Year 11 Physics: Electricity Marks: 10

Time: 25 mins

Series and Parallel circuits: **Practical Group** Assessment

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

You have been given 4 resistors: Two of them are 10 Ohm and Two of the are 20 Ohm. Your task is to design a circuit with a total circuit resistance of **5 Ohm.** You may complete questions 1, 2 and 3 in any order you wish.

Equipment:

* Voltmeter (0-12V)
* Ammeter (0-5A)
* Switch
* Power Supply (0-12V DC)
* Electrical leads
* Two 10 Ohm resistors
* Two 20 Ohm resistors

1. Using only the materials provided, draw a circuit that has a total resistance of . Include an ammeter and voltmeter that would measure the total circuit current and total circuit potential difference. (2 marks)

2. Using equations from your formula sheet, show that the total resistance of your circuit is equal to (3 marks)

3. Set up the Physical circuit with a total resistance of . Call the teacher to view the circuit before you turn it on.

a) Marks are awarded for safety and correctness (2 marks)

b) The Ammeter and Voltmeter should be set up to measure the circuit current and circuit potential. Measure these readings across five different supply Voltages to determine the average total circuit resistance. (3 marks)

|  |  |  |  |
| --- | --- | --- | --- |
| Supplied voltage (V) | V (circuit) | I (circuit) | R (  Resistor (a) |
| 2 |  |  |  |
| 4 |  |  |  |
| 6 |  |  |  |
| 8 |  |  |  |
| 10 |  |  |  |
|  |  |  |  |
|  |  | Average: |  |

Year 11 Physics: Electricity Marks: 12

Series and Parallel circuits: **Individual** Assessment

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. The following circuit is a compound resistive electrical circuit with 4 resistors. One of the resistor values is unknown. Use your knowledge of compound electrical circuits to determine the value of the unknown resistor. Provide all workings. (6 marks)

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Description automatically generated

2. You have been given two 10 resistors and two 20 resistors. Design a resistance network to the given value in the following question using all four, or fewer, resistors and show your full calculations.

A resistor network that has a resistance of 15 (3 marks)

3. A circuit has a 12 v power supply on a 100 resistor. A short circuit occurs, allowing current to bypass the resistor along a conductor with a resistance of 0.001 . The house is equipped with a circuit breaker that triggers if the drawn current is greater than 20 A. Will the circuit breaker trigger? Show your reasoning. (3 marks)

**End of written assessment**