

EASTERN MEDITERRANEAN UNIVERSITY

DEPARTMENT OF ELECTRICAL AND ELECTRONIC  
ENGINEERING

EENG223

CIRCUIT THEORY I

EXPERIMENT 10

INDUCTANCE

Student Name & Student Number

1.....

2.....

3.....

**Object:** To explore the idea of the Inductance of a component. •

Construct the following circuit in Fig. 10.1.

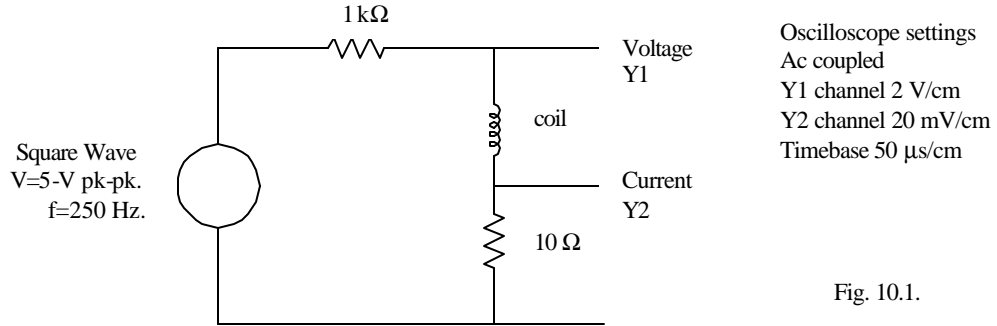


Fig. 10.1.

- Take readings for the current and record them to Table 10.1.
- Take readings from displayed voltage waveform and record them to Table 10.1.

**Table 10.1**

Time (μs)	Current (mA)	Voltage (V)
0		
50		
100		
150		
200		
250		
300		
350		
400		

**Questions:**

1. Plot the current waveform on graph paper, using axes as in Fig. 10.2.
2. Plot voltage graph on Fig. 10.3.
3. Draw a tangent to the current curve at times of 50, 100, 150, 200 and 250 μs and record them to Table 10.2. Also fill in the voltage readings at these times.

**Table 10.2**

Time (μs)	di/dt slope (mA/μs)	Voltage (V)
0		
50		
100		
150		
200		
250		

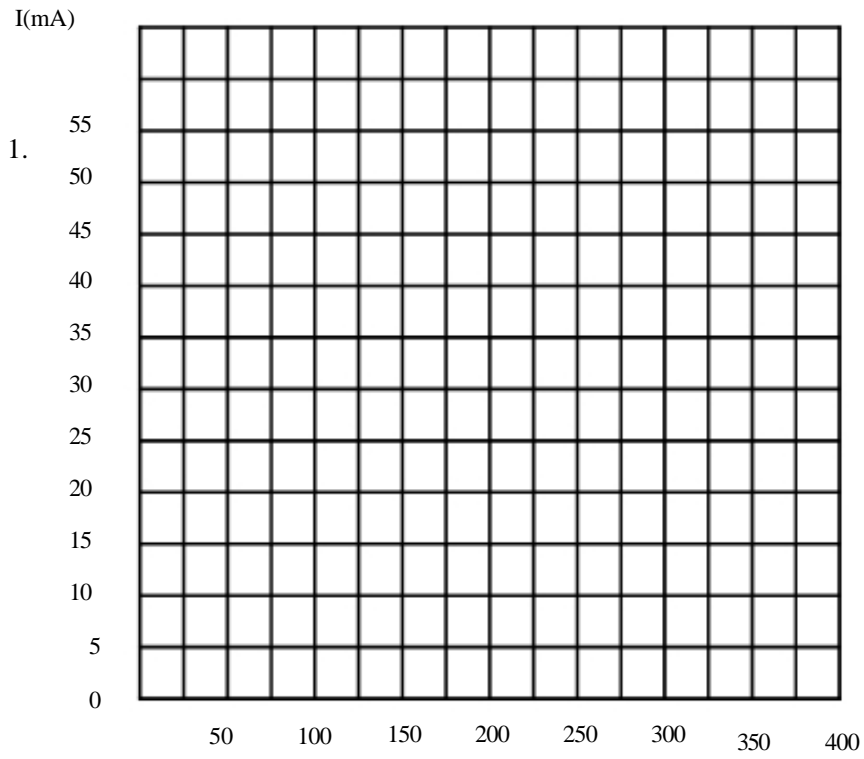


Fig. 10.2.

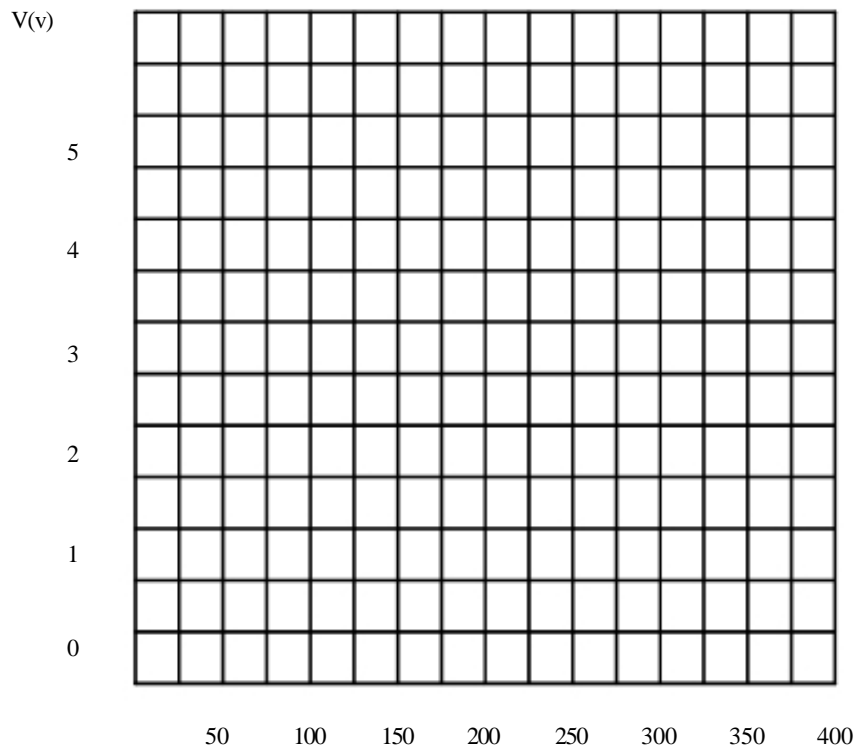


Fig. 10.3.

4. Do you notice any relationship between the voltage and the slope of the current curve?
5. What can you say about the rate of change of current and induced voltage ?
6. Plot to Fig. 10.4 a graph of voltage against rate of change of current, and measure the slope to find the constant of proportionality: its inductance.

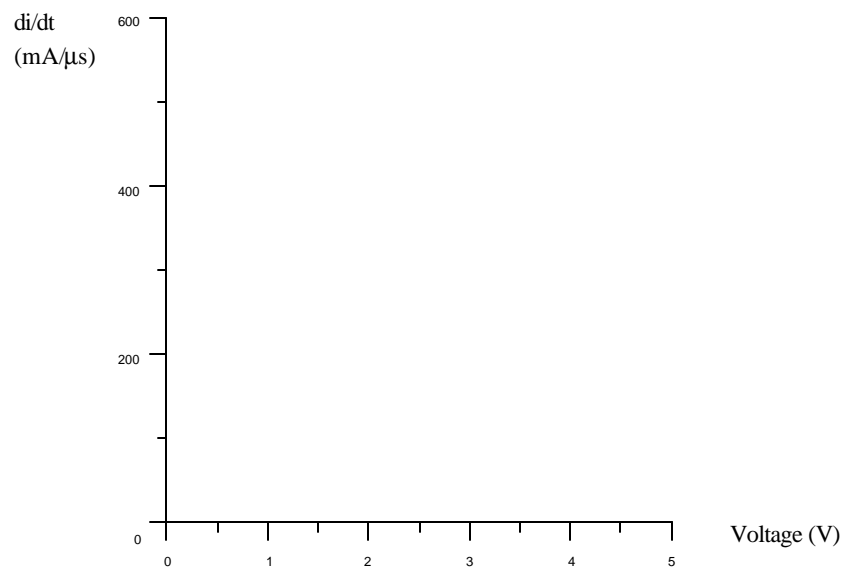


Fig. 10.4.

7. What was the value of inductance found ?
8. Are there any similarities between the charging and discharging curves of current and voltage for an inductor and those for a capacitor ?
9. What is the time constant of LR circuit ?
10. Can you see any relationship between the time constant,  $T$ , found, and the values of  $L$  and  $R$  in the circuit ?