EXPERIMENT #7

FIRST ORDER CIRCUITS

Object :
Experimental verification of the time responses of RC and RL circuits.

Theory :
The details are given in the ELE 203 Circuit Theory I course notes.

1. PRELIMINARY WORK :
1.1 For the circuit given in figure.1, sketch roughly the waveforms of \( V_C(t) \) and \( V_R(t) \).

1.2 For the circuit given in figure.2, sketch roughly the waveforms of \( V_L(t) \) and \( V_R(t) \).
2. EXPERIMENTAL WORK:
2.1 Set-up the circuit shown in figure 3.

a) For $R=47\Omega$, 470$\Omega$, 4.7K$\Omega$, 47K$\Omega$, obtain and sketch the waveforms of $V_C(t)$ and $V_R(t)$; measure the time constants.

b) By changing the frequency of the input signal, notice on the output waveform variations.

![Figure 3](image1.png)

2.1 Set-up the circuit shown in figure 4.

a) For $R=10\Omega$, 1K$\Omega$, 10K$\Omega$, obtain and sketch the waveforms of $V_L(t)$ and $V_R(t)$; measure the time constants.

b) By changing the frequency of the input signal, notice on the output waveform variations.

![Figure 4](image2.png)

3. RESULTS and CONCLUSION:
3.1 Compare your theoretical and practical voltage waveforms, and comment on differences.

3.2 Compare your theoretical and practical time constants for each case, and comment on differences.

EQUIPMENT AND COMPONENTS:
Oscilloscope
Signal Generator
Capacitor: 0.22$\mu$F, Inductor
Resistors: 47$\Omega$ (#1), 100$\Omega$ (#1), 470$\Omega$ (#1), 1K$\Omega$ (#1), 4.7K$\Omega$ (#1), 10K$\Omega$ (#1), 47K$\Omega$ (#1)
HACETTEPE UNIVERSITY
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING
ELE 271 MEASUREMENT LABORATORY

EXPERIMENT #7

Experiment Date :
Group No :
Group Members :

RESULTS :

\[ \text{t(msec)} \]

\[ \text{t(msec)} \]

\[ \text{t(msec)} \]

\[ \text{t(msec)} \]