

GCSE Chemistry

Worksheet: Fuel cells

TIME 15 min	TOTAL 12 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Fuel cells

NAME _____	CLASS _____	DATE _____
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- 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

Hydrogen fuel cells can be used to power vehicles.

0 1 . 1

Which **two** substances are supplied to a hydrogen fuel cell?

Tick (✓) **two** boxes.

Carbon dioxide

☐

Hydrogen

☐

Nitrogen

☐

Oxygen or air

☐

Water

☐

[2 marks]

0 1 . 2

Name the only product of the reaction in a hydrogen fuel cell.

.....

.....

.....

.....
[1 mark]

0 1 . 3

Is hydrogen oxidised or reduced in the fuel cell?

.....

.....

.....

.....

[1 mark]

0 1 . 4

Give **one** advantage of a vehicle powered by a hydrogen fuel cell compared with a vehicle powered by a petrol engine.

.....

.....

[1 mark]

0 2

0 2 . 1

Which statement about hydrogen fuel cells is correct?

Tick (✓) **one** box.

They store hydrogen and oxygen inside the cell and eventually run out

☐

They need a continuous external supply of hydrogen and oxygen (or air)

☐

They produce carbon dioxide as their only product

☐

They must be recharged using mains electricity

☐

[1 mark]

0 2 . 2

State **one** similarity between a hydrogen fuel cell and a rechargeable battery.

.....

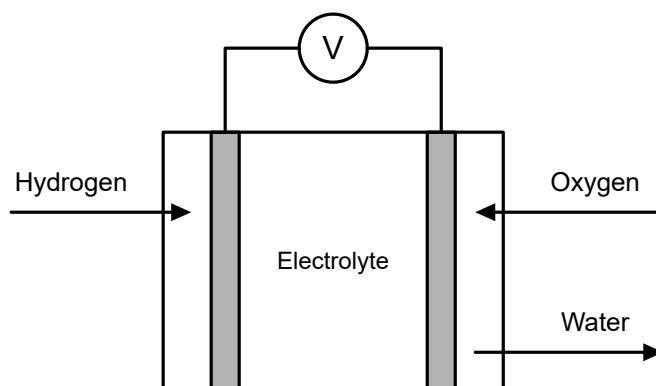
.....

[1 mark]

0 3

Figure 1 shows a hydrogen fuel cell.

Figure 1



0 3 . 1

Write a balanced symbol equation for the overall reaction in a hydrogen fuel cell.

.....

.....

.....

.....

[2 marks]

0 3 . 2

In the fuel cell, hydrogen is oxidised electrochemically.
What is oxidation, in terms of electrons?

.....

.....

[1 mark]

0 3 . 3

Give **two** differences between the way a hydrogen fuel cell and a rechargeable battery provide electricity.

.....

.....

.....

.....

[2 marks]

END OF QUESTIONS

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

Mark scheme

GCSE Chemistry · Worksheet: Fuel cells · 12 marks

Question 1 (5 marks)

01.1 [2 marks]

Correct: Hydrogen; Oxygen or air

01.2 [1 mark]

Answer: Water

- water (1)
-

01.3 [1 mark]

Answer: Oxidised

- oxidised (1)
-

01.4 [1 mark]

Answer: No carbon dioxide is produced when it is used.

- no carbon dioxide is produced (while it is being used) / only water is produced / no pollutants such as carbon monoxide are produced (1)
-

Question 2 (2 marks)

02.1 [1 mark]

Correct: They need a continuous external supply of hydrogen and oxygen (or air)

02.2 [1 mark]

Answer: Both convert chemical energy into electrical energy using a chemical reaction.

- both convert energy from a chemical reaction into electrical energy / both involve oxidation and reduction reactions (1)
-

Question 3 (5 marks)

03.1 [2 marks]

Answer: $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$

- correct formulae: $\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}$ (1)
- balanced: $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$ (1)

Notes: Allow multiples and fractions, e.g. $\text{H}_2 + \frac{1}{2}\text{O}_2 \rightarrow \text{H}_2\text{O}$.

03.2 [1 mark]

Answer: Loss of electrons

- loss of electrons (1)

03.3 [2 marks]

Answer: A fuel cell needs a continuous supply of hydrogen and oxygen from outside, whereas a battery stores its chemicals inside; a fuel cell is refuelled, whereas a battery is recharged with an electric current.

- a fuel cell needs a continuous supply of fuel and oxygen from outside, but a battery contains all its reactants (1)
- a fuel cell is refuelled, but a battery is recharged by supplying an electric current (1)
- a fuel cell produces water that leaves the cell, but a battery releases no products (1)
- a fuel cell keeps working while fuel is supplied, but a battery stops when a reactant is used up (until it is recharged) (1)

Any 2 of the points above.
