**Part A: Complete the circuit**

A student has the following partial circuit set up for a light meter.

I will fix this diagram later...

There are the following additional components available:

* LDR
* Resistors (all standard resistors available)
* Connecting wires

**Method:**

1. Given your LDR, determine the necessary components to create the voltage divider to drive the IC.
2. List the steps and calculations to complete this portion of the circuit.

**Steps and Calculations**

1. Construct the voltage divider on the circuit board. Draw the circuit onto the board above. Show the teacher that it works.

CHECKPOINT 1: \_\_\_\_\_\_\_\_\_\_\_\_\_

**Part B: Collecting data**

|  |  |
| --- | --- |
| **Step 1** | Measure Vt (Total Voltage) supplied by battery |
|  |  |
| **Step 2** | Measure across R1 the Voltage (V1) when the LDR is totally dark and totally light |
|  |  |
| **Step 3** | Measure across R1 the Voltage (V1) to light up the appropriate number of LEDs |
|  |  |
| **Step 4** | Given the known R of R1 calculate I using I=V1/R1 |
|  |  |
| **Step 5** | Using the calculated I, calculate the total Rt by Rt = Vt/I |
|  |  |
| **Step 6** | Now using Rt calculate R2 = Rt - R1 |
|  |  |
| **Step 7** | Plot R2 against V1 |
|  |  |
|  | **Note:** V1 is the voltage we are using to control the input to the LED driver chip |
|  |  |
| **Step 8** | Plot R2 against LDR Status |

There is debate in the class that the number of LEDs lit up is directly proportional to the intensity of the light. Your task is to collect data from your circuit to prove or disprove this assumption.

Not sure if I’ll give you these steps in the exam yet...

**Method**:

**Data:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***LDR status*** | ***Vin*** | ***V1*** | ***Rb*** | ***I*** | ***Rtot*** | ***RLDR*** |
| ***Dark*** |  |  |  |  |  |  |
| ***1*** |  |  |  |  |  |  |
| ***2*** |  |  |  |  |  |  |
| ***3*** |  |  |  |  |  |  |
| ***4*** |  |  |  |  |  |  |
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| ***7*** |  |  |  |  |  |  |
| ***8*** |  |  |  |  |  |  |
| ***9*** |  |  |  |  |  |  |
| ***10*** |  |  |  |  |  |  |
| ***Light*** |  |  |  |  |  |  |

**Graph:**

Plot

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Checkpoint 2: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part C: Analysis of Results**

Draw conclusions

Justify these conclusions

Generalise from the data

Make recommendations

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| Checkpoint 3: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

