

name _____

ID# _____

Experiment 6

Capacitive Reactance

R _____

C _____

V_o _____

approximate
frequency (Hz)

measured
frequency

capacitor
voltage

resistor
voltage

500

750

1000

2000

3000

4000

5000

6000

Analysis

frequency

theoretical
reactance

experimental
reactance

V_C

V_R

$V_0 = \sqrt{V_C^2 + V_R^2}$

Equations and sample calculations:

(10 points)

Pick a frequency and add the magnitudes of the capacitor and resistor voltages. How does this compare to the generator voltage? This seems to contradict Kirchoff's loop law. Why is this not the case?

Questions

1. Look at your table. Also, consider the equation $X_C = \frac{1}{2\pi fC}$. What happens to X_C as the frequency gets very large? **(2 points)**
2. What will happen to the current in the circuit as the frequency gets real large? For **(2 points)**
3. You can see from your data that the resistor and capacitor voltages must be equal for some frequency. Set the resistance and the reactance equal to each other and solve for the frequency. Look at your data and decide if your answer is reasonable. **(3 points)**
4. What would the voltage across the resistor and capacitor be when the voltages are equal? **(3 points)**