Energy changes

Chemistry Paper 1 | 5 questions, 6 marks each

GCSE science 6-mark questions

This topic online

Name: _____ **Date:** _____ **Score:** _____ **/ 30**

Plan before you write: jot down the 6 or more ideas you need, then put them in a sensible order. For compare questions give both sides of each point; for evaluate questions use the information and finish with a conclusion.

1 A pharmacy in Bristol sells two kinds of single-use pack. A hand warmer gets hot when a seal is broken. An instant cold pack for sports injuries gets cold when it is squeezed.

Compare the reactions in the two packs. Include energy transfers, temperature changes and what a reaction profile would show for each.

(6 marks)

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2 **Higher tier**

Hydrogen peroxide slowly decomposes into water and oxygen. This is why some bottles of hair bleach have caps that let gas escape.

2 H-O-O-H → 2 H-O-H + O=O

Bond	Bond energy in kJ/mol
O-H	464
O-O	146
O=O	498

Use the data to calculate the overall energy change for the reaction. Explain whether the reaction is exothermic or endothermic, and what this means in terms of bonds.

(6 marks)

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3 Zara makes a simple cell by putting a strip of zinc and a strip of copper into a beaker of salt solution and connecting them to a voltmeter. The voltmeter reads 0.9 V.

Describe how a chemical cell produces a voltage and the factors that affect the size of the voltage. Then describe the difference between non-rechargeable and rechargeable cells.

Separate science only

(6 marks)

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4 A delivery firm in Glasgow is choosing between hydrogen fuel cell vans and vans with rechargeable lithium-ion batteries.

Feature	Hydrogen fuel cell van	Battery van
Time to refuel or recharge	5 minutes	6 hours (or 1 hour on a fast charger)
Range on a full tank or charge	480 km	250 km
Refuelling or charging points near the depot	1	14
Waste product while driving	water	none

In a hydrogen fuel cell, hydrogen reacts with oxygen from the air to produce electricity.

Evaluate the two types of van for the firm. Use the information and your own knowledge.

Separate science only

(6 marks)

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5 The gas in a camping stove does not burn when it is turned on. It only starts burning when a spark is made. Once it is burning, it keeps burning without any more sparks.

A different reaction, the decomposition of hydrogen peroxide, is very slow on its own but becomes fast when a small amount of manganese dioxide is added.

Explain both observations using ideas about energy and reaction profiles.

(6 marks)

End of questions | Total 30 marks

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