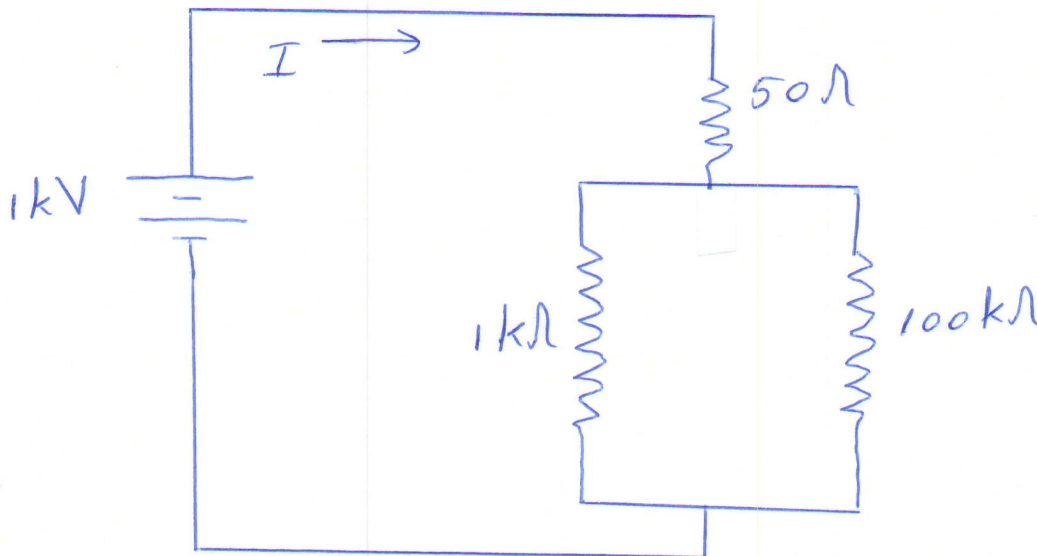


Quiz 10

Name: _____ Student Number: _____

1. Consider the circuit below.



- (3 marks) Find the voltages across each of the 3 resistors.
- (3 marks) Find the currents across each of the 3 resistors.
- (3 marks) Find the power dissipated by each resistor.
- (1 mark) How long would it take for the circuit to dissipate 1 kJ.

$$\text{Total Resistance } R_{TOT} = 50 + \left(\frac{1}{10^3} + \frac{1}{10^5} \right)^{-1}$$

$$= 1040 \Omega.$$

$$\text{Current } I = \frac{1000 \text{ V}}{1040 \Omega} = 0.96 \text{ Amp}$$

$$\text{Voltage across } 50 \Omega \text{ is } 0.96 \text{ A} \times 50 \Omega = 48 \text{ V.}$$

$$\text{Voltage across } 100 \text{ k}\Omega \text{ or } 1 \text{ k}\Omega \text{ is } 1 \text{ kV} - 48 \text{ V} = 952 \text{ V.}$$

$$\text{Current across } 1 \text{ k}\Omega \text{ is } \frac{952 \text{ V}}{1000 \Omega} = 0.95 \text{ A.}$$

$$\text{Current across } 100 \text{ k}\Omega \text{ is } \frac{952 \text{ V}}{10^5 \Omega} = 9.52 \times 10^{-3} \text{ A.}$$

$$\text{Power dissipated by } 50 \Omega \text{ is } (0.96 \text{ A})^2 50 \Omega = 46 \text{ W.}$$

$$\text{" } 1 \text{ k}\Omega \text{ is } (0.95 \text{ A})^2 1 \text{ k}\Omega = 906 \text{ W.}$$

$$\text{" } 100 \text{ k}\Omega \text{ " } (9.52 \times 10^{-3})^2 10^5 = 9.06 \text{ W}$$

$$P_{TOT} = 46 + 906 + 9.06 = 961 \text{ W.}$$

$$\text{Time to dissipate } 1 \text{ kJ} = \frac{1000 \text{ J}}{961 \text{ W}} = 1.04 \text{ sec.}$$