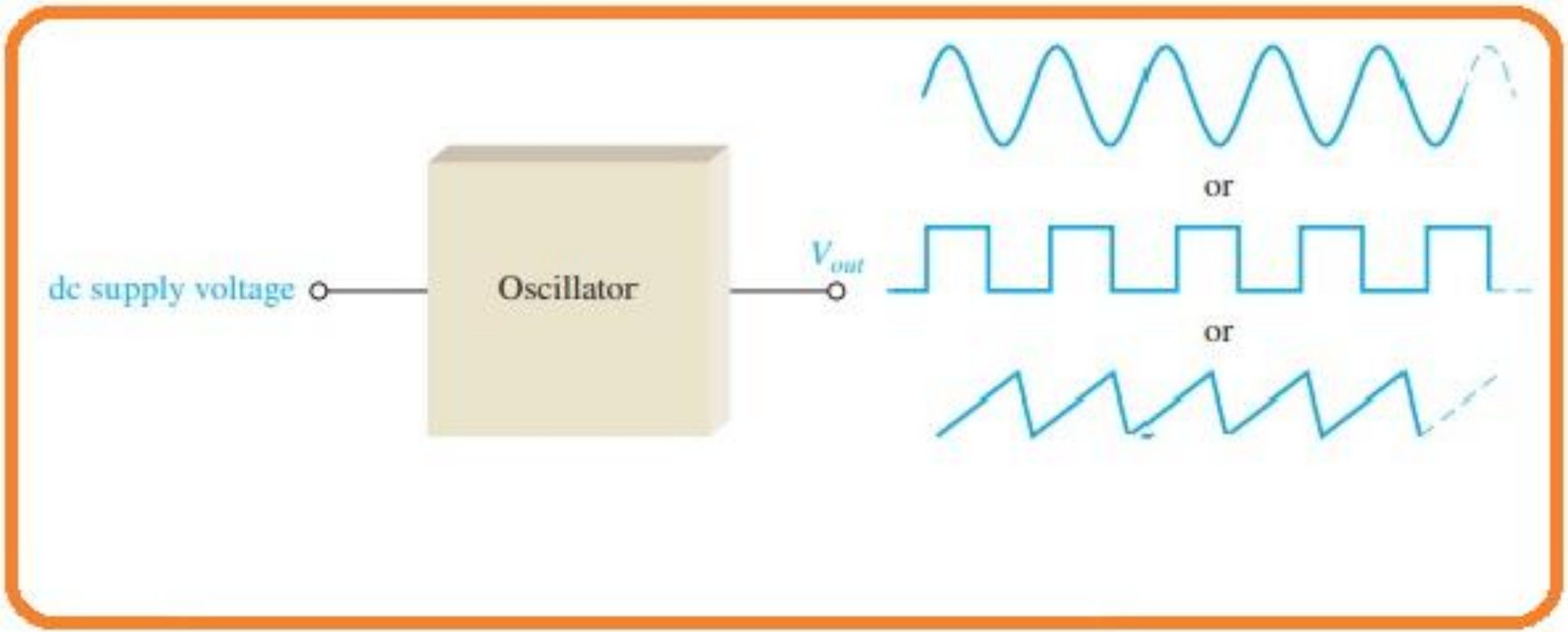
Topic : RC Phase Shift Oscillator

INTRODUCTION

- An electronic oscillator is an electronic circuit that produces a periodic, oscillating electronic signal, often a sine wave or a square wave or a triangle wave.
- Oscillators convert direct current (DC) from a power supply to an alternating current (AC) signal.
- They are widely used in many electronic devices ranging from simplest clock generators to digital instruments (like calculators) and complex computers and peripherals etc.



Oscillators



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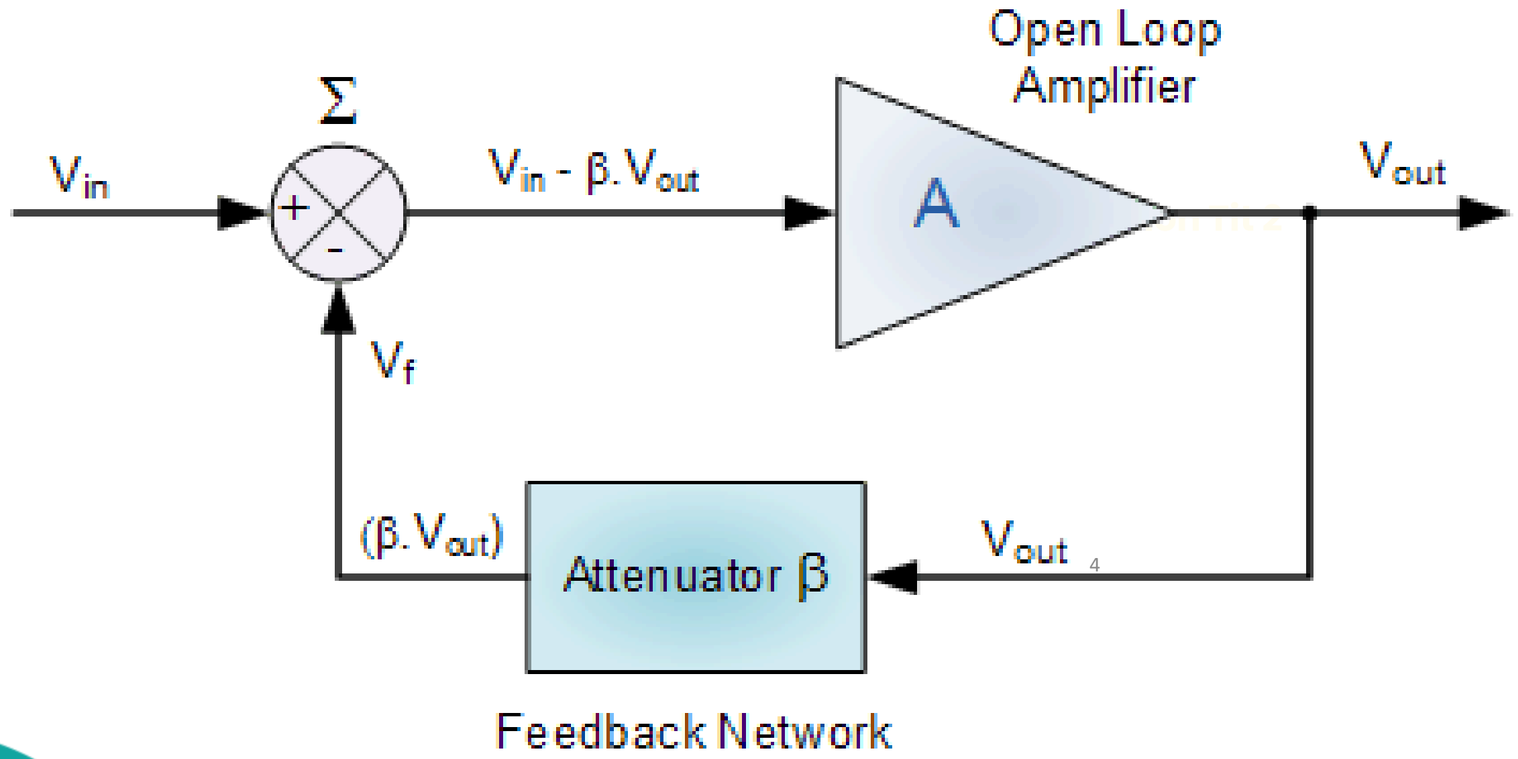

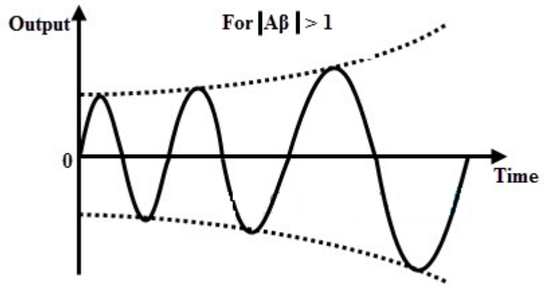

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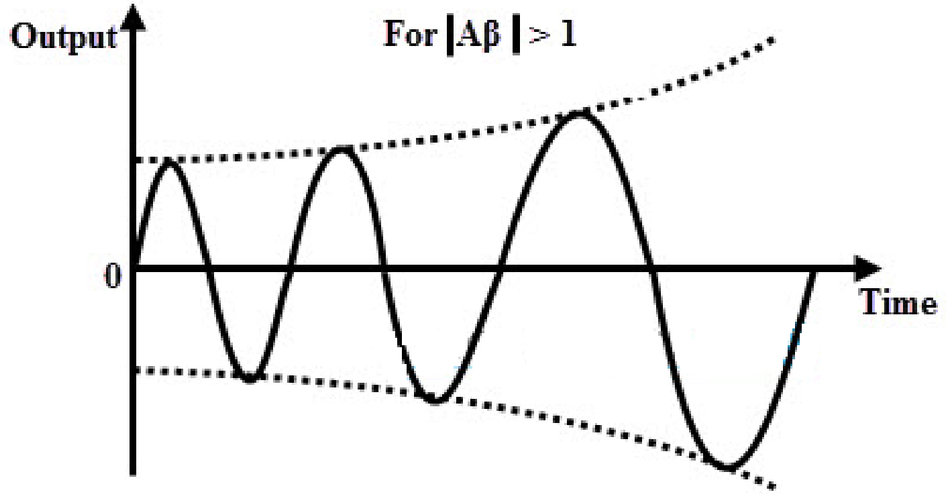
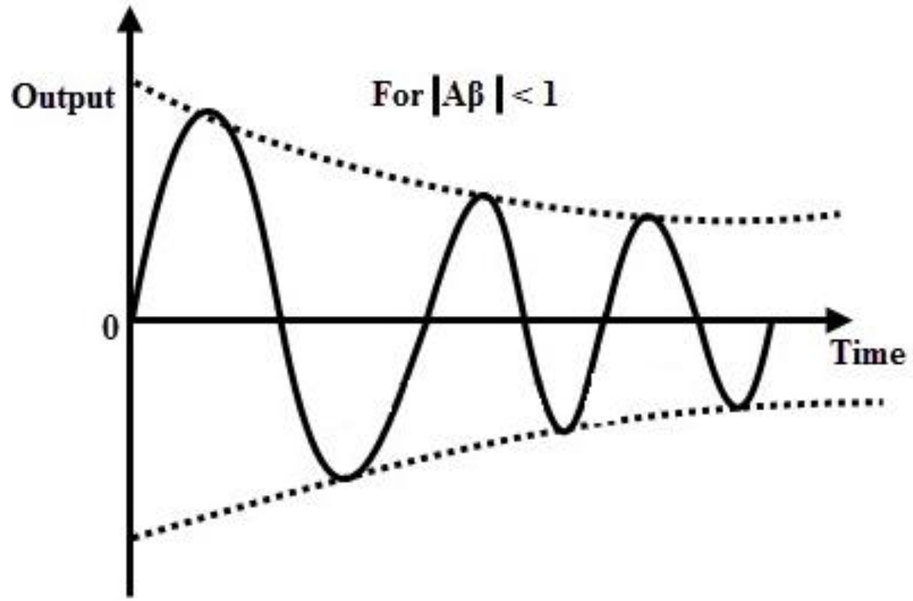
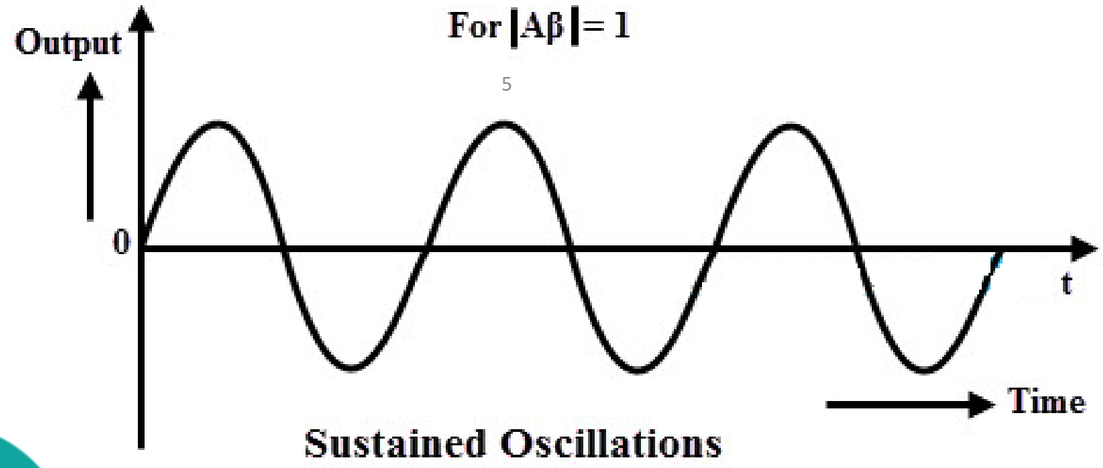
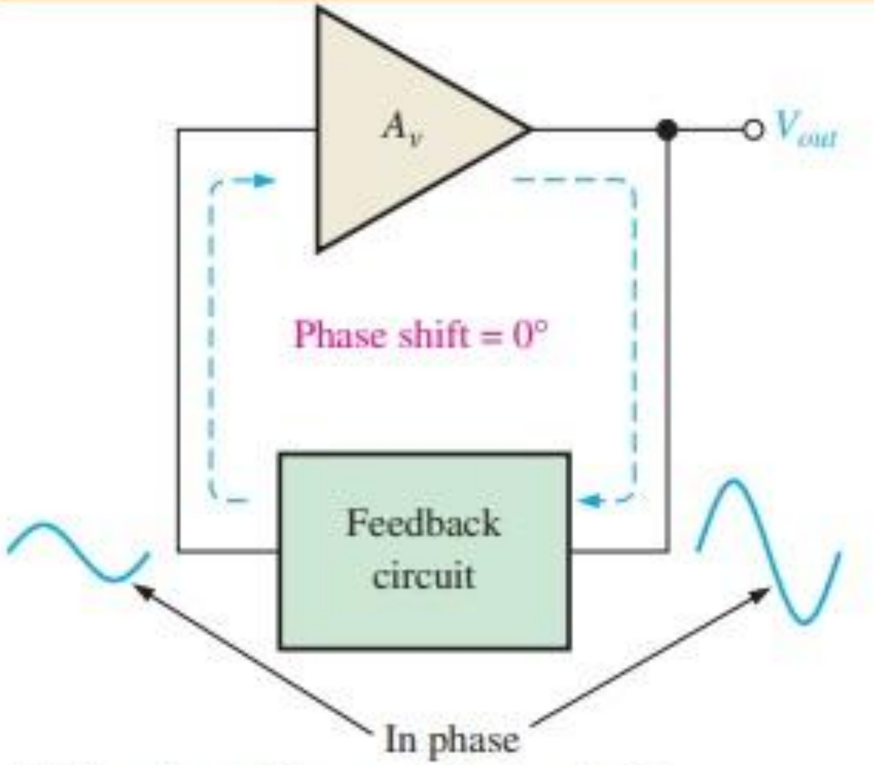


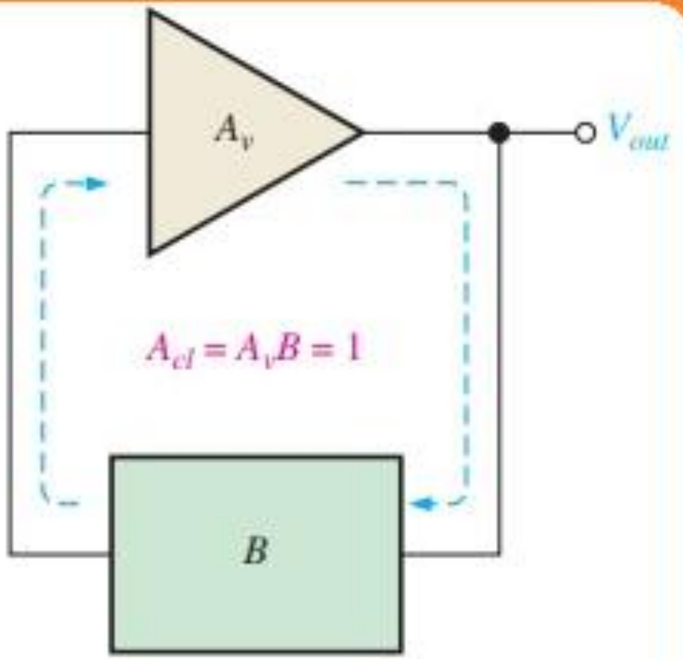




Conditions for Oscillations- Barkhausen Criterion



(a) The phase shift around the loop is 0°.

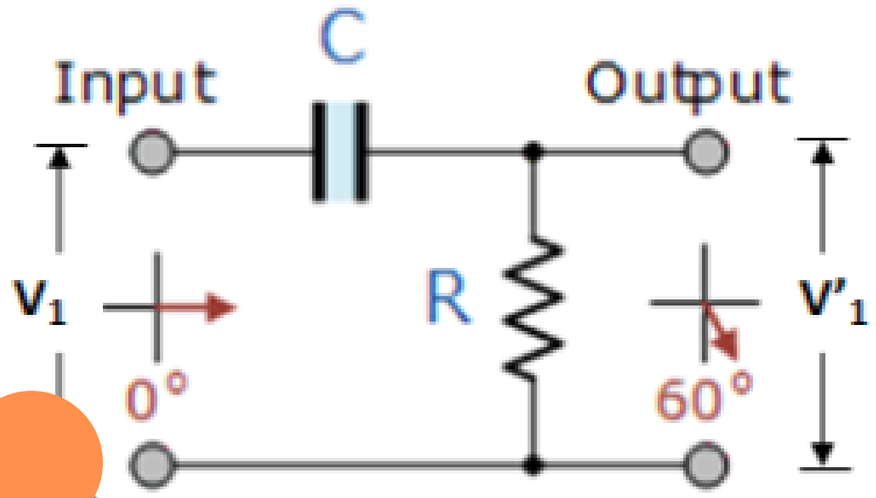


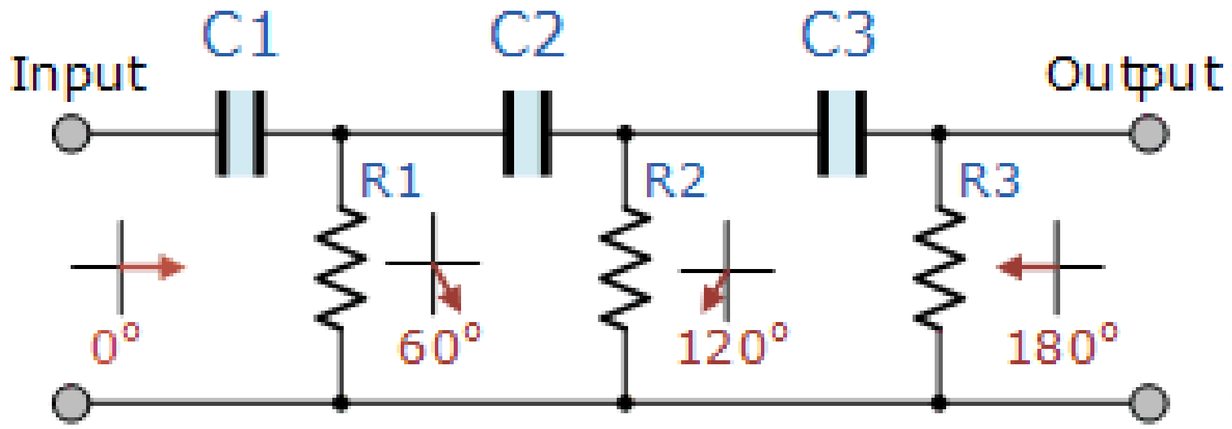
(b) The closed loop gain is 1.

General conditions to sustain oscillation.

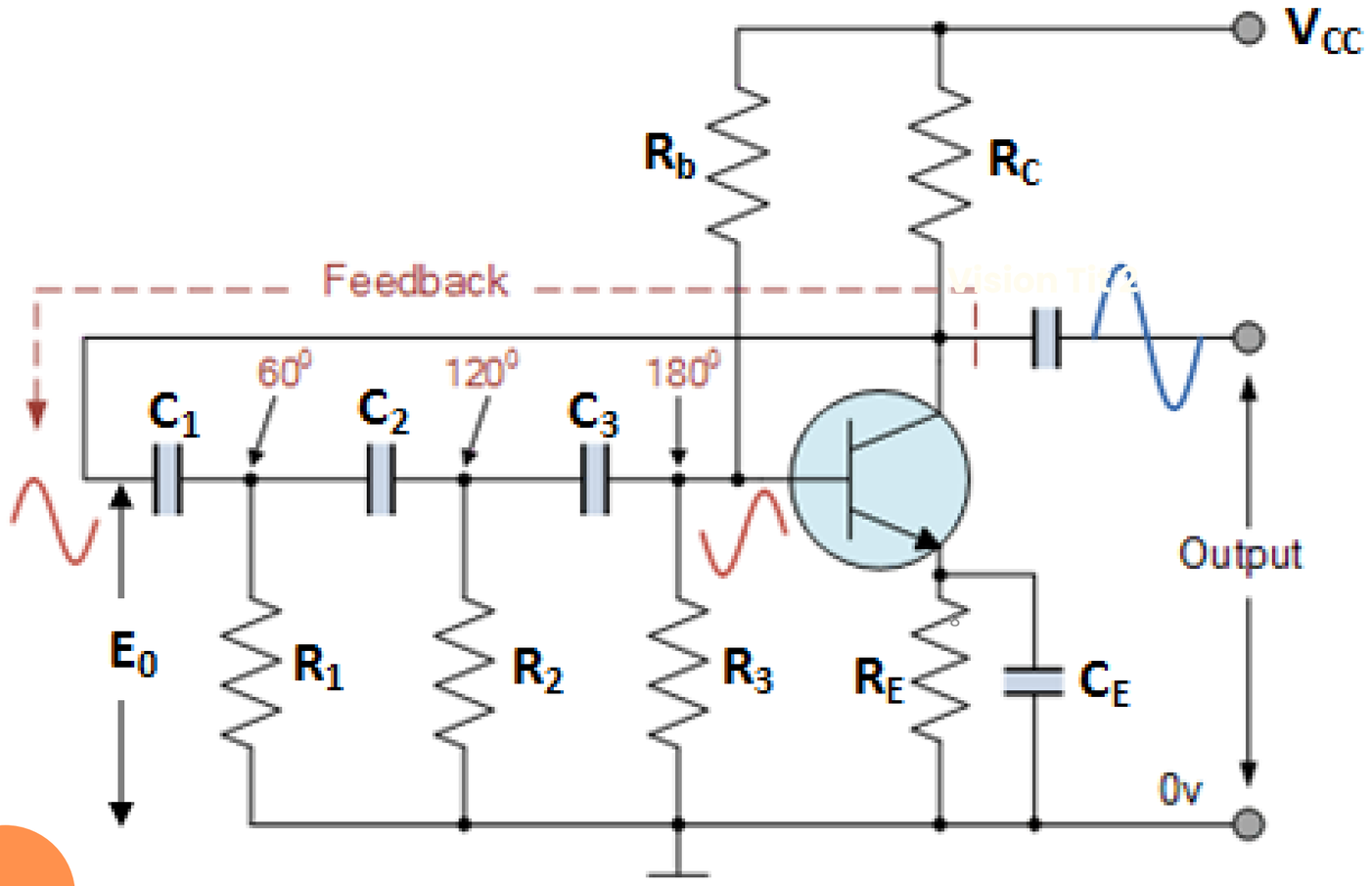
RC Phase shift Oscillator

- In a phase shift oscillator, a phase shift of 180^0 is obtained with a phase shift circuit instead of inductive or capacitive coupling.
- A further phase shift of 180° is introduced due to the transistor properties. Thus energy supplied back to the tank circuit is of correct phase.





RC Phase shift Oscillator



$$f_o = \frac{1}{2\pi RC\sqrt{6}}$$

$$R_1 = R_2 = R_3 = R$$

$$C_1 = C_2 = C_3 = C$$