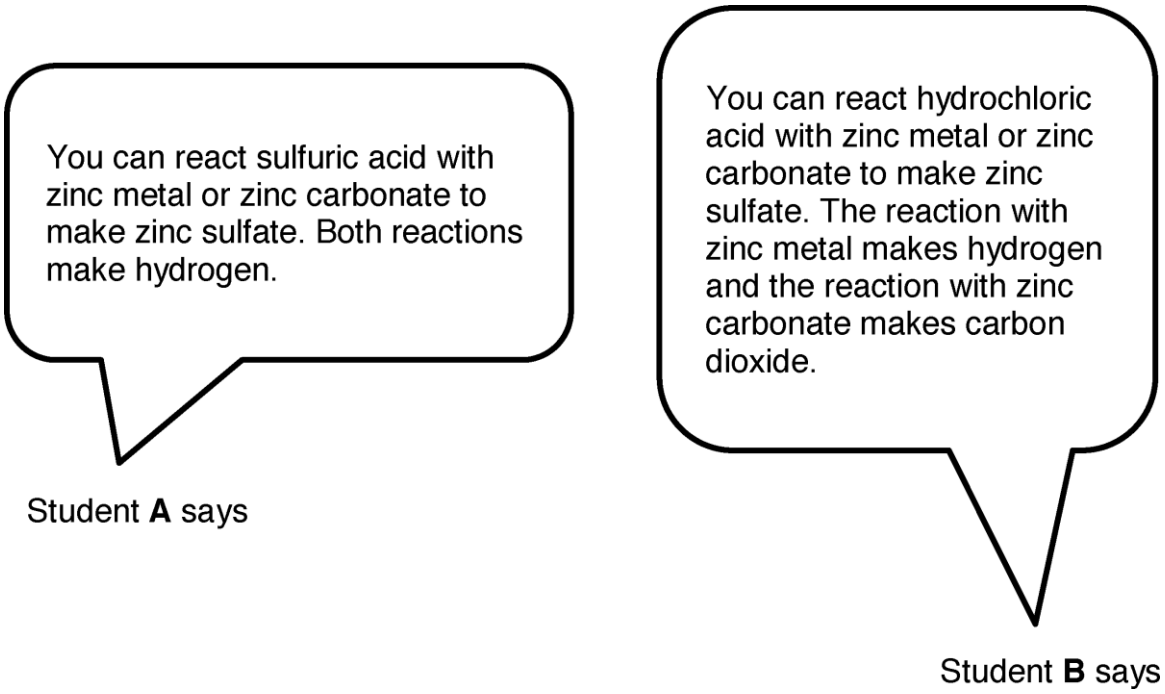
GCSE Chemistry A (Gateway Science)

J248/01 Chemistry A C1-C3 and C7 (Foundation Tier)

Question Set 8

1 Two students, **A** and **B**, want to make some solid zinc sulfate. They make some predictions.



(a) Comment on how correct **both** predictions are.

CORRECT :
- sulfuric acid reacts with zinc or zinc carbonate to make zinc sulfate
- zinc reacts with acid to make hydrogen
- zinc carbonate reacts with acid to make CO_2

INCORRECT :
- both reactions do not make hydrogen
- zinc or zinc carbonate will not react with HCl to make zinc sulfate
- zinc carbonate does not make hydrogen when it reacts with acid

[4]

(b) (i) Zinc oxide, ZnO, is reacted with nitric acid, HNO_3.

The reaction makes zinc nitrate, $Zn(NO_3)_2$, and water, H_2O.

Write a **balanced symbol** equation for this reaction.

$ZnO + 2HNO_3 \longrightarrow Zn(NO_3)_2 + H_2O$ **[2]**

(ii) A student suggests this method for preparing zinc nitrate.

1. Measure 50 cm^3 of dilute nitric acid into a beaker.
2. Add one spatula measure of zinc oxide.
3. Heat the mixture until crystals of zinc nitrate are made.

Her method will **not** make a pure dry sample of zinc nitrate.

What improvements should she make to the method to make sure that:

- the reaction is complete
- the zinc nitrate can be separated from the nitric acid and the zinc oxide?

Explain your answer. **[4]**

- Add zinc oxide (one spatula each time) and stir
- Continue adding zinc oxide until it is in excess (does not dissolve anymore)
- Filter to remove excess zinc oxide
- Pour the filtrate into evaporating basin
- Heat the zinc nitrate solution until half of the water is evaporated
- Leave the solution to allow all the water to evaporate

Total Marks for Question Set 8: 10