Using resources

Chemistry Paper 2 | 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 Waste water from homes in Manchester flows through sewers to a treatment works. It contains organic matter, harmful microbes and some solid rubbish. After treatment the water is released into a river.

Describe the stages used to treat sewage so that it is safe to release into the environment. (6 marks)

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2 A sports club in Glasgow is deciding whether to give members a reusable stainless steel water bottle or to keep selling single-use plastic (PET) bottles. The table shows estimates for one steel bottle used 500 times and for 500 plastic bottles.

Stage	One steel bottle	500 plastic bottles
raw materials	iron ore, chromium and nickel mined	made from crude oil
energy to make, in MJ	85	500
energy to wash or transport during use, in MJ	60	90
carbon dioxide over life, in kg	9	40
end of life	steel easily recycled	some recycled, many go to landfill or litter

Evaluate the two choices using a life cycle assessment approach. (6 marks)

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3 **Higher tier**

The supply of high-grade copper ore is running out. An old mine site in Cornwall has spoil heaps containing only low-grade copper ore.

Compare phytomining and bioleaching as ways of getting copper from this low-grade ore. (6 marks)

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4 **Higher tier | Separate science only**

Ammonia is made by the Haber process for use in fertilisers.

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

The forward reaction is exothermic. A typical plant uses a temperature of 450 °C, a pressure of 200 atmospheres and an iron catalyst.

Explain why these conditions are chosen.

(6 marks)

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5 Siobhan runs a boatyard on the coast near Swansea. The steel hulls of her boats sit in sea water, and the steel railings around the yard are exposed to wet, salty air. Both are rusting.

Suggest and explain ways Siobhan could reduce rusting of the steel hulls and the railings.

Separate science only

(6 marks)

End of questions | Total 30 marks

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