**Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Start time:**

**PHY2049C, Quiz 5 End time:**

**A- Read all the quiz once, or twice, before beginning to write. Make sure to comprehend all questions and start with those you fell most confident.**

**B – Be clear and concise. There are no extra points for being verbose or writing extra.**

**C –Only use the white pages that I will provide. You have 60 minutes to answer the quiz.**

**---------------------------------------------------------------------------------------------------------------------------**

**Problem 1**

Each resistor shown in the Figure has resistance R. An ideal emf device is connected to points a and b via two leads (not shown in the figure). Find an expression for the current through the emf device.

A circular black and white drawing

AI-generated content may be incorrect.

**Problem 2**

The Figure displays two circuits with a capacitor and a resistance. C1 is discharged, and C2 is charged to a voltage of 9 Volts. R1 =20.0 Ohms and C1 = 5.00 pF. R2 = 10.0 Ohms and C2 = 8.00 pF.   
At time t = 0 both switches are closed. At what time t do the two capacitors have the same charge?

A diagram of a circuit

AI-generated content may be incorrect.

**A circular object with lines and dots

AI-generated content may be incorrect.**

**Problem 3 (extra)**

N real batteries, each with an emf and Internal resistance r, are connected in a closed ring. A resistor R can be connected across any two points of this ring, causing there to be n real batteries in one branch and N — n resistors in the other branch. N is even and greater than 2,and this resistor R splits the circuit in two equal parts. Find an expression for the current through the resistor R in this case.