

Year 11 Physics

Electricity Practical Assessment

Power supply
number

Name: _____
Teacher: _____

Mark:
(15)

Determining the relationship between potential difference and current in a resistor.

The amount of current flowing in a metallic conductor depends on the amount of charge flowing past a point per unit time.

If you apply a potential difference, V , across the ends of a conductor it will cause a current, I , to flow. You can use a voltmeter to measure the electrical potential difference, V , between the ends of a metal wire resistor and you can measure the current, I , in that resistor with an ammeter.

In this experiment you will investigate the relationship between current and potential difference.

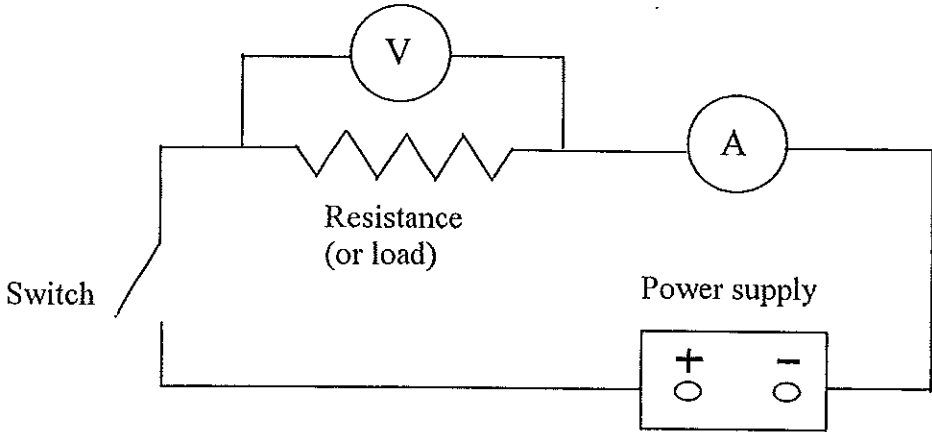
Equipment needed:

Power supply (0-12 V DC)
Electrical leads (6 of)
Single globe (12 V)

Voltmeter (0-12V)
Ammeter (0-5A)

Switch
Unknown resistor (1 only)

Procedure:

1	Before connecting the circuit using the voltmeter measure and record the terminal voltage of the power supply without any load in the bold column in the table below.
2	Connect the equipment as shown in the circuit diagram below. 
3	Set the power supply to the minimum output with the unknown resistor connected to your circuit. Set both meters to the maximum reading before turning on the power supply to ensure correct polarity. With the meters working correctly continue with the lab test.
4	Adjust the power supply output to get five different readings of potential difference and current. NB: Do NOT run the circuit for more than 15-20 seconds. If the current is too high it may overheat the resistor, damaging it.
5	Repeat steps 3 and 4, replacing the 12V globe as the unknown resistor. (Check that the globe is 12 V)

Processing results:

1. Record your results for the unknown resistor. Calculate & record the values for V / I .

Reading	Terminal voltage	Current (A or mA)	Potential difference (V)	V / I
1				
2				
3				
4				
5				
Average				

(2)

2. Record your results for the 12 V globe. Calculate & record the values for V/I .

Reading	Current (A or mA)	Potential difference (V)	V/I
1			
2			
3			
4			
5			

(3)

3. Plot a graph of potential difference, V , against current, I , (ie current on the horizontal axis) for the resistor, and the 12 V globe. Use graph paper supplied. **Write your full name on the top of the graph paper.**

(4)

QUESTIONS:

1.	State which component, if any, was ohmic or non-ohmic	
	Resistor (unknown) = _____	(1)
	12 V Globe = _____	(1)
2.	(i) On your unknown resistor graph (V vs I) show your working for the values used in determining the slope (actual rise and run used)	(1)
	(ii) Show your working to calculate the slope of your unknown resistor graph.	(1)
3.	State the value of unknown resistor according to <u>your graph</u> .	
	Unknown resistor = _____	(1)
4.	Briefly state the relationship between slope and resistance exhibited on your graph.	
		(1)

End of practical assessment.