

ELECTRICITY

BY REKHA CHOUDHARY T.G.T (SCIENCE)

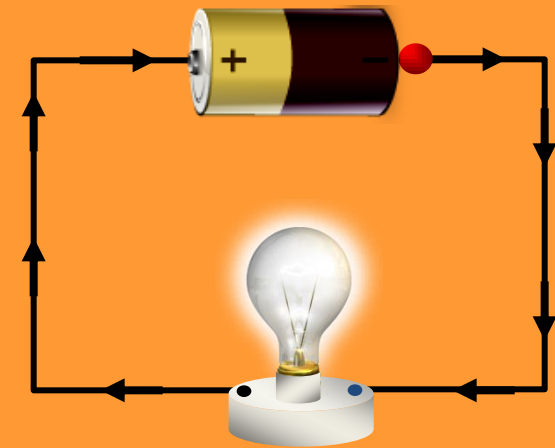


Potential difference

In every circuit there is a component that puts energy in. e.g. cell, battery, photocell, generator.

And there are components that receive energy. e.g. bulb, buzzer, motor. This energy is carried by the electrons.

In this circuit, the cell supplies each electron with electrical potential energy. The electron then delivers this energy to the bulb as it passes through it.



Electric current will flow through a conductor only if there is a difference in the electric potential between the two ends of the conductor. This difference in electric potential between the two ends of a conductor is called potential difference.

The potential difference in a circuit is provided by a cell or battery. The chemical reaction in the cell produces a potential difference between the two terminals and sets the electrons in motion and produces electric current.

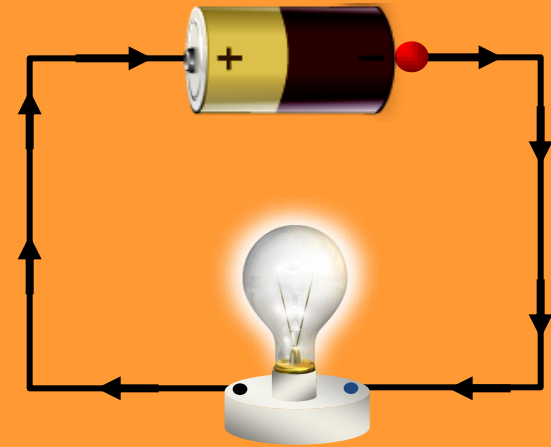
Potential difference

$$\text{Potential difference} = \frac{\text{Work done}}{\text{Charge}} \quad \text{or} \quad V = \frac{W}{Q}$$

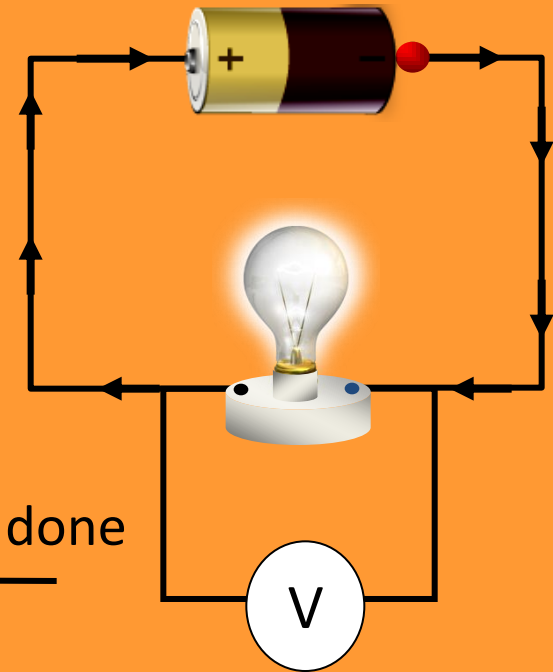
The SI unit of potential difference is volt (V). One volt is the potential difference when 1 joule of work is done to move a charge of 1 coulomb from one point to the other.

$$1 \text{ volt} = \frac{1 \text{ joule}}{1 \text{ coulomb}} \quad \text{or} \quad 1 \text{ V} = \frac{1 \text{ J}}{1 \text{ C}}$$

Potential difference is measured by a voltmeter. It is always connected in parallel across the two points between which the potential difference is to be measured.



In this circuit, 30 Joules of energy is transferred in the bulb when 5 Coulombs of charge passes through it.
What is the potential difference across it?

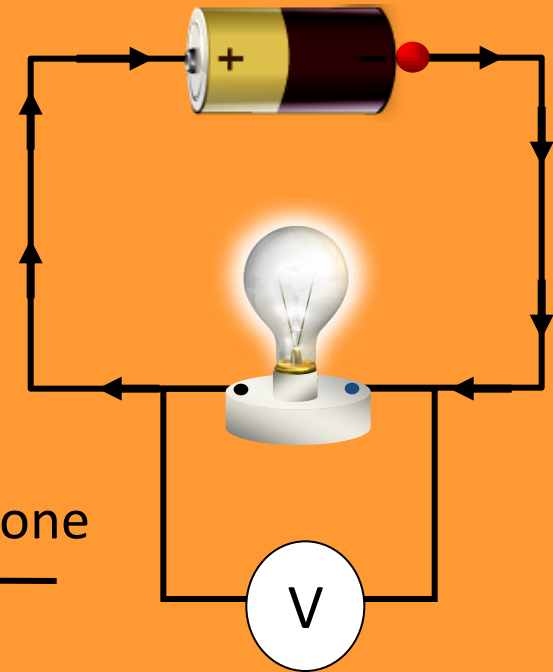


$$\text{POTENTIAL DIFFERENCE} = \frac{\text{Energy transferred/Work done}}{\text{Charge}}$$

$$= 30\text{J} / 5\text{C} = 6\text{ Volts}$$

In this circuit, the cell is supplying 48 Joules of energy for every 6 Coulombs of charge.

What is the cell's potential difference?

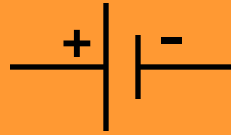


$$\text{Potential difference} = \frac{\text{Energy transferred/ work done}}{\text{Charge}}$$

$$= 48\text{J} / 6\text{ C} = 8\text{ V}$$

Symbols of components used in electric circuits

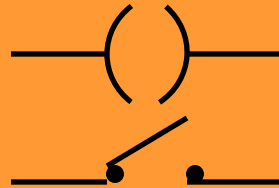
An electric cell



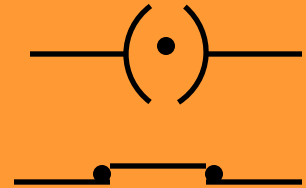
A battery or combination of cells



Plug key or switch (open)



Plug key or switch (closed)



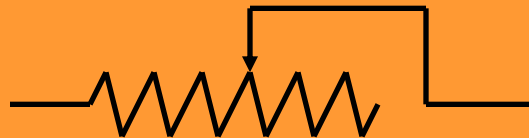
Electric bulb



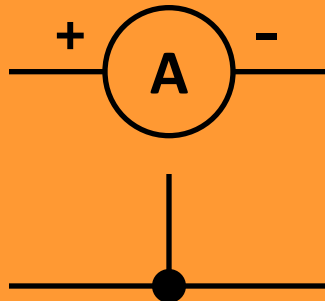
A resistor of resistance R



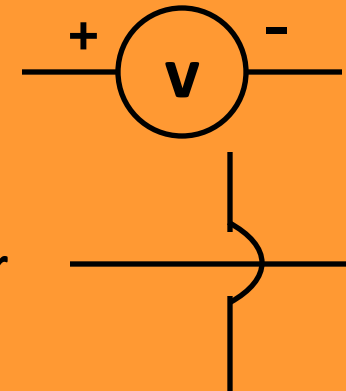
Variable resistance or rheostat



Ammeter



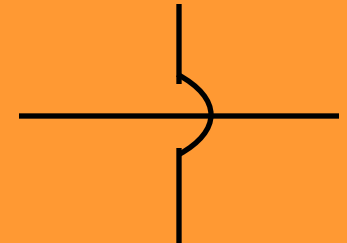
Voltmeter



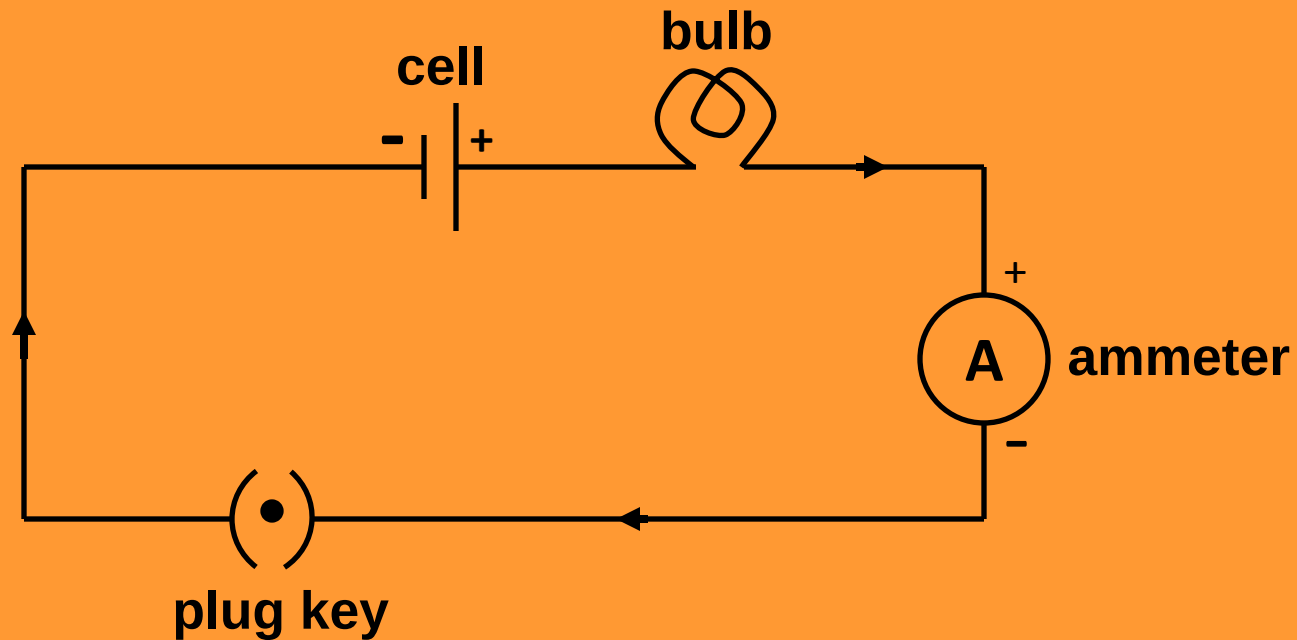
A wire joint



A wire crossing over without joining



A schematic diagram of an electric circuit comprising of a cell, electric bulb, ammeter and plug key.



THANK
YOU