Tips for the Quiz Component of Lab Exam

There will be a few multiple choice and long answer questions to complete while you are sitting at your desk. This will exclusively cover dynamic electricity topics you need to be comfortable with include:

- Ohm's Law
- Factors affecting conductance
- How to calculate electrical power
- How to draw and recognize components of electrical circuits (including voltmeters and ammeters)
- The difference between series and parallel circuits

NOTE: This quiz won't feature any questions on electrical energy.

Here are some practice questions:

1. If you look at the side of a TV, you may find a rating plate such as this one:

240 V	Model CT-M6
50 Hz	130 W

a. Determine the electrical current flowing through this TV. Show your work

$P = 130\ W$ $\quad P = VI$ $\quad \frac{P}{V\ I}$

$V = 240\ V$

$I = ?$

$I = \frac{P}{V} = \frac{130\ W}{240\ V} = 0.54\ A$

b. What is the resistance of this TV?

$V = 240\ V$ $\quad V = IR$ $\quad \frac{V}{I\ R}$

$I = 0.54\ A$

$R = ?$

$R = \frac{V}{I} = \frac{240\ V}{0.54\ A} = 444.4\ \Omega$

2. What are the four factors you should consider in trying to choose a wire with as little resistance as possible?

thickness, length, temperature, material

3. A current of 50 mA flows through a 100 Ω resistor. Determine the electrical power generated.

$V = ?$

$I = 50\ mA = 0.05\ A$

$R = 100\ \Omega$

$V = I \times R$

$= 0.05\ A \times 100\ \Omega$

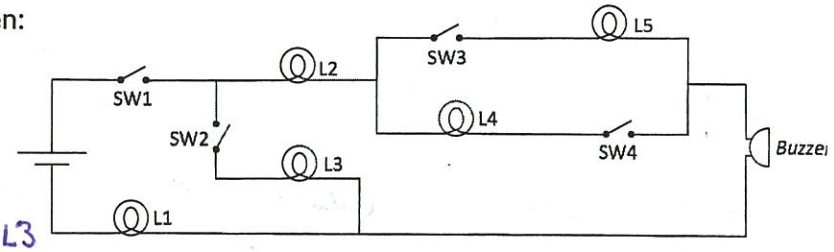
$= 5\ V$

$P = V \times I$

$= 5\ V \times 0.05\ A$

$= 0.25\ W$

4. Indicate which lights (and the buzzer) are on when:



a. Switch 1 and 2 are closed: L1, L3

b. Switch 1 and 3 are closed: L2, L5, Buzzer, L1

c. Switch 1, 2, and 4 are closed: L2, L4, Buzzer, L1, L3

d. Switch 2, 3, and 4 are closed: Everything is off

(Assume all switches that are not mentioned for each case remain open)

Tips for the Lab Component of Lab Exam

You will be provided with a resistor of unknown resistance. By connecting it in a circuit and recording different data points for current intensity and voltage, you will graphically determine the resistance by calculating a slope. Here are some useful tips:

- Make sure that your table has the parameters and unit of measurement specified. Make sure you have the correct number of significant digits as well. (For example, if you have a current of 0.05 A, the voltage should be 1.00 V and not 1 V).
- Label both your axes and indicate the unit of measurement (it is not enough to just write 'V' and 'A'). **Current** is the ***x***-component and **voltage** is the **y**-component.
- Choose a suitable scale for your graph by carefully analyzing your data. Remember, all your data points should fit in the graphing area, and you should be using at least half of the entire area.
- Give your graph an explanatory title. Do not use abbreviations in this title.
- Plot all your points carefully. Put point protectors (small circles) around each data point.
- Draw a line of best fit that is as representative of your data's trend as possible. Label this line.
- Choose two points that are far apart on this line (**that are NOT data points**) and label them with a triangle or some other symbol that clearly distinguishes them from your data points. Then, use their coordinates to find the slope. This will be your resistance.

Here is one more example to practice with:

1st resistor

Current (A)	Voltage (V)
0	0
0.01	1.00
0.02	2.10
0.03	2.90
0.04	4.00
0.05	5.20

Convert to Amps!

2nd resistor

Current (mA) → A	Voltage (V)
0 → 0	0
10 → 0.01	2.0
20 → 0.02	4.1
30 → 0.03	5.9
40 → 0.04	8.0
50 → 0.05	9.9

Slope $= \frac{V_2 - V_1}{R_2 - R_1}$

R_1: $\frac{4.6 - 0.6}{0.045 - 0.005} = \frac{4}{0.04}$

$= 100\ \Omega$

R_2: $\frac{9 - 1.4}{0.045 - 0.006} = \frac{7.6}{0.039}$

$= 194.87\ \Omega$