#### Equipment

- Protoboard Workstation
- Digital Oscilloscope
- DMM

### Objective

Learn how to use the digital oscilloscope

- Measure current
- Assign appropriate uncertainty

Learn how to use breadboard Analyze and construct voltage divider circuits with capacitor Graph V(t) and I(t) relationship

# Conceptual (C-level)

Draw a diagram of a voltage divider with a resistor and capacitor

- What is the time constant?
- How does the behavior of the circuit change if the voltage is AC or DC?

Given the circuit to the right

- Draw V(t) and I(t) for the capacitor charging.
- Draw V(t) and I(t) for the capacitor discharging.

# Basic Lab (B-level)

Construct an RC circuit with a time constant that is less than .1 msec. Measure the exact time constant and determine the capacitance.

Construct a high pass filter. Verify its behavior.

Construct a low pass filter. Verify its behavior.

# Advanced/Extended Lab (A-level)

Design and verify circuits to change a 10 volt AC voltage source to a DC voltage source.

- Half wave rectifier
- Full wave rectifier

What happens to the output voltage when you add a capacitor in parallel across the output voltage?

