General Certificate of Education
Advanced Subsidiary Examination
June 2014

Chemistry CHM3T/Q14/task

Unit 3T AS Investigative Skills Assignment

Task Sheet

An investigation of Group 2 compounds

Some Group 2 compounds are used in medicines.

X and **Z** are compounds of different Group 2 metals. Compound **X** is an insoluble white solid. Compound **Z** is provided as an aqueous solution.

In **Part 1**, you will react **X** with solution **A** to form solution **Y** so that the metal ions can be tested in solution.

In **Part 2**, you will carry out tests on solutions **Y** and **Z** using laboratory reagents and solutions **B** and **C**.

In this task, you are **not** required to identify the metal ion in **X**, in **Y** or in **Z**, or any of the reaction products.

Procedure

- **Wear eye protection at all times.**
- **Assume that all substances are toxic and corrosive.**

Part 1 Preparation of solution Y

1 Use a measuring cylinder to transfer 25 cm^3 of solution **A** to a small beaker.

2 Place the beaker on a tripod and gauze.

3 Add the sample of compound **X** to the beaker and stir the mixture.

4 Heat the mixture gently in the beaker. Stir the mixture from time to time. Stop heating when the liquid starts to boil.

5 Allow the mixture to cool until the beaker is safe to handle. Filter the mixture into a boiling tube. Do **not** discard the filtrate.

On your Candidate Results Sheet on page 3, describe the appearance of the residue on the filter paper and the appearance of the filtrate.

6 Label the boiling tube containing the filtrate as **Y**. Use solution **Y** in the following tests.
Have your filtrate Y checked by your teacher.

Part 2 The Tests

Carry out each test in a separate clean test tube or boiling tube. Use distilled or deionised water to clean the test tubes and boiling tube as appropriate.

Record what you **observe** for each test in **Part 2** in a table of your own design on the Candidate Results Sheet on page 4.
Where no visible change occurs in any of the tests, write 'no visible change'.

Test 1 Place about 10 drops of solution **Y** in a test tube. Add about 15 drops of sodium hydroxide solution and shake the mixture.

Repeat this test with solution **Z** instead of solution **Y**.

Test 2 Place about 10 drops of solution **Y** in a test tube. Add about 10 drops of sulfuric acid and shake the mixture.

Repeat this test with solution **Z** instead of solution **Y**.

Test 3 Place about 10 drops of solution **Y** in a boiling tube. Add about 10 drops of sodium carbonate solution and shake the mixture. Add sulfuric acid to the mixture, with shaking, until no further change occurs. Do **not** fill more than one-third of the boiling tube.

Repeat this test with solution **Z** instead of solution **Y**.

Test 4 Place about 10 drops of solution **Y** in a test tube. Add about 10 drops of silver nitrate solution and shake the mixture.

Repeat this test with solution **Z** instead of solution **Y**.

Test 5 Place about 10 drops of solution **Y** in a test tube. Add about 10 drops of barium chloride solution and shake the mixture.

Repeat this test with solution **Z** instead of solution **Y**.

Test 6 Place about 10 drops of solution **Y** in a test tube. Add about 10 drops of solution **B** and shake the mixture. Add solution **C** to the mixture, with shaking, until no further change occurs. Do **not** fill more than one-third of the test tube.

Repeat this test with solution **Z** instead of solution **Y**.

ISA CHM3T/Q14 Candidate Results Sheet

Centre Number | | | | | | Teacher Group .....

Candidate Name ..... Candidate Number | | | | |

Results for Part 1 - Preparation of solution Y

Record your observations for Part 1 in this table.

Appearance of the residue on the filter paper	
Appearance of the filtrate	

Record your observations for Part 2 in an appropriate table on page 4.

Results for Part 2 - The Tests

Record your observations for Part 2 in an appropriate table in this space.

[8 marks]

For Teacher's use only					
R		S		A	
Did the candidate use their own sample of solution **Y** in Part 2? (Y/N)					

8