ELECTRONICS LAB REPORT
EXPERIMENT (1)
MEASUREMENTS

Date:----------
Name:---------- **Partner's Name:----------**
Registration No:---------- **Registration No:----------**
Physics Section:---------- **Instructor's Name:----------**

DATA AND DATA ANALYSIS

A- Waveform Voltage Measurement

1- Set the function generator controls to produce a sinwave output at 1.0 *kHz* frequency. Adjust the oscilloscope setting using the *x, y-shift*, *Volt/cm* sensitivity switch, *Time/cm* timebase switch, stability and trigger level to obtain a clear and stable waveform on the screen. For one amplitude setting of the function generator, measure the peak to peak height (***h***) of the waveform for five different scale settings of the *Volt/cm*, switch (K_v), and record your measurements in table (1.1).

2- Using $V = K_v\, h$ to convert the data obtained to peak to peak voltage V_{pp} and enter your data and results in table (1.1).

Table (1.1)

Voltage scale K_v **(*Volt/cm*)**	**Wavevoltage Height *h* (*cm*)**	**Peak to peak Voltage** $V_{pp} = K_v\, h$ **(*V*)**	**Amplitude Voltage** V_p **(*V*)**

3- Are the peak to peak values equal? Explain.

4- Determine the amplitude of the waveform.

B-Waveform Frequency Measurement

1- Set the time base at calibration position or at extreme counterclockwise position, and set the *x-gain* control at extreme counterclockwise position. For five different frequency settings of the function generator, measure and record the horizontal distance (***L***) between two successive peaks of the displayed waveform, and record the results in table (1.2).

2- Using the time base (*Time/cm*) setting K_h for each frequency, convert the data obtained to frequency values and enter your data and results in table (1.2), using the relation $f = (1 / \tau) = 1 / (K_h L)$.

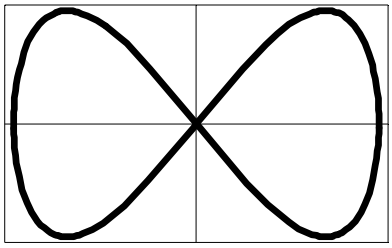
Table (1.2)

Generator frequency (*Hz*)	**Distance (*L*) between two peaks (*cm*)**	K_h = *Time/cm*	**Calculated Frequency:** $f = 1/(K_h L)$ (*Hz*)

3- Compare the calculated frequency values with the actual values obtained from the function generator.

C- Frequency Measurement Using Lissajous Patterns

1- Record the frequency of the waveform applied to the horizontal input f_h **,** the number of vertical maxima n_v and the number of horizontal maxima n_h.



2- Using the relation $f_v = (n_v/n_h)\, f_h$ **,** Calculate the vertical frequency f_v and enter your data and results in table (1.3).

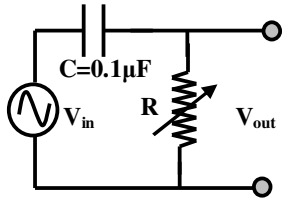
Table (1.3)

Horizontal Frequency f_h **(*Hz*)**	**Number of Horizontal maxima** (n_h)	**Number of Vertical maxima** (n_v)	**Calculated** $f_v = (n_v/n_h)\, f_h$ **(*Hz*)**	**Generator Frequency** f_v **(*Hz*)**

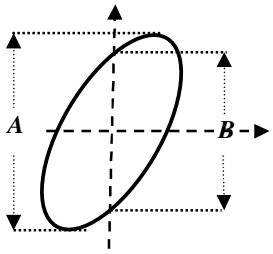
3- Compare the calculated vertical frequency values with the actual values obtained from the function generator.

D- Phase Measurement Using Lissajous Method

1- Connect the circuit shown in figure 1.



2- Measure the heights ***A*** and ***B*** of the pattern as shown in figure 2, for different values of the resistance ***R***.



3- Calculate the phase shift Φ using the two relations:-

$$\Phi = \sin^{-1} B/A$$

$$\Phi = \tan^{-1} 1/(2\pi fRC)$$

5- Compare the values of the phase shift obtained by the two methods.

6- Write down the parameters affected the values of the phase shift Φ.