

Exercise walk-through

11.1

Electric Current

AP Physics 2

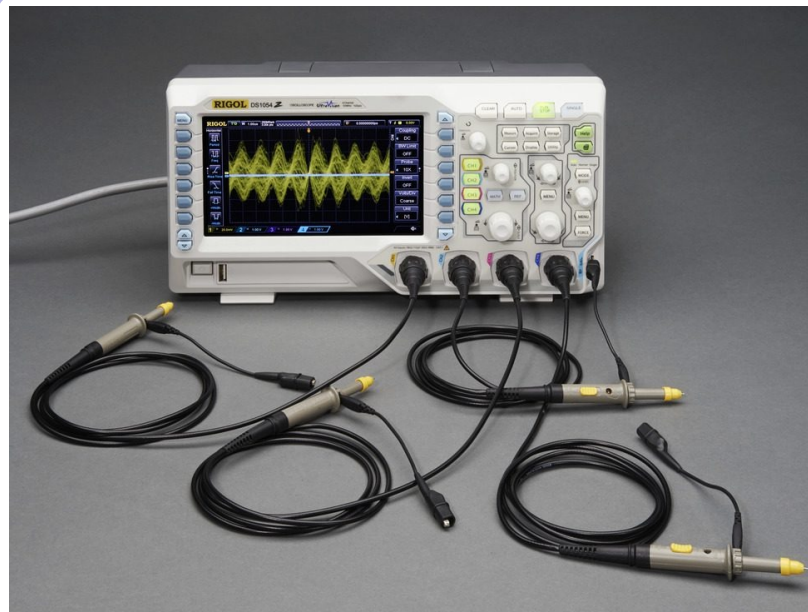
Electric current

Electric current is the rate charge flows past a point:

Charge per second

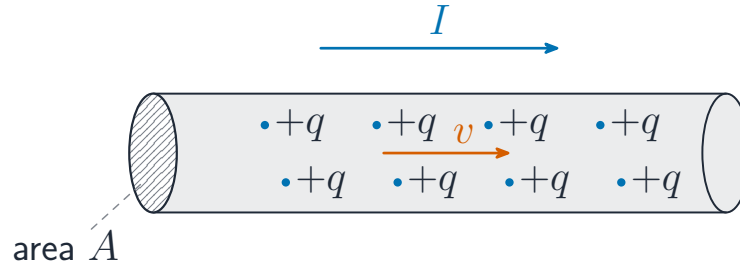
$$I = \frac{\Delta q}{\Delta t} \quad (\text{amperes})$$

Conventional current points the way **positive** charge would flow – opposite to the electron drift.

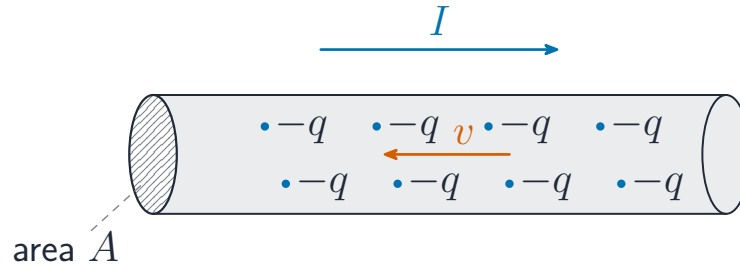


Meters and scopes probe circuit behaviour

Charge carriers drift slowly through a conductor



(a) positive carriers drift with I



(b) electrons drift against I

Charge carriers drift slowly through a conductor to make a current

Exercises 2.1-2.3

2.1 A charge of 12 C flows past a point in 4.0 s. Find the current. [2]

2.2 State the direction of conventional current relative to the electron flow. [1]

2.3 A current of 0.50 A flows for 10 s. Find the charge that passes. [2]

Exercises 2.1-2.3

2.1 A charge of 12 C flows past a point in 4.0 s. Find the current. [2]

2.1

- $I = \frac{\Delta q}{\Delta t} = \frac{12}{4.0} = 3.0 \text{ A}$

2.2 State the direction of conventional current relative to the electron flow. [1]

2.2

- opposite to the electron flow

2.3 A current of 0.50 A flows for 10 s. Find the charge that passes. [2]

2.3

- $\Delta q = I \Delta t = 0.50 \times 10 = 5.0 \text{ C}$

Exercises 3.1-3.2

3.1 Electric current is the rate of flow of

[1]

☐

A energy

B charge

C mass

D voltage

3.2 Conventional current is defined as the direction of flow of

[1]

☐

A electrons

B positive charge

C neutrons

D photons

Exercises 3.1-3.2

3.1 Electric current is the rate of flow of

[1]

☐

A energy

B charge

C mass

D voltage

3.1 B

- charge.

3.2 Conventional current is defined as the direction of flow of

[1]

☐

A electrons

B positive charge

C neutrons

D photons

3.2 B

- positive charge.

Exercise 3.3 (a)

3.3 A wire carries a current of 2.0 A.

(a) Find the charge that passes in 30 s.

[2]

Exercise 3.3 (a)

3.3 A wire carries a current of 2.0 A.

(a) Find the charge that passes in 30 s.

[2]

(a)

- $\Delta q = I \Delta t = 2.0 \times 30 = 60 \text{ C}$

Exercise 3.3 (b)

3.3 A wire carries a current of 2.0 A.

(b) Find the number of electrons this represents ($e = 1.6 \times 10^{-19}$ C).

[2]

Exercise 3.3 (b)

3.3 A wire carries a current of 2.0 A.

(b) Find the number of electrons this represents ($e = 1.6 \times 10^{-19}$ C). [2]

(b)

- $$N = \frac{60}{1.6 \times 10^{-19}} = 3.75 \times 10^{20} \text{ electrons}$$