1) Consider the circuit shown in Figure 1 below.

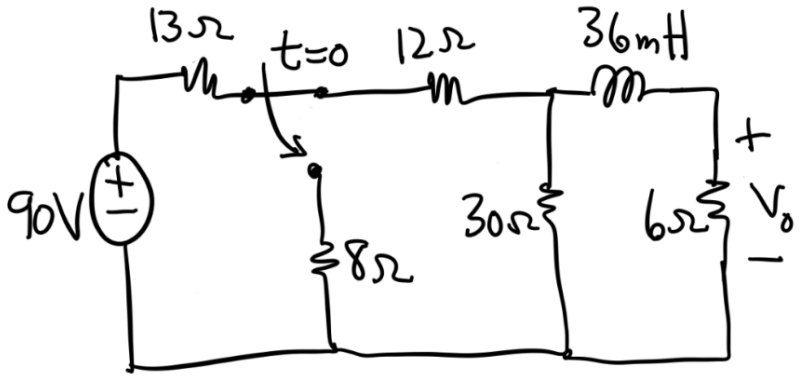

Figure 1. Circuit for Problem 1.

a) The response $V_0(t)$ for $t > 0$ can be written as

$$V_0(t) = A + Be^{-ct},$$

where A and B are in units of volts and c has units of rps (i.e., rad/sec; c is the reciprocal of the time constant). State your by-hand solutions for A, B, and c, and list your A, B, and c values with appropriate units in proper engineering notation format with two decimal places of precision.

Also, sketch the response. Label the plot axes on your sketch and otherwise make your sketch neat-looking and easy to comprehend.

b) Use the LTSpice verification testbench which has been provided to you to verify your by-hand answers for A, B, and c. List the *maxerror* value you attained from the LTSpice verification testbench; you should ensure that the *maxerror* value listed in the Spice Error Log (ctrl-L) is less than or equal to the value given in the testbench comment. If you do not achieve a *maxerror* less than or equal to the value given in the testbench comment, **something is wrong**, and you should work to resolve the issues with your by-hand solutions for A, B, and c prior to submitting. Attach a screenshot of the Spice Error Log showing the value of *maxerror* that you attained.

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2) Consider the circuit shown in Figure 2 below.

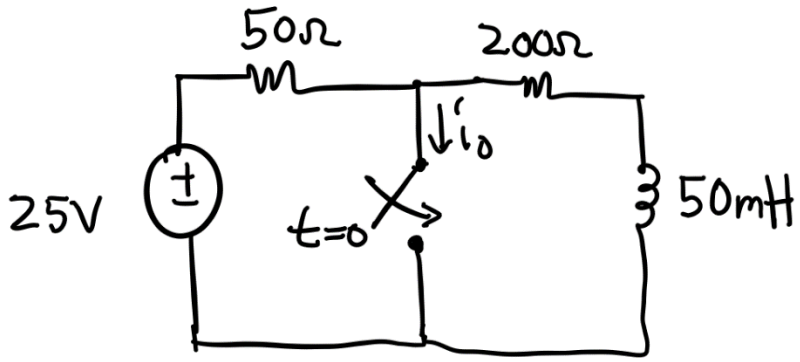

Figure 2. Circuit for Problem 2.

a) The response $i_0(t)$ for $t > 0$ can be written as

$$i_0(t) = A + Be^{-ct},$$

where A and B are in units of amps and c has units of rps (i.e., rad/sec; c is the reciprocal of the time constant). State your by-hand solutions for A, B, and c, and list your A, B, and c values with appropriate units in proper engineering notation format with two decimal places of precision.

Also, sketch the response. Label the plot axes on your sketch and otherwise make your sketch neat-looking and easy to comprehend.

b) Use the LTSpice verification testbench which has been provided to you to verify your by-hand answers for A, B, and c. List the *maxerror* value you attained from the LTSpice verification testbench; you should ensure that the *maxerror* value listed in the Spice Error Log (ctrl-L) is less than or equal to the value given in the testbench comment. If you do not achieve a *maxerror* less than or equal to the value given in the testbench comment, **something is wrong**, and you should work to resolve the issues with your by-hand solutions for A, B, and c prior to submitting. Attach a screenshot of the Spice Error Log showing the value of *maxerror* that you attained.

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3) Consider the circuit shown in Figure 3 below.

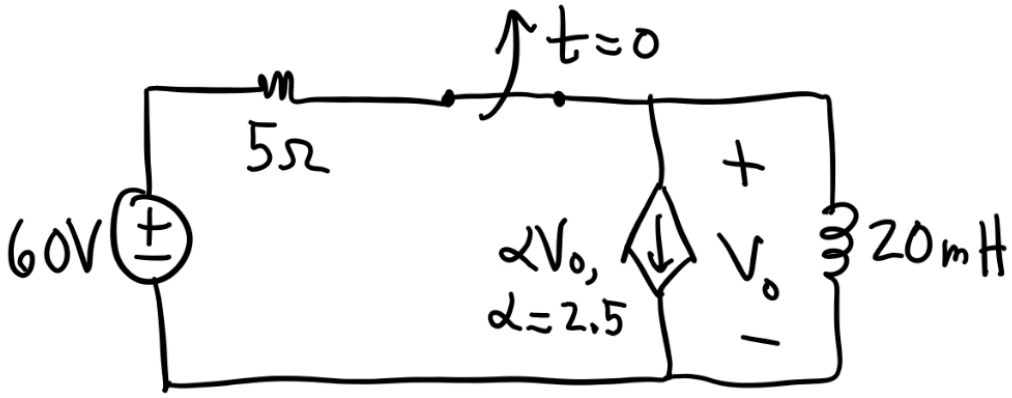

Figure 3. Circuit for Problem 3.

a) The response $V_0(t)$ for $t > 0$ can be written as

$$V_0(t) = A + Be^{-ct},$$

where A and B are in units of volts and c has units of rps (i.e., rad/sec; c is the reciprocal of the time constant). State your by-hand solutions for A, B, and c, and list your A, B, and c values with appropriate units in proper engineering notation format with two decimal places of precision.

Also, sketch the response. Label the plot axes on your sketch and otherwise make your sketch neat-looking and easy to comprehend.

b) Use the LTSpice verification testbench which has been provided to you to verify your by-hand answers for A, B, and c. List the *maxerror* value you attained from the LTSpice verification testbench; you should ensure that the *maxerror* value listed in the Spice Error Log (ctrl-L) is less than or equal to the value given in the testbench comment. If you do not achieve a *maxerror* less than or equal to the value given in the testbench comment, **something is wrong**, and you should work to resolve the issues with your by-hand solutions for A, B, and c prior to submitting. Attach a screenshot of the Spice Error Log showing the value of *maxerror* that you attained.

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4) Consider the circuit shown in Figure 4 below.

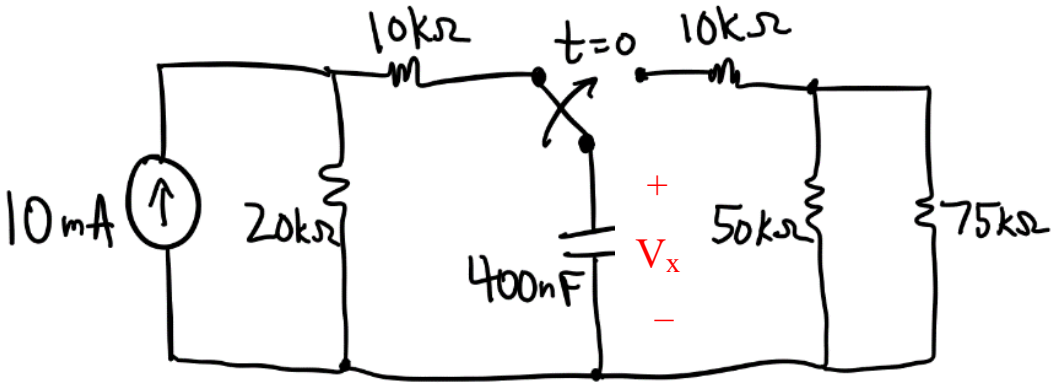

Figure 4. Circuit for Problem 4.

a) The response $V_x(t)$ for $t \geq 0$ can be written as

$$V_x(t) = A + Be^{-ct},$$

where A and B are in units of volts and c has units of rps (i.e., rad/sec; c is the reciprocal of the time constant). State your by-hand solutions for A, B, and c, and list your A, B, and c values with appropriate units in proper engineering notation format with two decimal places of precision.

Also, sketch the response. Label the plot axes on your sketch and otherwise make your sketch neat-looking and easy to comprehend.

b) Use the LTSpice verification testbench which has been provided to you to verify your by-hand answers for A, B, and c. List the *maxerror* value you attained from the LTSpice verification testbench; you should ensure that the *maxerror* value listed in the Spice Error Log (ctrl-L) is less than or equal to the value given in the testbench comment. If you do not achieve a *maxerror* less than or equal to the value given in the testbench comment, **something is wrong**, and you should work to resolve the issues with your by-hand solutions for A, B, and c prior to submitting. Attach a screenshot of the Spice Error Log showing the value of *maxerror* that you attained.