Title: **Capacitors** Lab: 27

Course: Electrical Applications Unit: Electrical Lab CLO: 2, 3, 4

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Grade \_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**

1. Student shall identify the relationship between voltage and current in a resistive-inductive (RL) circuit.
2. Student shall construct an AC RL circuit, take voltage readings and analyze the results.

**Assessment**

Students shall demonstrate a comprehension of the objectives listed above by scoring a minimum of 75% on this Lab. Grading shall be based on instructor evaluation.

**Materials**

|  |  |
| --- | --- |
| Student Provided Materials | Department Provided |
| Proto-Board | DC Power Supply |
| Multimeter |  |
| Resistor Kit |  |
| Component Kit |  |
| Calculator |  |

**Theory**

A capacitor is a passive two-terminal electrical component that stores potential energy in an electric field. The effect of a capacitor is known as capacitance. While some capacitance exists between any two electrical conductors in proximity in a circuit, a capacitor is a component designed to add capacitance to a circuit. The capacitor was originally known as a condenser. A capacitor is made up of two electrical conductors separated by a dielectric medium. The two electric conductors are often in the form of metallic plates, foil, thin film, sintered bead of metal depending on the size of the capacitor. The nonconducting dielectric acts to increase the capacitor's charge capacity. Materials commonly used as dielectrics include glass, ceramic, plastic film, paper, mica, and oxide layers. Capacitors are widely used as parts of electrical circuits in many common electrical devices. Unlike a resistor, an ideal capacitor does not dissipate energy. When two conductors experience a potential difference, for example, when a capacitor is attached across a battery, an electric field develops across the dielectric, causing a net positive charge to collect on one plate and net negative charge to collect on the other plate. No current actually flows through the dielectric, however, there is a flow of charge through the source circuit. If the condition is maintained sufficiently long, the current through the source circuit ceases.

**Graphic**

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| --- | --- |
|  |  |

**Circuit**



Where;

**Instructions**

Build the circuit shown above.

1. Adjust the power supply to 10V and energize the circuit.
2. With power still applied, remove C1 carefully. Ensure that the leads of the capacitor do not touch each other.
3. With your multimeter, measure the voltage across the C1 leads. Record the voltage. \_\_\_\_\_\_
4. Explain in your own words why the reading from step 3 exists.

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1. Place C1 back into the circuit.
2. Disconnect the power and remove C1 and C2, placing the components in series as shown below. Be careful not to short leads together and notice polarity of each capacitor.



1. Measure and record the voltage across the series connected capacitors. \_\_\_\_\_\_\_\_\_\_\_\_
2. Explain in your own words why the reading from step 7 exists.

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1. Rebuild the original circuit and apply power to the circuit.
2. Disconnect power, remove C1 and C2, placing the components in series as shown. Be careful not short leads together and notice polarity.



1. Measure and record the voltage across the series connected capacitors. \_\_\_\_\_\_\_\_\_\_\_\_
2. Explain in your own words why the reading from step 11 exists.

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Evaluations

1. When connecting a capacitor into a DC circuit, you don’t have pay attention to polarity.
   1. True
   2. False
2. A capacitor resists changes in;
   1. Voltage
   2. Current
   3. Reactance
   4. All the above
3. If a capacitor is charged, it will retain that charge for a very long time unless it is drained.
   1. True
   2. False

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