

GCSE CHEMISTRY

Chemistry Test 2: Chemical changes (Higher)

Total number of marks: 36

0	1
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Soluble salts are formed by reacting metal oxides with acids.

0	1	.	1
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Give **one** other type of substance that can react with an acid to form a soluble salt.

[1 mark]

0	1	.	2
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Calcium nitrate contains the ions Ca^{2+} and NO_3^-

Give the formula of calcium nitrate.

[1 mark]

0	1	.	3
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Describe a method to make pure, dry crystals of magnesium sulfate from a metal oxide and a dilute acid.

[6 marks]

07

This question is about electrolysis.

Aluminium is produced by electrolysis of a molten mixture of aluminium oxide and cryolite.

07.1

Explain why a mixture is used as the electrolyte instead of using only aluminium oxide.

[2 marks]

07.2

What happens at the negative electrode during the production of aluminium?

[1 mark]

Tick (✓) **one** box.

Aluminium atoms gain electrons.

Aluminium atoms lose electrons.

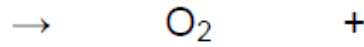
Aluminium ions gain electrons.

Aluminium ions lose electrons.

0 7 . 3 Oxygen is produced at the positive electrode.

Complete the balanced half-equation for the process at the positive electrode.

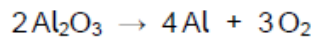
[2 marks]



0 7 . 4 Explain why the positive electrode must be continually replaced.

[3 marks]

0 7 . 5 The overall equation for the electrolysis of aluminium oxide is:



Calculate the mass of oxygen produced when 2000 kg of aluminium oxide is completely electrolysed.

Relative atomic masses (A_r): O = 16 Al = 27

[4 marks]

Mass of oxygen = _____ kg

Sodium metal and chlorine gas are produced by the electrolysis of molten sodium chloride.

- 0 7 . 6 Explain why sodium chloride solution **cannot** be used as the electrolyte to produce sodium metal.

[2 marks]

- 0 7 . 7 Calculate the volume of 150 kg of chlorine gas at room temperature and pressure.

The volume of one mole of any gas at room temperature and pressure is 24.0 dm^3

Relative formula mass (M_r): $\text{Cl}_2 = 71$

[2 marks]

Volume = _____ dm^3

0	9
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Citric acid is a weak acid.

0	9	.	1
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Explain what is meant by a weak acid.

[2 marks]

A student titrated citric acid with sodium hydroxide solution.

This is the method used.

1. Pipette 25.0 cm³ of sodium hydroxide solution into a conical flask.
2. Add a few drops of thymol blue indicator to the sodium hydroxide solution.

Thymol blue is blue in alkali and yellow in acid.

3. Add citric acid solution from a burette until the end-point was reached.

0	9	.	2
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Explain what would happen at the end-point of this titration.

Refer to the acid, the alkali and the indicator in your answer.

[3 marks]

0	9	.	3
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Explain why a pipette is used to measure the sodium hydroxide solution but a burette is used to measure the citric acid solution.

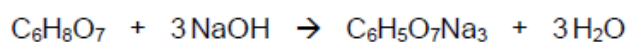
[2 marks]

0 9 . 4 Table 5 shows the student's results.

Table 5

	Titration 1	Titration 2	Titration 3	Titration 4	Titration 5
Volume of citric acid solution in cm ³	13.50	12.10	11.10	12.15	12.15

The equation for the reaction is:



The concentration of the sodium hydroxide was 0.102 mol/dm³

Concordant results are those within 0.10 cm³ of each other.

Calculate the concentration of the citric acid in mol/dm³

Use only the concordant results from **Table 5** in your calculation.

You must show your working.

[5 marks]

Concentration = _____ mol/dm³