

Assignment 1B (25 marks) – Lab Week3

Due: End of your week Four's lab period

Simple Series Circuits**PURPOSE OF LAB:**

The purpose of this lab is to confirm your understanding of the course lecture material by building and analyzing several simple electronic circuits that contain batteries, switches, resistors, lamps, and fuses.

I highly recommend that you make notes of the lab video and that you understand the concepts contained in this lab, as other assessments in the course will test you on this knowledge.

If you have ANY questions concerning this material, please ask me during the lab period. Remember – this is a LEARNING process.

Work Directory Structure

All of the files in this lab should be stored on your hard drive or flash drive called CST8216\Lab3.

Save your work OFTEN!

Lab Procedure**Lab Week Three Prelab Work - Multisim Test Equipment Videos**

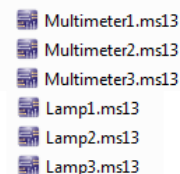
Prior to commencing with this lab exercises, download the Multisim Test Equipment tutorial file, which is located on Brightspace in the same folder as this document. After downloading the file, unzip it and click on the .mp4 file to view the video.

Note: Within the video there are questions about some important concepts that you should understand. If you have difficulty with the questions or you would like clarification on their answers, then use your lab time to discuss this material with me.

Assignment_1B_Exercise1: (2 Marks)

Download the Lab Week Three video, which is located on Brightspace in the same folder as this document.

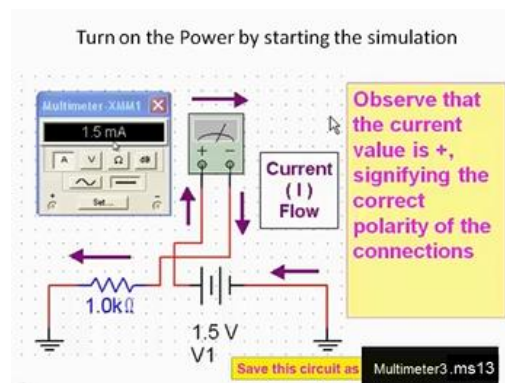
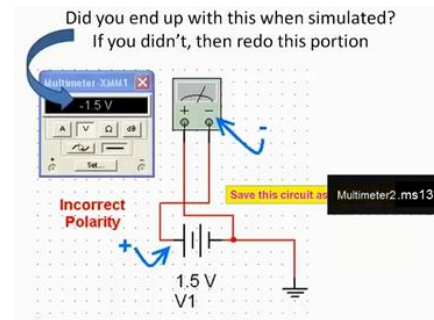
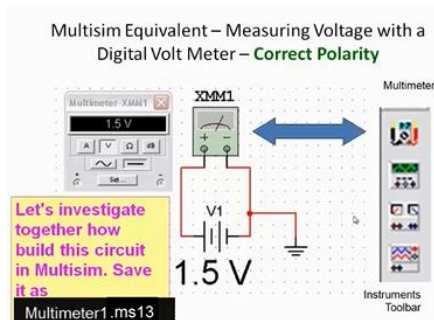
After downloading the file, unzip it and click on .mp4 file to view the video.



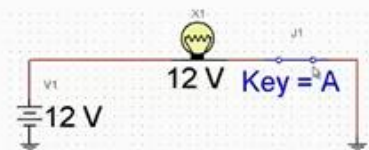
Once you have completed the instructions in the video, you should have the following six files in your CST8216\Lab3 folder:

Once you have created the 6 circuits and analyzed them, Zip you files and post them into Brightspace **Assignment_1B_Exercise1**

Note: Multisim version we are using now is 14.2 , files should have extension .ms14



Current Does Flow Here...



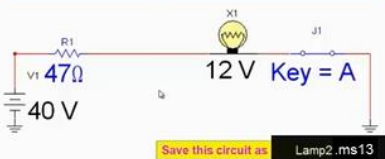
because the circuit is a CLOSED loop...

Build this circuit now in Multisim and test it.

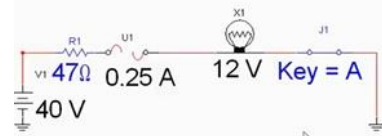
Save this circuit as

Lamp1.ms13

After saving your previous circuit, change its configuration as shown and test it, observing that the lamp burns out.



Fuse will blow (open) before lamp burns out



After saving your previous circuit, change its configuration as shown and test it, observing that the fuse blows (e.g. the fuse opens).

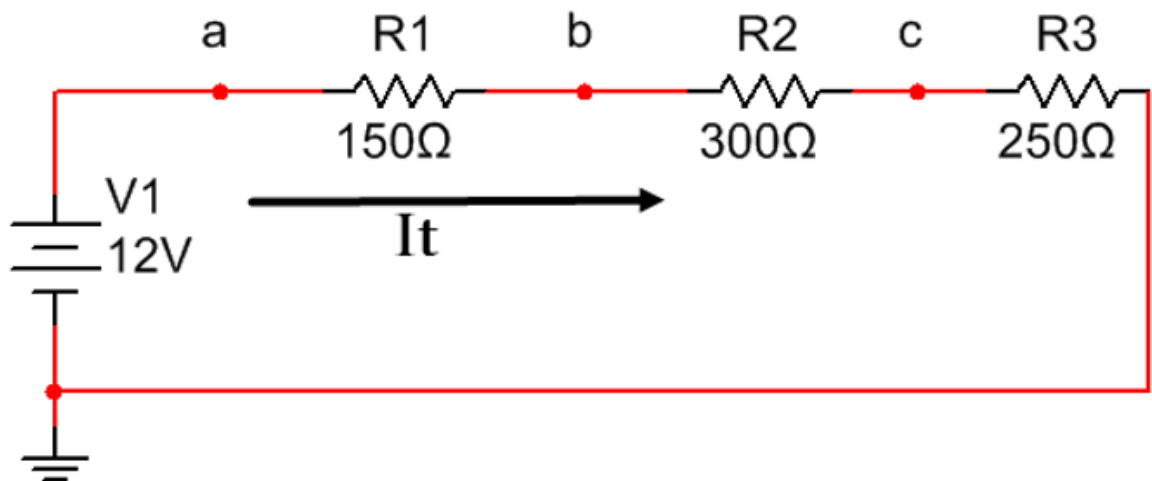
Save this circuit as

Lamp3.ms13

Assignment_1B_Exercise2: (6 Marks)

Neatly complete the following Circuit1 questions in your notebook than submit your answer in Brightspace under **Assignment_1B_Exercise2_Quiz**

Circuit1:

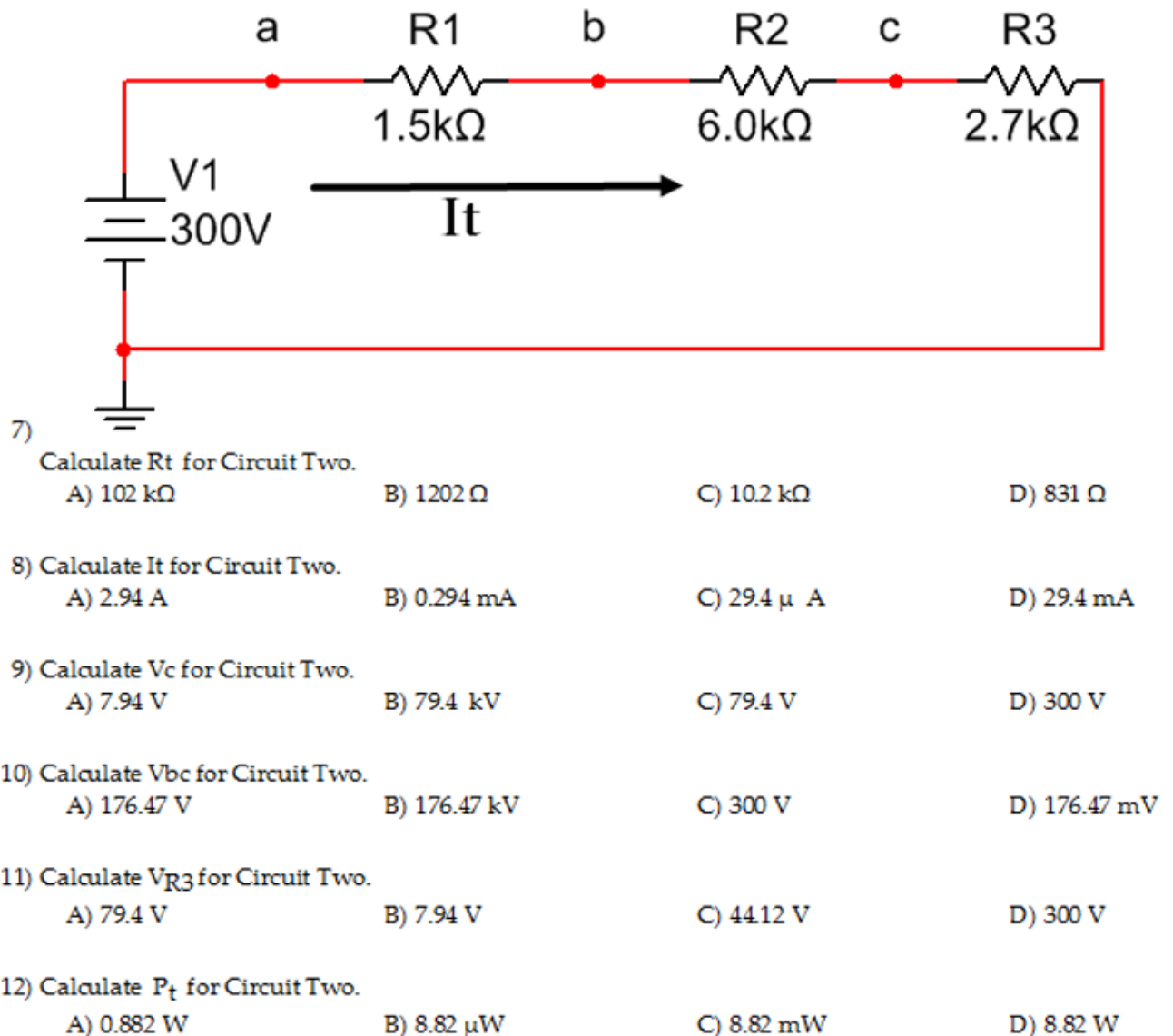


- 1) Calculate R_t for Circuit One.
A) 500 Ω B) 700 Ω C) 36.6 Ω D) 350 Ω
- 2) Calculate I_t for Circuit One.
A) 1.7 A B) 171.4 mA C) 17.14 mA D) 17.14 μ A
- 3) Calculate V_b for Circuit One.
A) 2.57 V B) 9.43 V C) 5.14 V D) 12 V
- 4) Calculate V_{ab} for Circuit One.
A) 2.57 V B) 9.43 V C) 5.14 V D) 12 V
- 5) Calculate V_{R3} for Circuit One.
A) 12 V B) 0 V C) 5.14 V D) 4.29 V
- 6) Calculate P_t for Circuit One.
A) 12 V B) 205.7 mW C) 205.7 W D) 205.7 μ W

Assignment_1B_Exercise3: (6 Marks)

Neatly complete the following Circuit2 questions in your notebook than submit your answer in Brightspace under **Assignment_1B_Exercise3_Quiz**

Circuit2:



Assignment_1B_Exercise4: (6 Marks)

Neatly complete the following question for Circuit Three in your notebook than submit your answer in Brightspace under **Assignment_1B_Exercise4_Quiz**

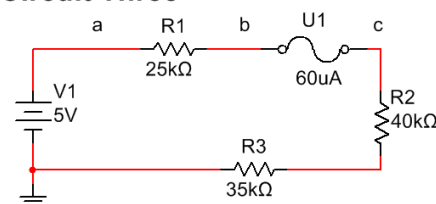
For full credit:

Pay attention to the correct engineering prefixes (e.g. k, m, μ , p, M) and correct symbols (e.g. V, A, Ω , W) in all your calculations. Pay attention also to your CaPiTaLiZaTiOn (example MV \neq mV, K \neq k).

①

mark each

Circuit Three



#	Required Calculation	Solution	Answer
c	Calculate V_{R1}	$V_{R1} = I \times R_1$ $= 60\mu A \cdot 4k\Omega$ $= 24mV$ <p>← Formula ← Calculation</p>	$V_{R1} = 24mV$

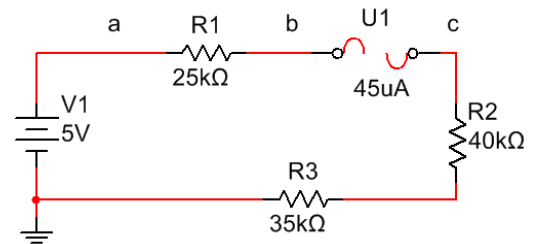
#	Required Calculation	Solution	Answer
a	Calculate the Total Resistance (R_t).		
b	Calculate the Total Current (I_t). Express your answer in microamperes using correct engineering notation.		
c	Calculate V_{R1}		
d	Calculate V_{R2}		
e	Calculate V_{R3}		
f.	Calculate V_b (Do NOT use $V_b = V_{R2} + V_{R3}$)		

Assignment_1B_Exercise5: (2 Marks)

Assume that someone replaced Circuit Three's fuse with a one that has a smaller current rating and that the fuse has blown as shown in Circuit Four. Calculate V_b again, including all formulas used in your calculation.

Neatly complete the following question for Circuit4 in your notebook, take a picture of you work than submit it in Brightspace under **Assignment_1B_Exercise5**

Circuit Four



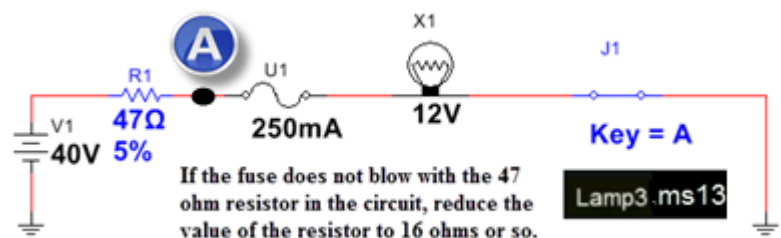
#	Required Calculation	Solution	Answer
a	Calculate V_b		

Assignment_1B_Exercise6: (3 Marks)

Demonstration of Multisim Circuit

Demonstrate Lamp3.ms13 during your lab period. Be prepared to explain to me how a fuse works and be able to measure the voltage on the right-hand side of R1 (e.g. at Point A) with respect to ground by correctly using a multimeter. What you should be demonstrating is V_A before and after the fuse blows.

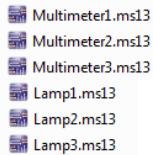
Have the Multimeter correctly set up to measure V_A before you come up to demonstrate this circuit.



Assignment 1B (30 marks) – Lab Week Three**Due: End of your week4 Lab period****Simple Series Circuits****PURPOSE OF LAB:**

The purpose of this lab is to confirm your understanding of the course lecture material by building and analyzing several simple electronic circuits that contain batteries, switches, resistors, lamps, and fuses. You will also analyze series circuits, and work with engineering notation.

To gain credit for this portion of Week3 lab, *independently* complete the lab exercise and questions on the pages (1 to 6) and submit under their specific Brightspace ASSIGNMENT by the due date.

Task#		Marks
1	Assignment_1B_Exercise1: Submit the following circuits created and analyzed 	/ 2 marks
2	Assignment_1B_Exercise2: Resolve circuit 1	/ 6 marks
3	Assignment_1B_Exercise3: Resolve circuit 2	/ 6 marks
4	Assignment_1B_Exercise4: resolve circuit 3	/ 6 marks
5	Assignment_1B_Exercise5: resolve circuit 4	/ 2 marks
6	Assignment_1B_Exercise6: Demonstrate Lamp3.ms13	/ 3 marks

Total: _____ / 25 marks