MAE221 Thermodynamics Lab – Lab 1.1 ***(20 Marks)***

Name:

Lab Day:

***Instructions:*** Complete this worksheet as you work through the labs. Once completed, submit it through Canvas (Gradescope) before the start of your next lab.

The following circuits were constructed in step 3 of the lab. Answer the following questions on these circuits:

***Exercise 1***

|  |  |
| --- | --- |
| Figure 1: Circuit diagram for setup 1 | ***From Ohm’s Law what is expected current passing through the circuit? (2 Marks)***  ***Using the Multimeter, measure the current***  ***(1 Marks)*** |

***Exercise 2***

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Figure 2: Circuit diagram for setup 2. | **Measure the voltage drop across each resistor and then calculate the current passing through each resistor using Ohm’s Law (4 Marks)**   |  |  |  | | --- | --- | --- | | Measured  Resistor |  |  | | Measured |  |  | | Calculated |  |  |   ***What does this say about the current in a series circuit? (1 Mark)*** |

***Exercise 3***

***Matt is soldering together 1000 fairy lights (LEDs). Each LED has a resistance R. Should he solder them in series or parallel? Draw a circuit diagram of a subsection of this light arrangement using (3 LEDS) and justify your circuit selection.***

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| --- | --- |
| Circuit Diagram ***(2 marks)*** | Explanation ***(2 Marks)*** |

***Exercise 4***

***Produce a graph of the current at the LED versus the output voltage for the 470 and 1000 resistors as well as the Voltage in vs Voltage at LED. These plots will be directly output from the “[Voltage\_vs\_Current\_Curve.m](https://github.com/MAE221/Thermodynamics-Lab/wiki/LED_Voltage_vs_Current_Curve.m)” program.***

|  |  |
| --- | --- |
| ***(2 Marks)*** | ***(2 Marks)*** |

Answer the following questions on the above plots:

***Can the slope of the Current/Voltage curve be explained with resistor value? (2 Marks)***

***Is the diode is a linear or non-linear device? (2 Marks)***