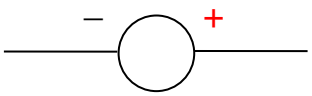
Tips about using a multi-range ammeter

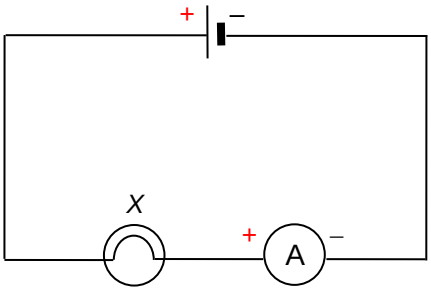
Book 4 Ch 2 p.61
Skill: experiment

An ammeter can be used to measure the size of a current in a circuit.

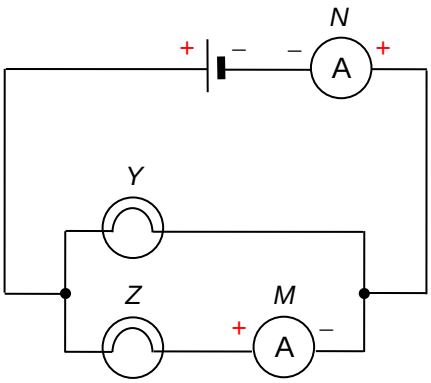
Circuit symbol for ammeter



An ammeter should be connected in a chain with a circuit component to measure the current passing through it. The following figures show two examples.



The ammeter measures the current passing through bulb *X* (or the battery).A



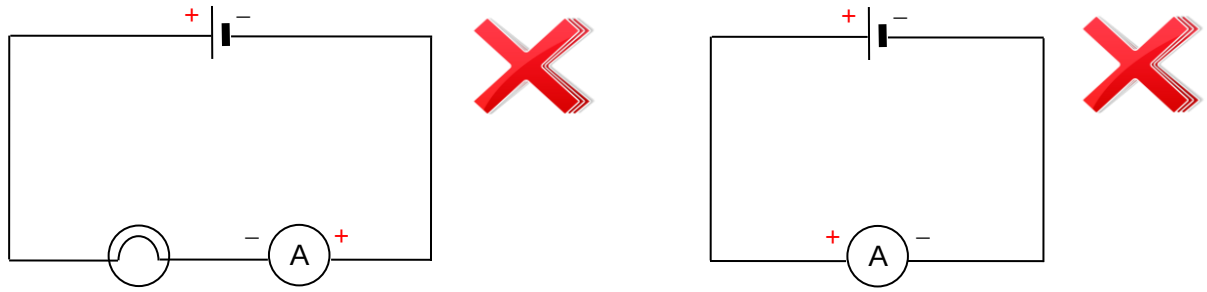
Ammeter *M* measures the current passing through bulb *Z*.
Ammeter *N* measures the current passing through the battery.

Tips about using a multi-range ammeter

Precautions:

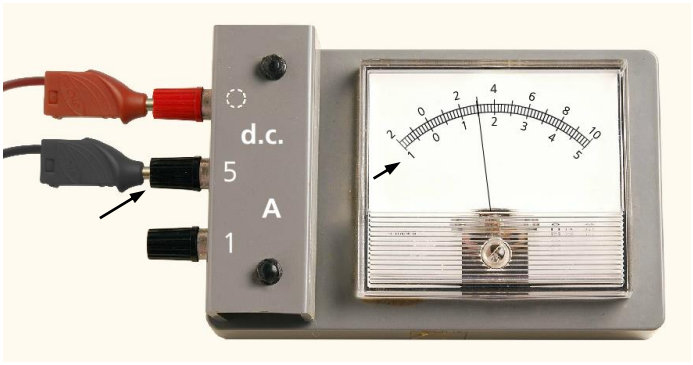
1 The red terminal (+ terminal) of an ammeter should lead to the + terminal of the power source, and the black terminal (– terminal) to the – terminal.

2 An ammeter should not be connected across a source directly when there is no other component in the circuit.



The ammeters could be damaged!

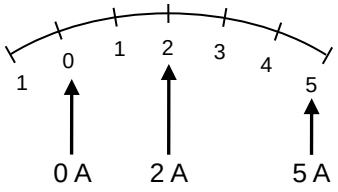
3 Some ammeters have more than one red/black terminal for different ranges of measurements.

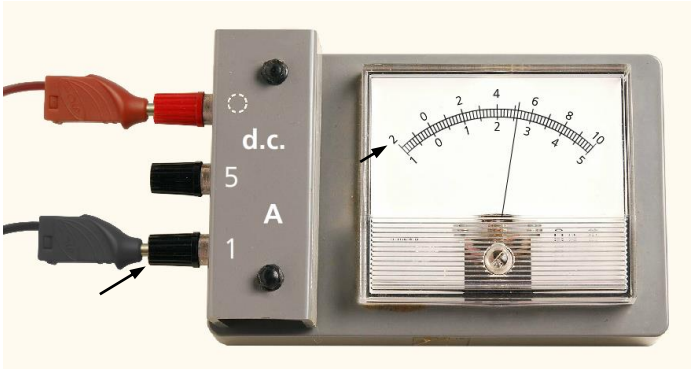


When the 5-A terminal is connected,

maximum reading = 5 A

∴ We use the lower scale:

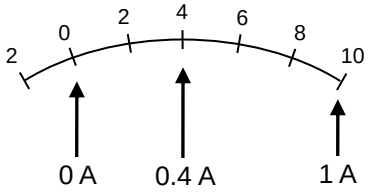




When the 1-A terminal is connected,

maximum reading = 1 A

∴ We use the upper scale:

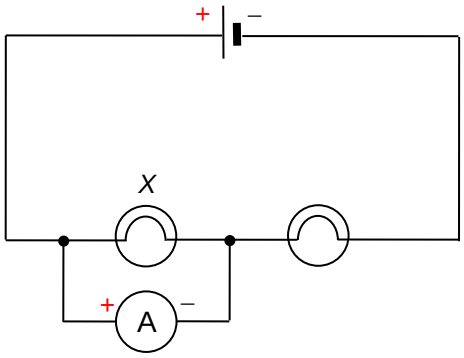


4 If an ammeter has multiple ranges of measurements, always use the largest range first. Switch to a smaller range for a more accurate reading only if the current measured is within that range. This avoids damaging the ammeter.

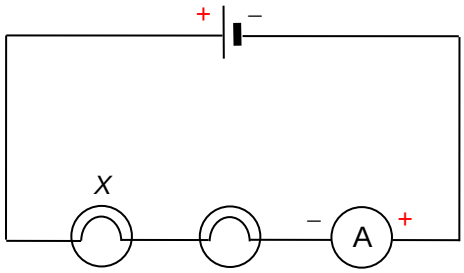
Exercise

1 Determine in each of the following cases whether the ammeter is properly connected to measure the current passing through bulb *X*. If not, give one modification to make it usable.

(a)

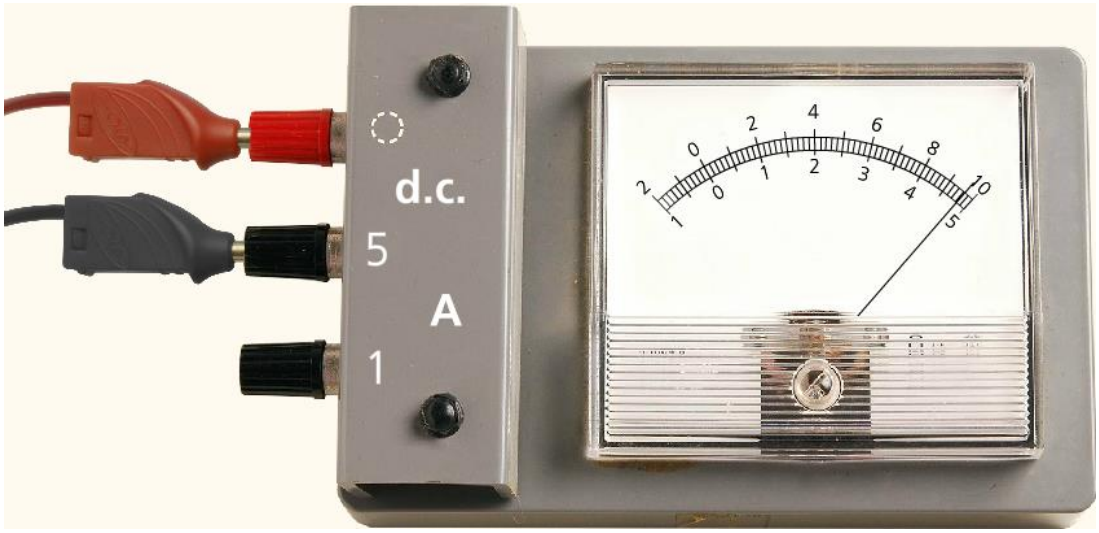


(b)

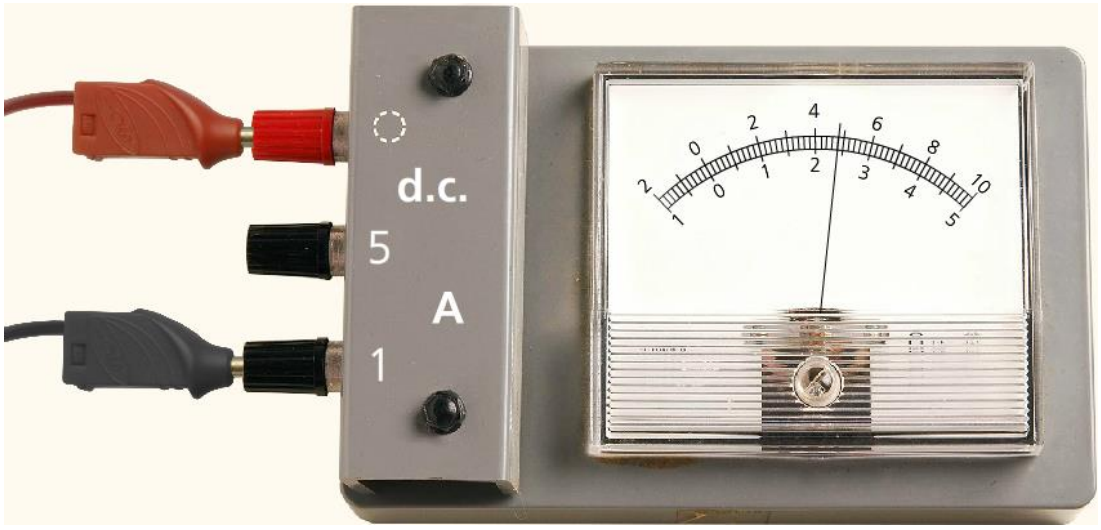


2 Read the ammeters in the following cases.

(a)



(b)



Answers

1 **(a)** No, the ammeter should be connected in a chain with bulb *X*.

(b) No, the connections to the positive and negative terminals of the ammeter should be interchanged.

2 **(a)** 4.8 A

(b) 0.48 A