ECSE-200 Electric Circuits 1 - Quiz #12 (April 12, 2019)

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

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

* ***Only Faculty standard calculator accepted***
* ***No cellphone allowed***
* ***Show all your work***
* ***Clearly indicate your final answer with the SI unit and multiplier***
* ***You have 45 minutes to complete this quiz***

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**Question 1:** Consider the circuit shown. The circuit is in dc steady state for with the inductor storing zero energy. Answer the following questions.

1. Plot as a function of time *t* if where is the unit step function. [1 pt]
2. A screenshot of a cell phone

   Description automatically generatedPlot as a function of time *t* if . [1 pt]

For the following questions, assume .

1. Solve for the voltage for . [2 pt]
2. Solve for the voltage for . [2 pt]
3. Plot the voltage versus time *t*. Clearly indicate the initial and final voltage values for each interval and the time constants. [2 pt]

Extra Working Space

**Question 2:** Consider the circuit shown. is the unit step function and the current-controlled voltage source has a gain of B. The circuit is in dc steady state at . Answer the following questions.

1. Determine if the circuit is stable for if B = 1 V/A. [2 pt]
2. A screenshot of a cell phone

   Description automatically generatedDetermine the value of the gain B of the dependent source for which the stability condition will change at . [2 pt]

Extra Working Space