

GCSE Physics

Worksheet: Electrical charge and current

TIME 35 min	TOTAL 32 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Electrical charge and current

NAME _____ **CLASS** _____ **DATE** _____

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

A student sets up a simple circuit containing a cell, a switch and a lamp.

0 1 . 1

Complete the sentence.

Electric current is a flow of electrical ...

Tick (✓) **one** box.

charge.

☐

energy.

☐

power.

☐

resistance.

☐

[1 mark]

0 1 . 2

Which component in the circuit is the source of potential difference?

Tick (✓) **one** box.

the cell

☐

the lamp

☐

the switch

☐

the wires

☐

[1 mark]

0 1 . 3

The current in the lamp is 0.40 A.
Calculate the charge that flows through the lamp in 60 s.
Use the equation:
charge flow = current $\times$ time

.....
.....
.....
.....

Charge flow = C

[2 marks]

0 1 . 4

Give the unit of charge.

.....
.....
.....

.....

[1 mark]

0 2

The current in a car's starter motor is 210 A.

0 2 . 1

Calculate the charge that flows in 1 s.
Use the equation:
charge flow = current $\times$ time

.....
.....
.....
.....

Charge flow = C

[2 marks]

0 3

0 3 . 1

In a metal wire, an electric current is a flow of...

Tick (✓) **one** box.

protons

☐

electrons

☐

neutrons

☐

ions

☐

[1 mark]

0 3 . 2

State the instrument used to measure current, and how it is connected in a circuit.

[2 marks]

0 4

0 4 . 1

Which instrument measures potential difference, and how must it be connected?

Tick (✓) **one** box.

An ammeter, in series

☐

An ammeter, in parallel

☐

A voltmeter, in series

☐

A voltmeter, in parallel

☐

[1 mark]

0 4 . 2

State the unit of electric current.

.....

.....

.....

.....

[1 mark]

0 5

The current in a torch lamp is 0.6 A.

0 5 . 1

Calculate the charge that flows in 480 s.

Use the equation:

charge flow = current $\times$ time

.....

.....

.....

.....

Charge flow = C

[2 marks]

0 6

A charge of 540 C flows through a car's starter motor in 3 s.

0 6 . 1

Calculate the current in the car's starter motor.

.....

.....

.....

.....

.....

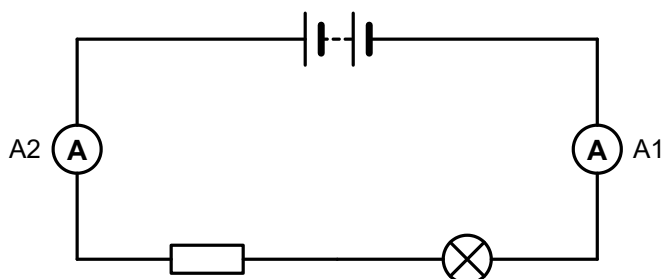
Current = A

[3 marks]

0 7

A student set up the circuit shown in Figure 1. Ammeter A1 reads 0.30 A.

Figure 1



0 7 . 1

State the reading on ammeter A2.
Give a reason for your answer.

.....

.....

.....

.....

Current = A

[2 marks]

0 7 . 2

Calculate the charge that flows through the lamp in 2.0 minutes.

.....

.....

.....

.....

Charge = C

[3 marks]

0 7 . 3

The student replaces the resistor with one that has a greater resistance. The battery is not changed.

Explain what happens to the amount of charge that flows through the lamp each second.

[2 marks]

0 8

0 8 . 1

A student says: 'Conventional current and the flow of electrons in a wire are in the same direction.'

Is the student correct? Explain your answer.

[2 marks]

0 9

A charge of 180 C flows through a torch lamp in 360 s.

0 9 . 1

Calculate the current in the torch lamp.

Current = A

[3 marks]

1 0

1 0 . 1

A wire carries a current of 2 A.

Explain what this means, in terms of charge.

[2 marks]

1 0 . 2

In which direction does conventional current flow, outside the power source?

Tick (✓) **one** box.

From the negative terminal to the positive terminal

☐

From the positive terminal to the negative terminal

☐

It depends on which way round the electrons move

☐

[1 mark]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Physics · Worksheet: Electrical charge and current · 32 marks

Question 1 (5 marks)

01.1 [1 mark]

Correct: charge.

01.2 [1 mark]

Correct: the cell

01.3 [2 marks]

Answer: 24 C

- $Q = 0.40 \times 60$ (1)
 - $Q = 24$ (C) (1)
-

01.4 [1 mark]

Answer: coulomb (C)

- coulomb / C (1)
-

Question 2 (2 marks)

02.1 [2 marks]

Answer: 210 C

- $Q = 210 \times 1$ (1)
 - $Q = 210$ (C) (1)
-

Question 3 (3 marks)

03.1 [1 mark]

Correct: electrons

03.2 [2 marks]

Answer: An ammeter, connected in series.

- ammeter (1)
 - connected in series (with the component) (1)
-

Question 4 (2 marks)

04.1 [1 mark]

Correct: A voltmeter, in parallel

04.2 [1 mark]

Answer: Ampere (amp, A)

- ampere / amp (1)
-

Question 5 (2 marks)

05.1 [2 marks]

Answer: 288 C

- $Q = 0.6 \times 480$ (1)
 - $Q = 288$ (C) (1)
-

Question 6 (3 marks)

06.1 [3 marks]

Answer: 180 A

- $540 = I \times 3$ (1)
 - $I = 540 \div 3$ (1)
 - $I = 180$ (A) (1)
-

Question 7 (7 marks)

07.1 [2 marks]

Answer: 0.30 A — the current is the same at any point in a single closed loop.

- 0.30 (A) (1)
- the current is the same at any point in a single closed loop (1)

Notes: The reason mark can be awarded without the value.

07.2 [3 marks]

Answer: 36 C

- $t = 120 \text{ s}$ (1)
- $Q = 0.30 \times 120$ (1)
- $Q = 36 \text{ (C)}$ (1)

Notes: An answer of 0.6 (C) (time in minutes) scores 1 mark.

07.3 [2 marks]

Answer: The total resistance increases, so the current decreases; current is the rate of flow of charge, so less charge flows through the lamp each second.

- the (total) resistance increases so the current decreases (1)
 - current is the rate of flow of charge, so less charge flows (through the lamp) each second (1)
-

Question 8 (2 marks)

08.1 [2 marks]

Answer: No — conventional current flows from positive to negative (outside the source), but electrons, which are negatively charged, flow from negative to positive, in the opposite direction.

- no, the student is incorrect (1)
 - conventional current flows from positive to negative (outside the source), but electrons flow from negative to positive — the opposite direction (1)
-

Question 9 (3 marks)

09.1 [3 marks]

Answer: 0.5 A

- $180 = I \times 360$ (1)
 - $I = 180 \div 360$ (1)
 - $I = 0.5 \text{ (A)}$ (1)
-

Question 10 (3 marks)

10.1 [2 marks]

Answer: 2 coulombs of charge pass a given point in the wire every second.

- a current of 2 A means 2 coulombs of charge (1)
- pass a given point (cross-section) of the wire every second (1)

10.2 [1 mark]

Correct: From the positive terminal to the negative terminal
