ECSE-200 Electric Circuits 1

Quiz #3 (Feb. 1, 2019)

**LAST NAME** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **MCGILL ID#** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**FIRST NAME­­­­­­­­­**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**SIGNATURE**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* ***Only Faculty standard calculator accepted***
* ***Show all your work***
* ***Clearly indicate your final answer with SI units and SI multiplier***
* ***You have 45 minutes to complete this quiz***
* ***Plagiarism will have important consequences***

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**Question 1**. Consider the circuit shown. Answer the following questions.

1. How many nodes are there in this circuit? [1 pt]
2. Identify the super-node in the circuit [1 pt]
3. What is the current supplied by the dependent current source? [2 pt]
4. What is the total power absorbed by both resistance? [2 pt]

A close up of a clock

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**Question 2.** Consider the circuit shown below. Answer the following questions.

1. How many super-nodes are there in this circuit? Identify them. [1 pt]
2. Using the node voltage method, find the value of the voltage ***vA*** across the 6 Ω resistor. [2 pt]
3. How much power does the independent current source deliver or absorb? [1 pt]
4. How much power is absorbed by the 12 Ω resistor? [1 pt]

A close up of a clock

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**Question 3**. The practical voltmeter used to measure *vx* in the circuit shown below is a D’Arsonval galvanometer with a full-scale current (*iFS*) of 1 mA (), an internal resistance *RM* of 25 Ω (due to the wire loop resistance), and a series resistance *Rs* chosen such that the full-scale meter current (*iFS*) is reached with 100 V at the voltmeter terminals. Answer the following questions.

1. What is the value of *vx* if an ideal voltmeter was used to make the measurement? [1 pt]
2. What is the value of the series resistance *Rs* in the practical voltmeter used to measure *vx*? [2 pt]
3. What is the measured voltage *vx* by the practical voltmeter? [1 pt]
4. To decrease the measurement error on the voltage *vx*, should a larger series resistance *Rs* be used or a smaller series resistance *Rs* be used? Justify your answer. [1 pt]

A screenshot of a cell phone

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Extra working space.