Analytical Physics II Laboratory
Dr. Pogo

Due on April 6, 2026

Quiz #9

Name:_____

1. A capacitor has a charge of −50 Coulombs on one plate. What is the charge on the other plate?_____
2. The two plates of a capacitor ($C = 300 \times 10^{-6}$ F) have voltages differing by 7V. What is Q, the magnitude of charge on each plate? $Q =$ _____
3. A capacitor ($C = 400 \times 10^{-6}$ F) is allowed to discharge through a resistor ($R = 30$ kΩ). What is the time constant for this pair, in seconds?

   Time constant = _____ seconds
4. A capacitor starts out at 10 Volts, and then begins to discharge through a resistor. What is the voltage after one time constant has passed?

   V(one time constant) = _____
5. A capacitor starts out at 10 Volts, and then begins to discharge through a resistor. What is the voltage after two time constants have passed?

   V(one time constant) = _____

Problems 6 through 9: A power supply, set to 20.0 V, is used to **charge** a capacitor that starts out at 0 Volts. A resistor $R = 400$ kΩ is used to control the rate of charging, and the time constant is $\tau = 10.0$ seconds.

6. What is the capacitance (in μF)? _____ μF
7. What is the voltage across the capacitor when $t = \tau$? _____ V

   Hint: It starts at zero and rises, rather than starting at 20 and falling!
8. What is the voltage across the capacitor when $t = 2\tau$? _____ V
9. The lab technician starts charging the capacitor on Friday afternoon, and it charges all weekend. When the technician arrives on Monday morning, what is the voltage across the capacitor? _____ V