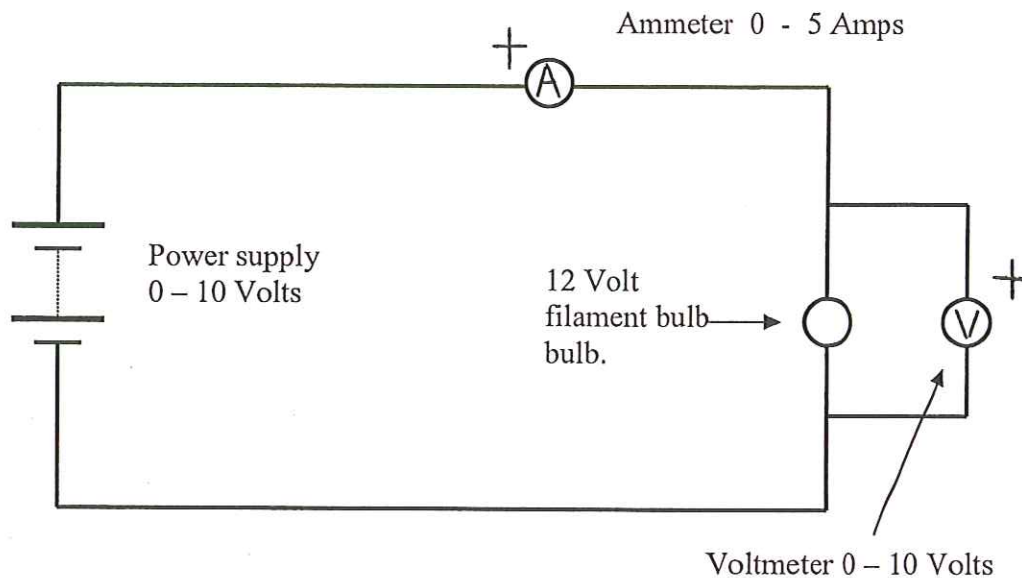


DC 1. Name _____ Group _____

To investigate the voltage-current characteristics for a filament bulb.



Procedure.

- 1 Connect up the circuit as shown but DO NOT switch on the supply.
- 2 Check that both meters are reading zero when the supply is off.
- 3 Set the supply so that the reading on the voltmeter is about 0.5 Volts. Note the Voltmeter reading in a prepared table.
- 4 Read the ammeter and enter the reading in the prepared table.
- 5 Increase the supply until the voltmeter reads about 1 volt and record this value and, the reading on the ammeter in the table.
- 6 Increase the supply to about 1.5 volts and record both voltmeter and ammeter readings.
- 7 Increase the supply to 2 volts and record the data as before.

The reason for the small 0.5 Volt steps is that a major change takes place in the range covered by the first 2.0 volts. If a larger interval was used, those changes would not be so evident.

- 8 From 2.0 volts, you should proceed in 1.0 volt stages.
- 9 Plot a graph of voltage (x – axis) against current (y – axis).
- 10 Explain the shape of the graph in detail.

Additional exercise.

NB the bulb **MUST** be cold before starting this exercise.

If time permits, determine an approximate value of the supply voltage when the bulb first emits:

Heat.

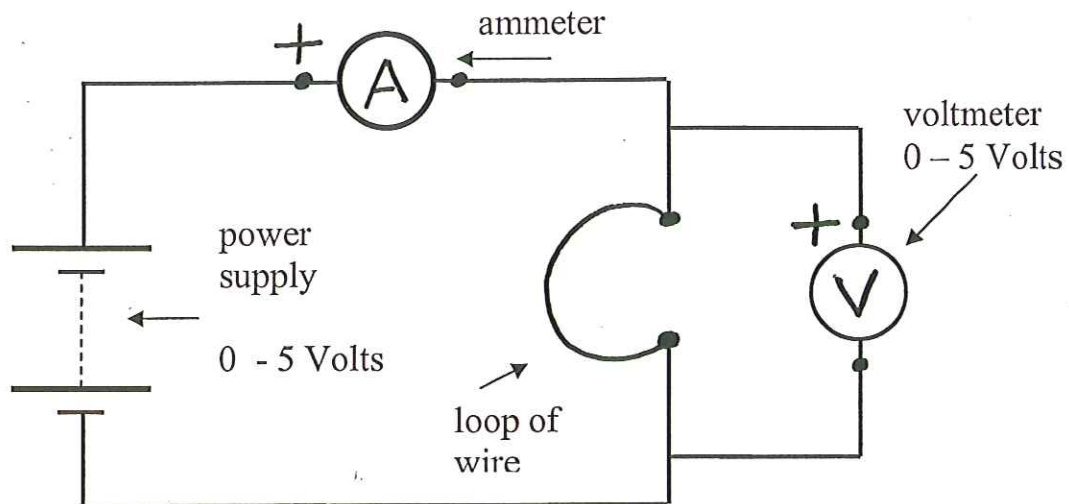
To do this, touch the inside of your wrist to the glass of the bulb and slowly increase the voltage from zero. **DO NOT** try this if the bulb is hot.

Light.

To do this, put the piece of tubing over the bulb and, shading your eye from the light in the lab, and slowly increase the voltage.

Note the voltage and the colour of the filament when it first emits light.

To investigate the voltage - current characteristics for a loop of an unknown wire.



Additional equipment. a micrometer screw gauge.

Method.

- 1 Set up the apparatus as shown in the diagram.
- 2 Check that both meters are reading zero when the supply is off.
- 3 Set the potential divider so that the pd across the loop is about 0.5 Volt.
- 4 Read the voltmeter and ammeter and enter the readings in a prepared table.
- 5 Repeat steps (4) until you have a set of readings in the range 0 – 5 V in about 0.5 Volt steps.
(take care as the increased current will cause the wire to get hot)

NB DO NOT EXCEED 5 Volts. Change ammeter range if necessary.

- 6 Plot a graph of current (y – axis).against voltage (x – axis)
- 7 Use the graph and a reference book to determine the material of the wire.
- 8 Use the micrometer to obtain an ACCURATE value for the diameter of the wire. Describe your method and explain what information can be obtained from the readings.