Chapter 21

Chapter 21

Current & Charge

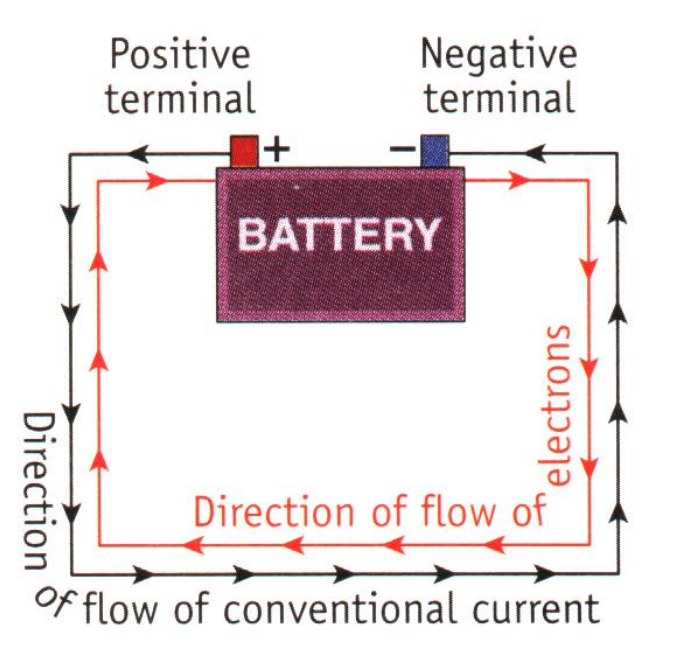
Electric Current

is a flow of electric charge

$$Q = It$$

$$1\ A = 1\ C\ s^{-1}$$

In a metal electrons move

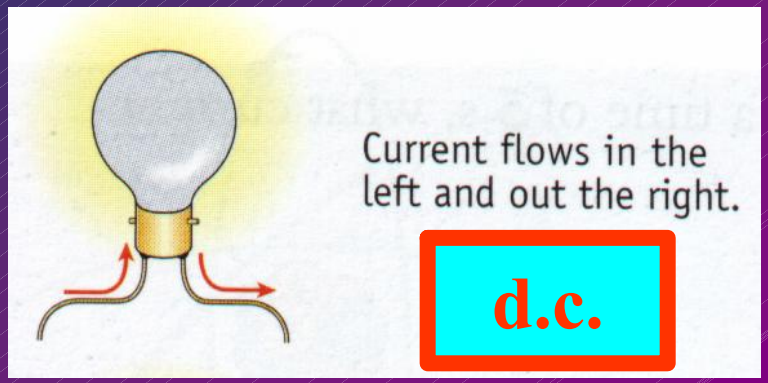


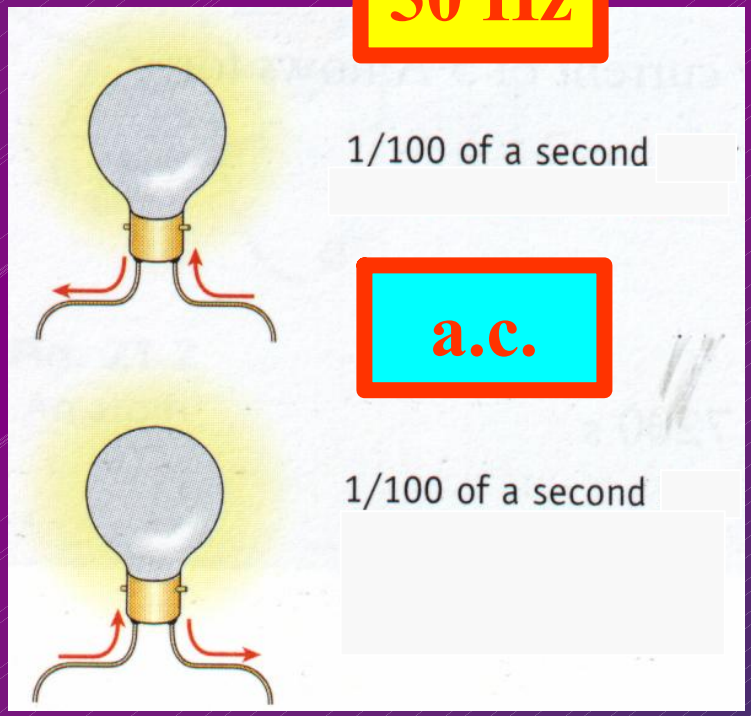
Electron flow

Conventional current

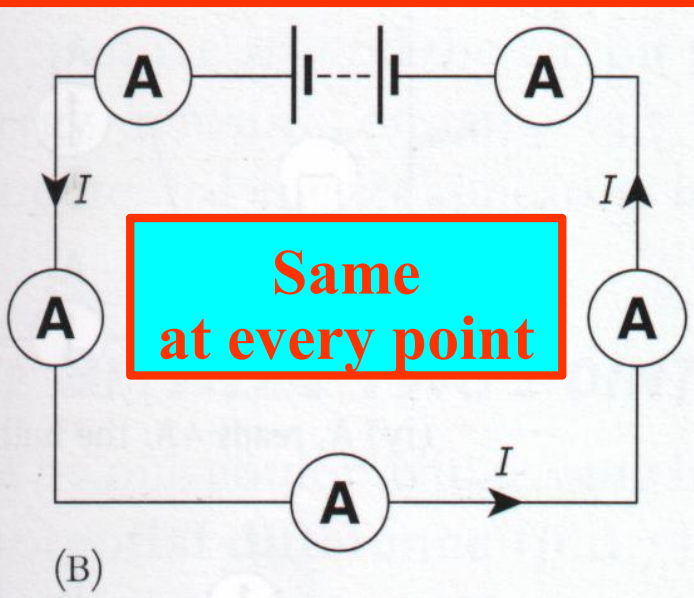
Direct Current (d.c.)

Alternating Current (a.c.)

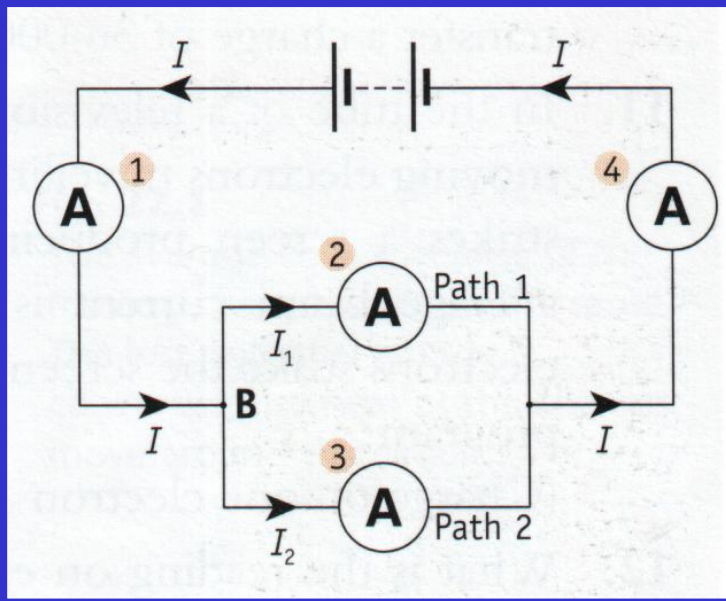




Current In A Series Circuit

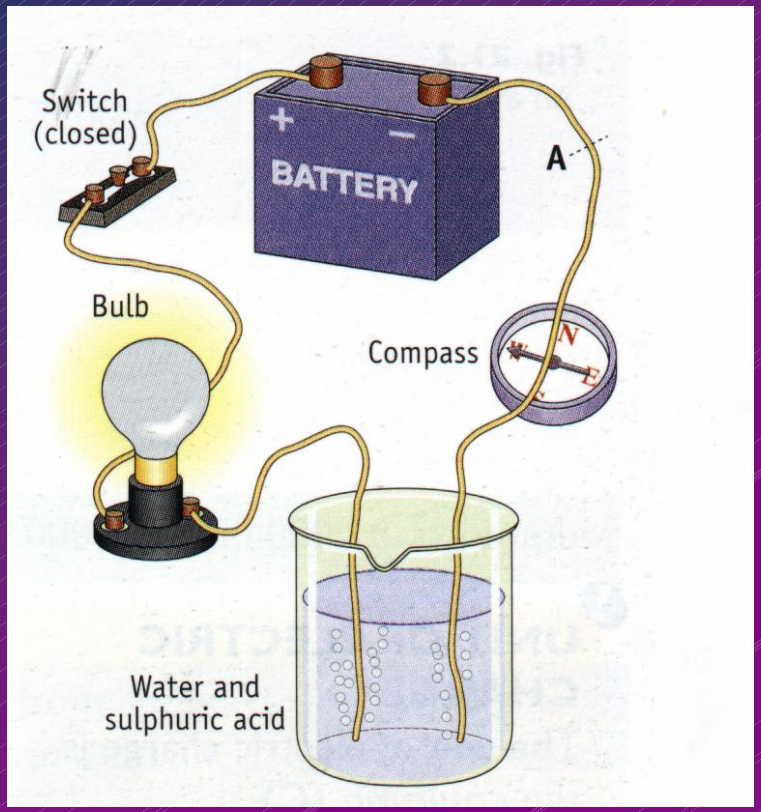


Current In Parallel Circuits



$$I = I_1 + I_2$$

Effects Of Electric Current



- Heating
- Chemical
- Magnetic

Chapter 22

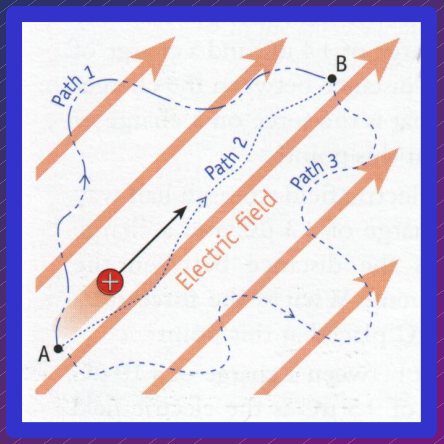
Chapter 22

Electromotive Force

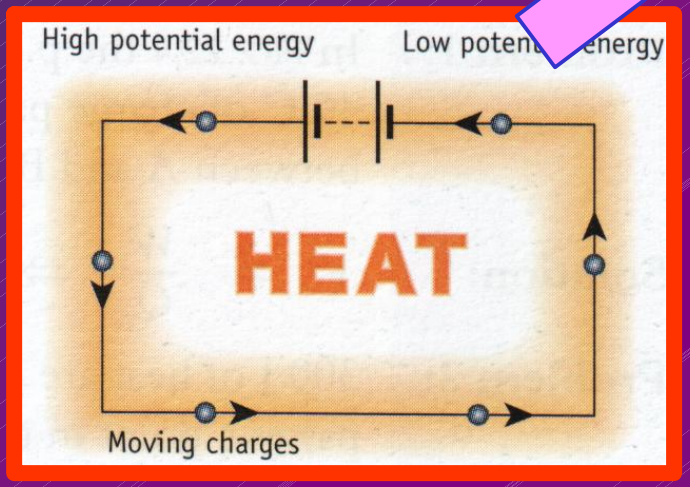
&

Potential Difference

Potential Difference (Voltage)



Work done
to move 1 C
from one point to another



Energy lost
by 1 C
as it moves from one point to another

Potential Difference

$$V = \frac{W}{Q}$$

W = work / energy

V = potential difference (voltage)

Q = charge

$\rightarrow W = VQ$ $= V(It)$

$\Rightarrow W = VIt$

$$\frac{W}{t} = \frac{VIt}{t}$$

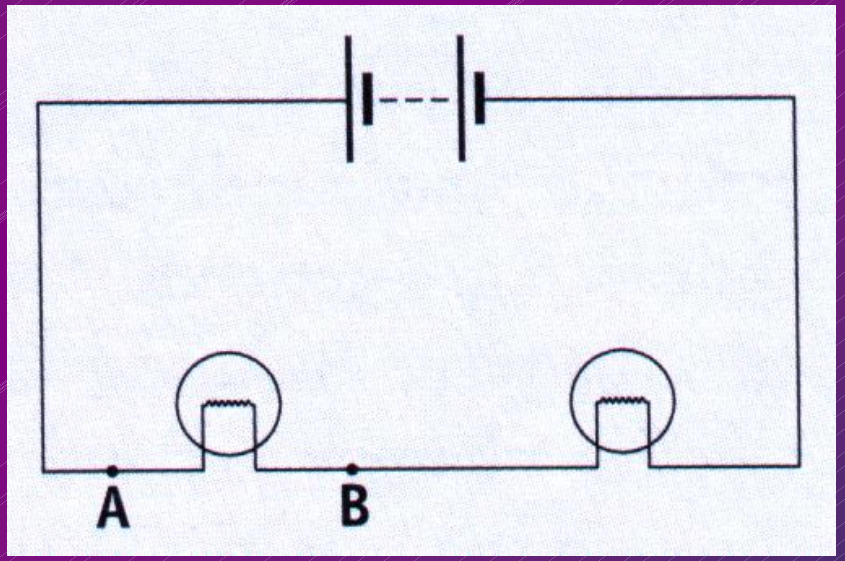
$$P = VI$$

Problem 1 The *pd* between A and B is 20 V. In a certain time 40 C of charge pass A. How much heat energy is produced between A and B?

$V = W/Q$

➔ $W = VQ$

$= 20 \times 40 \quad = 800$ J



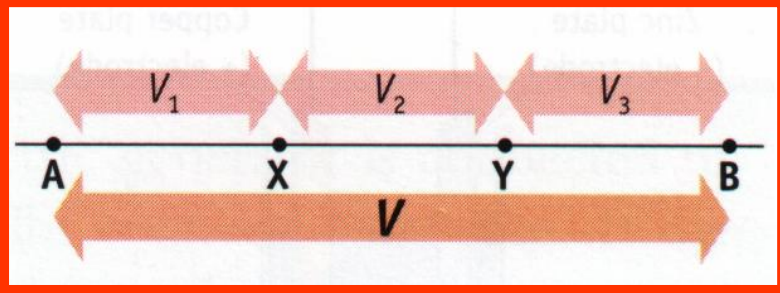
Problem 3 The current in a bulb is 2 A when the *pd* across it is 230 V. What is the power dissipated in the bulb?

$P = VI$

$= (230)(2) \quad = 460$ W

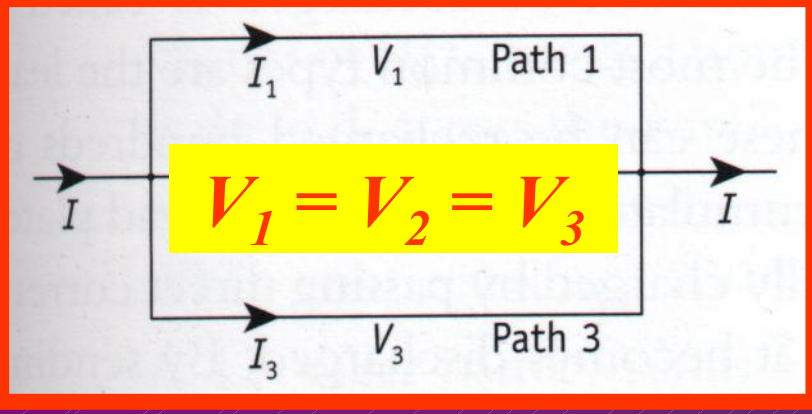
Voltages In Series And Parallel

Series



$$V = V_1 + V_2 + V_3$$

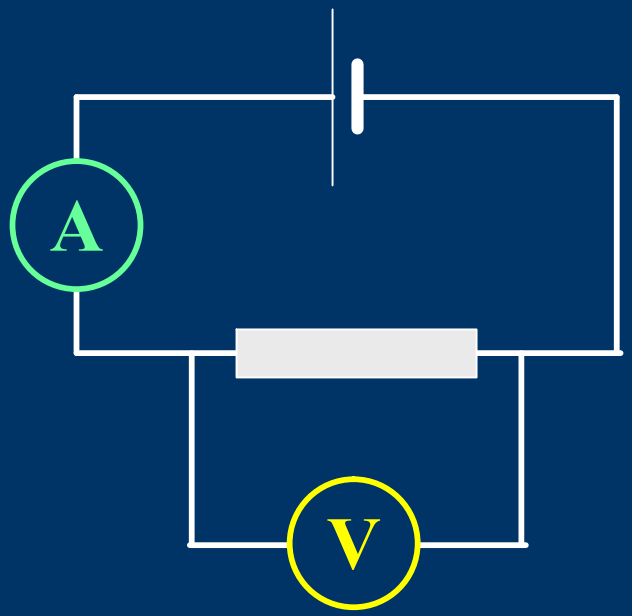
Parallel



Same V

Ammeter

Voltmeter



Electromotive Force emf

The voltage applied to a full circuit.

Symbol *E*

Unit Volt

Sources Of EMF

Cells

Simple Cell
$E = 1.1$ V

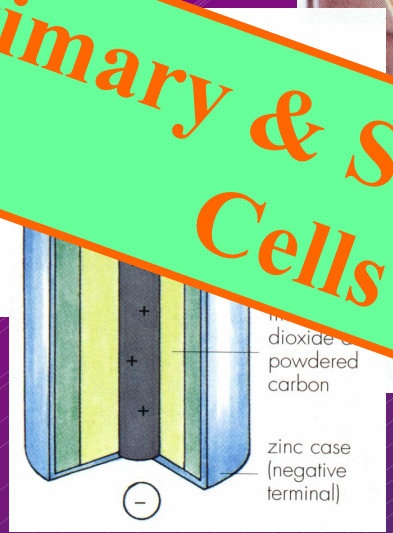
Lead-Acid Accumulator
$E = 2$ V

Nickel Cadmium
E = 1.2 V

Dry Cell

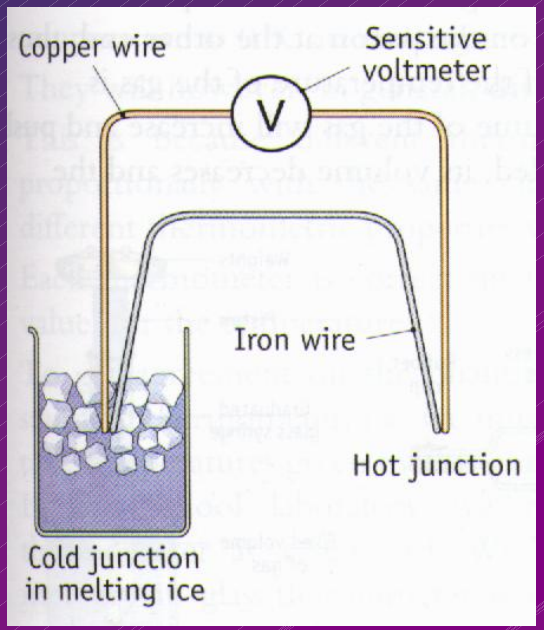
Nickel Metal Hydride
$E = 1.2$ V

Primary & Secondary Cells



Sources Of EMF

Thermocouple



Mains

a.c.

$E = 230$ V

50 Hz

Cells In Series