APC

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad – 500 043

LABORATORY WORK SHEET

Date: 17.05.2022

Roll No: 20951A04H4 Name: Mohammed Sohail

Exp No: 05 Experiment Name: RC phase shift oscillator

DAY TO DAY EVALUATION:

	Preparation	Algorithm / Performance in the Lab	Source Code / Calculations and Graphs	Program Execution / Results and Error Analysis	Viva	Total
Max. Marks	4	4	4	4	4	20
Obtained	4	4	4	4	4	20

21/6/22
Signature of Lab I/C

START WRITING FROM HERE:

Aim: To determine practical frequency of RC phase shift oscillator.
To draw frequency response comparing with theoretical frequency.
Determine maximum gain and bandwidth using bode plots

Equipment needed:

Hardware Requirements:

1. Analog Discovery 2. Instrument
3. Personal computer
4. Training Kit
5. connecting Wires

Software Requirements:

1. Multisim software 14.0 edition
2. Waveform generation Software

Background :-

RC shift oscillator has a CE amplifier followed by three section of RC phase shift feedback networks. The output of the last stage is returned to the input of the amplifier. the values of R and C are chooses such that the phase shift of each RC section is 60°. Thus, the RC ladder network produces a total phase shift of 180° between its input and output voltage for the given frequencies since CE amplifier produces 180° phase shift the total phase shift from the base of the transistor around the circuit and back to the transistor will be exactly 360 or 0°. Thus frequency of oscillation is given by

$F = 1/2RC\sqrt{6}$

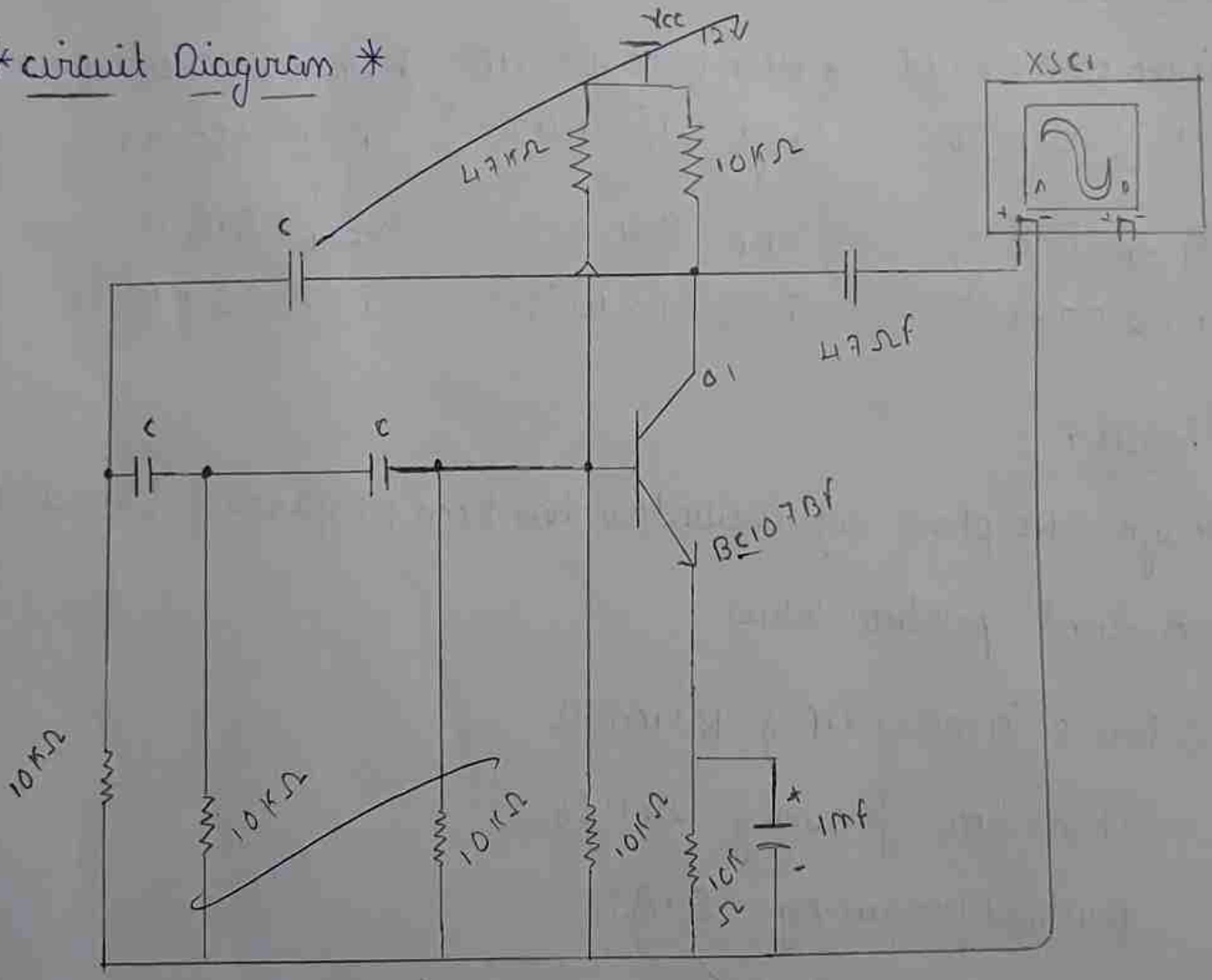
procedure

1. Connect the circuit as shown in figure.
2. connect the 0.0022 F capacitors in the circuit and observe the waveform.
3. Save the circuit and simulate
4. Calculate the time period and frequency of the resultant wave - form. Compare the values with the practical circuit values.
5. Repeat the same procedure for C = 0.033F and 0.01F and calculate the frequency and tabulate as shown.
6. Find theoretical frequency from the formula $F = 1/2RC\sqrt{6}$ and compare theortical and practical Frequency.

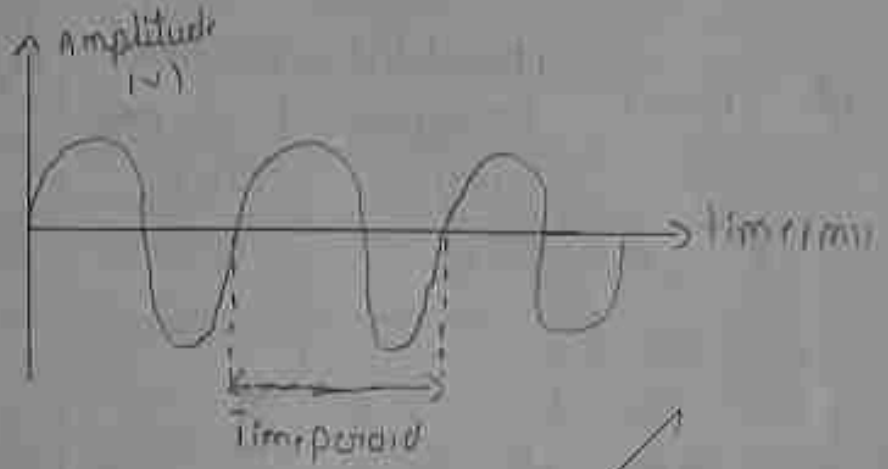
observation

S.NO	C (μF)	R (Ω)	Theoretical Frequency (KHz)	practical Frequency (KHz)	Vo(P-P) (Volts)
1.	0.01μF	10K	846.74Hz	544.36Hz	8.89 V
2.	0.033μF	10K	2.953Hz	2.514KHz	8.83 V
3	0.0033μF	10K	1.963KHz	1.6491KHz	8.0 V

circuit Diagram



* Expected waveform *



* calculations *

* When c = 0.003 uf

$f = \frac{1}{T} = 241.56$

$V_{p-p} = 8.83V$

$T = 2.07 \times 10^{-4} s$

* When c = 0.033 uf

$f = \frac{1}{T} = 1634.92$

$V_{p-p} = 8.4$

$T = 6.06 \times 10^{-4} s$

* When c = 0.01 uf

$f = \frac{1}{T} = 650.07$

$V_{p-p} = 8.871$

$T = 8.83 \times 10^{-3} s$

* Result *

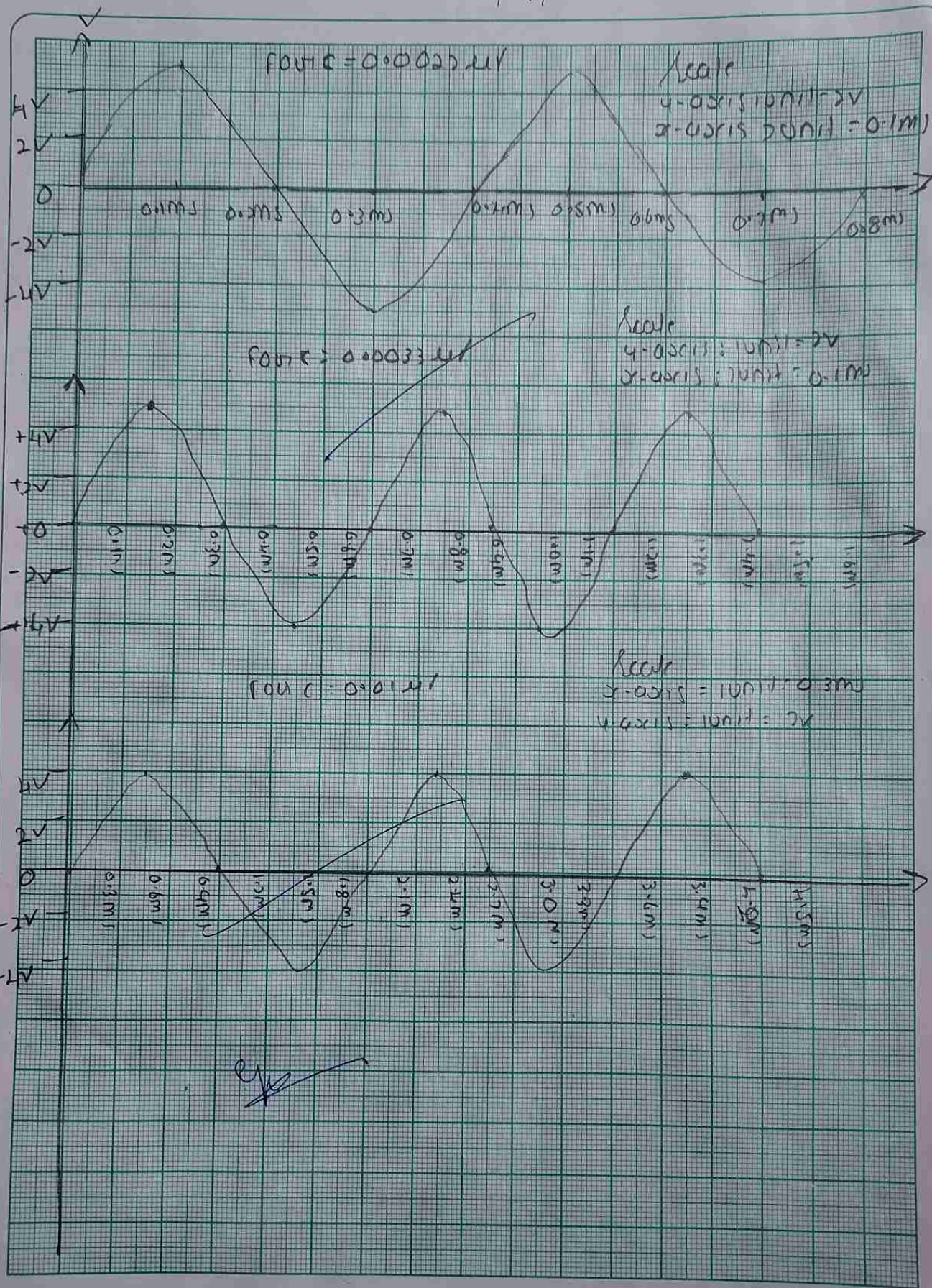
Design of RC phase shift oscillator has been performed & Verified

theoretical & practical Values

=> For c = 0.0033 uf & R = 10 kΩ

Theoretical frequency = 241.56

practical frequency = 8.83


Four C = 0.0022 μF
Scale
y-axis 1 unit = 2V
x-axis 1 unit = 0.1ms
Four C = 0.0033 μF
Scale
y-axis : 1 unit = 2V
x-axis : 1 unit = 0.1ms
Four C : 0.01 μF
Scale
x-axis = 1 unit = 0.3ms
y-axis : 1 unit = 2V
V
t
4V
2V
0
-2V
-4V
+4V
+2V
-2V
-4V
2V
-2V
-4V

Ajay