EXPERIMENT NUMBER 4	**GROUP 10**	Trần Minh Quân-19151078
	DATE	25/03/2022
Determine R, L, C by using ossciloscope	**LECTURER**	Tạ Đình Hiến
	REPORT DATE	
	GRADING	

Purpose:

- About knowledge: Know how to use the oscilloscope, frequency generators, know how to measure R, L, C and the resonance frequency using the ossciloscope.
- About skills: Proficiently using measuring tools, conducting experiments in the correct order to obtain data exactly.
- About attitude: Careful, persistent, accurate, honest, objective

I. Measurement's tool.

- Oscilloscope
- Generator
- Board
- Rheostat 0 ÷ 9999,9 Ω
- Capacitor Cx
- Resistor Rx
- Inductor Lx.

II. Formula used: $Z_c = \frac{1}{2\pi \times f \times C}$, $Z_L = 2\pi \times f \times L$

III. Measurement's method

If you put on two X1X2 poles a voltage: $u_x = U_x cos(\omega t)$ and put on two Y1Y2 poles a voltage: $u_x = U_x cos(\omega t + \varphi)$ then the light trail on the M screen will simultaneously perform two perpendicular oscillations.

$$x = K_x \times U_x = X_0 cos(\omega_x t)$$

$$y = K_y \times U_y = Y_0 cos(\omega_y t + \varphi)$$

If $\omega_{y=} n\omega_x$ then the light trail on M screen will be a Lissajou line

If $\omega_{y=}\omega_x$ then the light trail on M screen will be calculated using the following equation:

$$(\frac{x}{X_0})^2 + (\frac{y}{Y_0})^2 - 2.\frac{x.y}{X_0.Y_0}.cos\varphi = sin\varphi^2$$

If $\varphi = 0\ or\ \varphi = \pi$ then the trajectory will be a line with a phase shift about 45 degree and have $U_x = U_y$.

If $\varphi = \pm\frac{\pi}{2}$ then the trajectory will be a circle and have $U_x = U_y$.

Measurement of R_x

Number	f	R_0	R_x	ε_{R_x}
1				
2				
3				
Average				

Measurement of Z_c and calculate C_x

Number	f	$Z_c = R_0$	C_x	ε_{C_x}
1				
2				
3				
Average				

Measurement of Z_c and calculate C_x

Number	f	$Z_L = R_0$	L_x	ε_{L_x}
1				
2				
3				
Average				

Calculating the resonance frequency

Number	RLC's series circuit	
	f	Δf
1		
2		
3		
Average		