

Concentration Solutions

GCSE Chemistry · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

10 g of sodium chloride is dissolved in water to make 250 cm³ of solution. Calculate the concentration in g/dm³. (2 marks)

Step 1 · Convert the volume

$$250 \text{ cm}^3 \div 1000 = 0.25 \text{ dm}^3$$

Step 2 · concentration = mass ÷ volume

$$10 \div 0.25 = 40 \text{ g/dm}^3$$

Answer: 40 g/dm³

Check: 250 cm³ is a quarter of a litre, so 4 × 10 g per litre ✓

2. Now try one with the steps

Calculate the mass of solute in 200 cm³ of a 30 g/dm³ solution. (2 marks)

Step 1 · Volume in dm³

Step 2 · mass = concentration × volume

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Convert 250 cm³ into dm³. [1]

2. 25 g of solute is dissolved to make 0.5 dm³ of solution. Calculate the concentration in g/dm³. [1]

3. 10 g of solute is dissolved to make 250 cm³ of solution. Calculate the concentration in g/dm³. [2]

4. Calculate the mass, in g, of solute in 200 cm³ of a 30 g/dm³ solution. [2]

5. Calculate the volume, in dm^3 , of a 20 g/dm^3 solution that contains 5 g of solute. [2]

6. Describe what happens to the concentration of a solution if more water is added. [1]

7. Explain how increasing the mass of solute in a fixed volume affects the concentration. [1]

8. 0.20 mol of solute is dissolved to make 500 cm^3 of solution. Calculate the concentration in mol/dm^3 . [2]

9. Calculate the number of moles of solute in 25.0 cm^3 of a 0.100 mol/dm^3 solution. [2]

10. Convert a 0.50 mol/dm^3 solution of sodium hydroxide to g/dm^3 . ($\text{Na} = 23$, $\text{O} = 16$, $\text{H} = 1$) [2]

11. Convert 73 g/dm^3 hydrochloric acid to mol/dm^3 . ($\text{H} = 1$, $\text{Cl} = 35.5$) [2]

12. 4.0 g of sodium hydroxide is dissolved to make 250 cm^3 of solution. Calculate the concentration in mol/dm^3 . ($\text{Na} = 23$, $\text{O} = 16$, $\text{H} = 1$) [3]

13. Calculate the mass of copper(II) sulfate, CuSO_4 , in g, needed to make 100 cm^3 of a 0.40 mol/dm^3 solution. Give your answer to 3 significant figures. ($\text{Cu} = 63.5$, $\text{S} = 32$, $\text{O} = 16$) [3]

14. Describe how to make 250 cm³ of a solution of accurately known concentration from a solid. [3]

4. Before you hand it in

Dividing by the volume in cm³

Convert cm³ to dm³ first by dividing by 1000.

Confusing g/dm³ and mol/dm³

$\text{mol/dm}^3 = \text{g/dm}^3 \div M_r$; $\text{g/dm}^3 = \text{mol/dm}^3 \times M_r$.

"Concentrated means strong."

Concentration is the amount of solute per volume; strength is a different idea (GC-C4).