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Week 3 Studio 1

Group 4b

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**Activity 1: Characterising the I-V characteristics of the Red, Green, and Blue LEDs within an RGB LED Lamp**

IR=(5-VR)/RR

IG=(5-VG)/RG

IB=(5-VB)/RB

Actual Voltage: 5.00V

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Resistance Values for RR, RB, and RG | | | | |
| Nominal resistance → | | 150 Ω | 330Ω | 560Ω | 820Ω | 1500Ω |
| Measured resistance → | | 148.9 | 326.3 | 550.5 | 798.9 | 1467 |
| Red  LED | Measured  voltage VR (V) | 2.002 | 1.917 | 1.869 | 1.839 | 1.796 |
| Calculated  Current IR (mA) | 20.134 | 9.448 | 5.688 | 3.957 | 2.184 |
| Green  LED | Measured  voltage VG (V) | 3.108 | 2.904 | 2.778 | 2.694 | 2.572 |
| Calculated  Current IG (mA) | 12.707 | 6.424 | 4.036 | 2.886 | 1.655 |
| Blue  LED | Measured  voltage VB (V) | 3.115 | 2.952 | 2.865 | 2.813 | 2.74 |
| Calculated  Current IB (mA) | 12.660 | 6.276 | 3.878 | 2.738 | 1.541 |

Observation:

The graphs are not linear. They are polynomial in nature and they have similar shape with those provided in the datasheet for the RGB LED Lamp. The values are similar as the datasheet. However, we cannot obtain the higher voltage and current part of the graph from the datasheet as insufficient lab data points collected. We should collect more data points and include more than 5 resistance values per graph to move our graphs closer to those in the datasheet.

**Activity 2: Biasing the Red, Green, and Blue LEDs with appropriate resistors to achieve a desired colour**

Actual Voltage: 5.00V

Power Consumed = VI

Power Loss = (I^2)R

|  |  |  |  |
| --- | --- | --- | --- |
|  | Red LED | Green LED | Blue LED |
| Current I (mA) | 20 | 2 | 2 |
| Voltage V (V) | 2 | 2.6 | 2.8 |
| Resistance R ( Ω ) | 150 | 1200 | 1100 |
| Actual Resistance R ( Ω) | 148.9 | 1168.0 | 1109.6 |
| Power Consumed (W) | 0.04 | 0.0052 | 0.0056 |
| Power Loss(W) | 0.06 | 0.0048 | 0.0044 |
| Efficiency (%) | 40 | 52 | 56 |

Mystery Colour A

After constructing the circuit, the colour is pinkish.