

IGCSE Moles questions – Solutions 2

The molar volume of a gas at room temperature and pressure is 24 dm^3 or $24\,000 \text{ cm}^3$

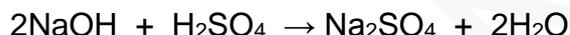
- 1 Which of the following contains the greatest number of moles of sodium hydroxide?
(put a x in the correct box)

- | | | |
|---|---|--------------------------|
| A | 100.0 cm^3 of 0.100 mol/dm^3 NaOH | <input type="checkbox"/> |
| B | 25.0 cm^3 of 0.500 mol/dm^3 NaOH | <input type="checkbox"/> |
| C | 50.0 cm^3 of 0.200 mol/dm^3 NaOH | <input type="checkbox"/> |
| D | 1.00 cm^3 of 1.00 mol/dm^3 NaOH | <input type="checkbox"/> |

- 2 A student wants to make a 0.200 mol/dm^3 solution of copper(II) sulfate. They have been given copper(II) sulfate crystals, which have the formula $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$. What mass of crystals do they have to weigh out if they want to make 100 cm^3 of solution?
(put a x in the correct box)

- | | | |
|---|--------|--------------------------|
| A | 4.99 g | <input type="checkbox"/> |
| B | 3.19 g | <input type="checkbox"/> |
| C | 49.9 g | <input type="checkbox"/> |
| D | 31.9 g | <input type="checkbox"/> |

- 3 A student carries out a titration experiment. They measured out 25.0 cm^3 of sulfuric acid into a conical flask and put 0.120 mol/dm^3 sodium hydroxide in the burette. 27.60 cm^3 of sodium hydroxide was required for neutralisation. The equation for the reaction is:



Which of following is correct? (put a x in the correct box)

- | | | |
|---|--|--------------------------|
| A | The NaOH is more concentrated than the H_2SO_4 | <input type="checkbox"/> |
| B | The H_2SO_4 is more concentrated than the NaOH | <input type="checkbox"/> |
| C | The NaOH and H_2SO_4 have the same concentration | <input type="checkbox"/> |

- 4 A teacher adds a piece of sodium of mass 0.100 g to 500 cm^3 of water.

(a) Write an equation (including state symbols) for the reaction that occurs [2]

.....
(b) Calculate the volume of gas produced in this reaction. [3]

(c) Calculate the concentration of the resulting solution. [3]

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5 Sodium carbonate reacts with hydrochloric acid:



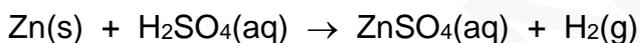
A student added $x \text{ cm}^3$ of 0.100 mol/dm^3 hydrochloric acid to solid sodium carbonate and collected 60.0 cm^3 of gas.

Calculate the mass of sodium carbonate and the volume of hydrochloric acid that reacted if the students used the exact quantities for the reaction and no gas escaped. [4]

Sodium carbonate.....g

Hydrochloric acid cm^3

6 A student wanted to make a sample of zinc sulfate crystals. They were told to react excess zinc with 50.0 cm^3 of 0.100 mol/dm^3 sulfuric acid. The equation for the reaction between zinc and sulfuric acid is:



(a) Calculate the number of moles of sulfuric acid that the student used. [2]

(b) The teacher suggested that 0.500 g of zinc should be enough to add. Explain whether the teacher is correct or not. [2]

(c) Zinc sulfate crystals have the formula $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$. Calculate the maximum mass of zinc sulfate crystals that could be formed from adding excess zinc to 50.0 cm^3 of 0.100 mol/dm^3 sulfuric acid. [3]