

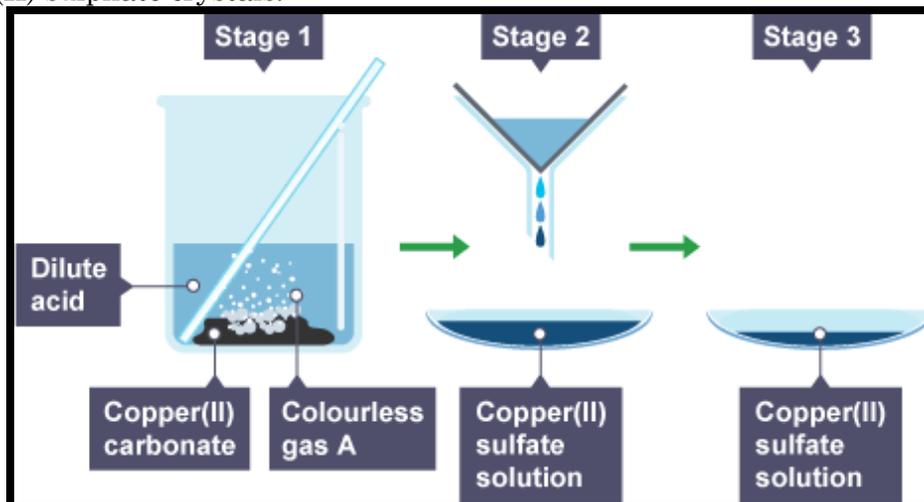
CHEMISTRY For Senior 3

HOME PACKAGE

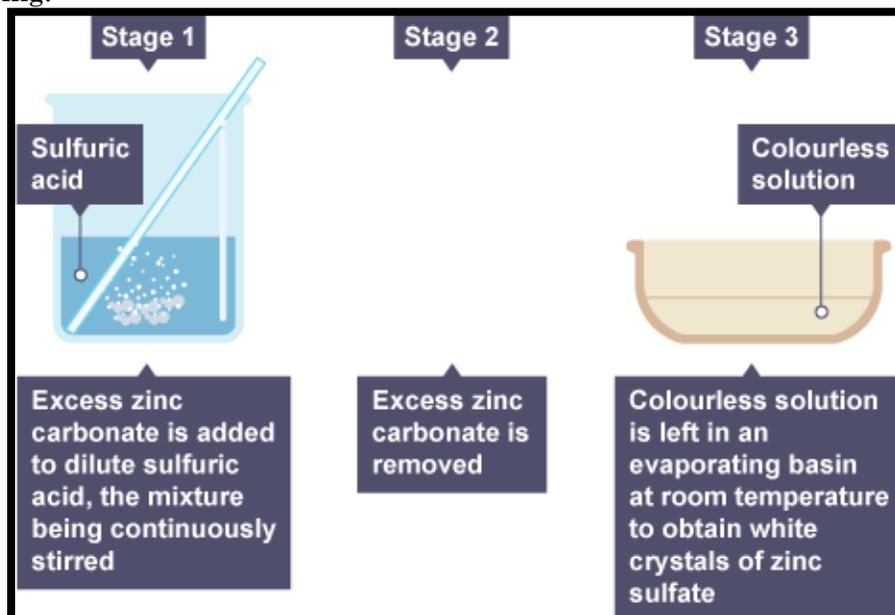
Submission via email: chemclement@gmail.com Max.: 45 marks

Question 1 (10 marks)

- (a) Define acid and base according to Arrhenius Theory. (2 marks)
- (b) One method of preparing dry copper (II) sulphate crystals is by reacting a carbonate with a dilute acid. The information below shows the stages a pupil follows to make copper (II) sulphate crystals.



- (i) Name the acid used in the process. (1 mark)
- (ii) Name gas A formed in *stage 1*. (1 mark)
- (iii) Name the substance removed during *stage 3*. (1 mark)
- (c) The diagrams below show the stages in making the compound zinc sulphate by reacting zinc carbonate with dilute sulphuric acid. The diagram showing the apparatus for *stage 2* is missing.



- (i) State what you would see when excess zinc carbonate is added. (1 mark)
- (ii) State why excess zinc carbonate is added. (1 mark)
- (iii) Draw the apparatus you would use to carry out *stage 2*. Label the excess zinc carbonate on your diagram. (3 marks)

Question 2**(10 marks)**

- (a) When sodium hydroxide reacts with sulphuric acid a solution of sodium sulphate is produced.
- (i) Give the formula of sodium sulphate. (1 mark)
 - (ii) Describe how crystals of sodium sulphate can be obtained from a solution of sodium sulphate. (3 marks)
- (b) Umutesi makes zinc chloride crystals from zinc oxide and an acid.
This is what she does:
1. *Add zinc oxide to dilute acid until some zinc oxide remains unreacted.*
 2. *Filter the mixture.*
 3. *Pour the filtrate into an evaporating basin.*
 4. *Heat the filtrate over a water bath until crystals appear around the edge.*
 5. *Remove the heat and leave in a warm, dry place for a few days.*
- (i) Name the acid used in *step 1*. (1 mark)
 - (ii) Describe and explain one improvement to *step 1*. (2 marks)
 - (iii) Explain why Umutesi filters the mixture in *step 2*. (1 mark)
 - (iv) Write a balanced chemical equation for the reaction, including state symbols. (2 marks)

Question 3**(20 marks)**

- (a) Calculate the molarity of the following solution made by: 5.85g of NaCl in 100 cm³ of solution. (3 marks)
- (b) Calculate the amount of solute present in 250 cm³ of a solution of hydrochloric acid which has a concentration of 2.0 mol dm⁻³. (3 marks)
- (c) What mass of sodium carbonate must be dissolved in 1 dm³ of solution to give a solution of concentration 1.5 M? (4 marks)
- (d) 500 cm³ of a solution hydroxide contains a mass of 5 g of solid NaOH. Calculate the concentration of the solution in g/dm³. (3 marks)
- (e) 0.95 g of solid aluminium sulphate, Al₂(SO₄)₃, was dissolved in 250 cm³ of water. What is the mass concentration of the solution in g/dm³. (4 marks)
- (f) Solution of NaOH had a concentration of 40 g/dm³. What mass of NaOH would there be in 250 cm³ of the solution? (3 marks)

Question 4**(5 marks)**

The student transfers 25.0 cm³ of hydrochloric acid with unknown concentration into a conical flask using a pipette and adds three drops of methyl orange indicator.

0.100 mol/dm³ sodium hydroxide is put into a burette and run into the conical flask until the end-point is reached.

- (a) Why does the student decide to use pipette and not a measuring cylinder to transfer 25.0 cm³ solution into the conical flask? (2 marks)
- (b) Write the equation for the occurring neutralisation reaction. (2 marks)
- (c) What is the colour change of the methyl orange indicator at the end-point? (1 mark)