

# Chem!stry

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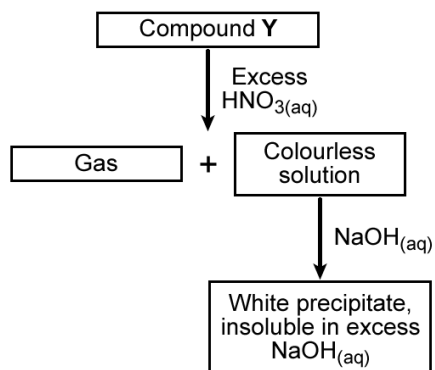
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## Questions on Qualitative Analysis – Assignment 6

### Question 1:

The scheme below shows some reactions of a compound Y:



What is the identity of compound Y?

- A Zinc carbonate.
- B Aluminium sulfate.
- C Calcium carbonate.
- D Copper(II) carbonate.

### Question 2:

A solution containing  $\text{Pb}^{2+}$  can be distinguished from a solution containing  $\text{Zn}^{2+}$  by adding any of the following solutions, except:

- A Aqueous sodium hydroxide.
- B Dilute sulphuric acid.
- C Aqueous sodium sulphate.
- D Dilute hydrochloric acid.

### Question 3:

Two aqueous solutions, X and Y, are mixed together. Which one of the following pairs would *not* give a white precipitate?

- A X = barium nitrate                      Y = sodium sulfate
- B X = calcium nitrate                     Y = sodium carbonate
- C X = lead(II) nitrate                     Y = sodium chloride
- D X = magnesium nitrate                 Y = sodium sulfate

**Question 4:**

A solution **X** formed a white precipitate with both dilute sulfuric acid and with aqueous silver nitrate. What could solution **X** contain?

- A** Barium chloride                      **B** Barium nitrate  
**C** Magnesium chloride                **D** Magnesium sulfate

**Question 5:**

An aqueous solution of an unknown salt gives the following results when added to the reagents:

Reagent	Result
Aqueous sodium hydroxide	Green precipitate that slowly turns brown
Aqueous barium nitrate	White precipitate

Which one of the following is the unknown salt?

- A** FeCl<sub>2</sub>                                      **B** FeSO<sub>4</sub>  
**C** Fe<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>                                **D** CuSO<sub>4</sub>

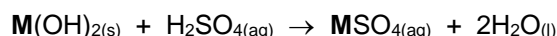
**Question 6:**

Which one of the following metallic ions forms a white hydroxide which dissolves in excess aqueous sodium hydroxide but *not* excess aqueous ammonia?

- A** Al<sup>3+</sup>    **B** Ca<sup>2+</sup>  
**C** Cu<sup>2+</sup>    **D** Zn<sup>2+</sup>

**Question 7:**

An aqueous solution of a sulfate is made from a solid hydroxide, of metal **M**, by the following reaction:



For which hydroxide would this method *not* work?

- A** Barium hydroxide                      **B** Copper(II) hydroxide  
**C** Iron(II) hydroxide                      **D** Magnesium hydroxide

**Question 8:**

The results on some fertiliser **X** are listed below:

Warming **X** with aqueous sodium hydroxide produced a gas which turned damp red litmus paper blue.

Mixing aqueous **X** with acidified barium chloride did *not* give a white precipitate.

Mixing aqueous **X** with acidified silver nitrate gave a white precipitate.

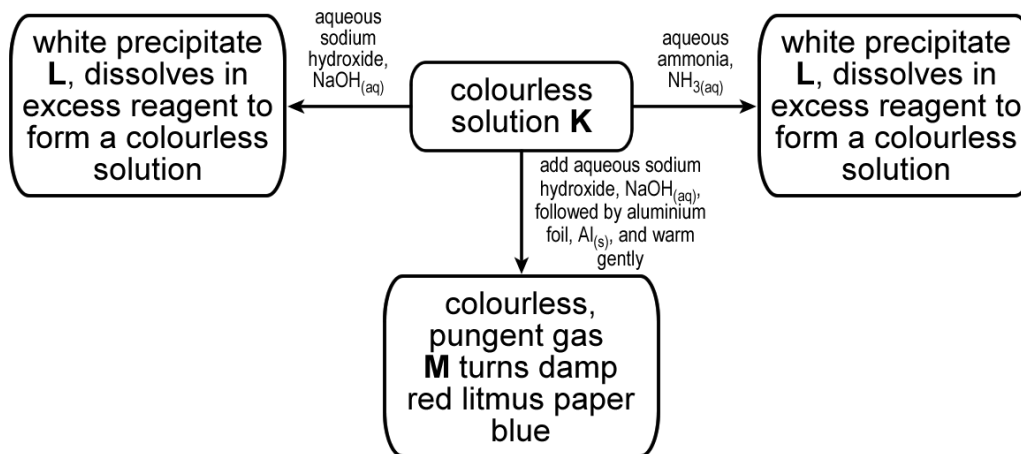
Which ions does fertiliser **X** contain?

- A** NH<sub>4</sub><sup>+</sup> and Cl<sup>-</sup>                                **B** NH<sub>4</sub><sup>+</sup> and SO<sub>4</sub><sup>2-</sup>  
**C** NH<sub>4</sub><sup>+</sup> and NO<sub>3</sub><sup>-</sup>                              **D** K<sup>+</sup> and NO<sub>3</sub><sup>-</sup>

• Write your answers to the multiple-choice questions in the table below:

1:	2:	3:	4:	5:	6:	7:	8:
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**Question 9:**



a) Identify the chemicals **K**, **L** and **M** by writing their formulae in the spaces provided below:

**K** is ..... **L** is .....

**M** is .....

b) i) Write the balanced chemical equation for the reaction between **K** and aqueous ammonia to form **L**:

.....

ii) Write the ionic equation for the reaction between **K** and aqueous ammonia to form **L**:

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**Question 10:**

Outline the chemical tests that you would perform in order to distinguish between aqueous solutions of aluminium nitrate, lead(II) nitrate and zinc nitrate. Include balanced chemical equations to support your answer.

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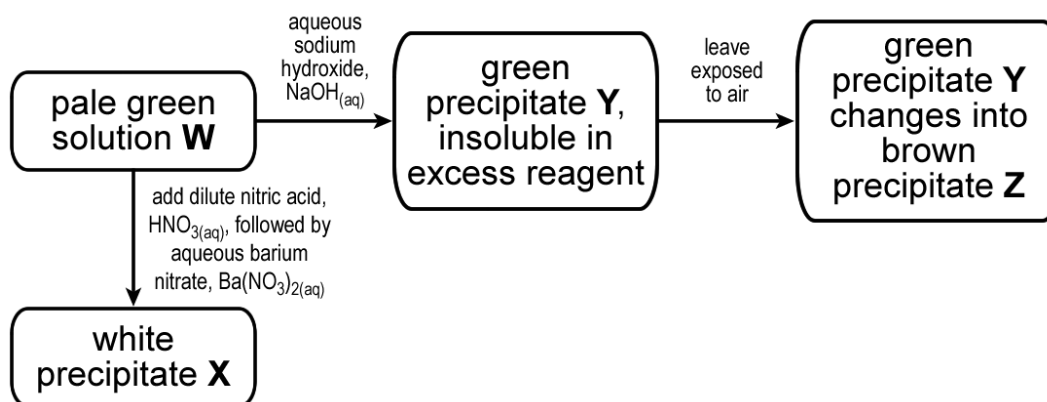
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**Question 11:**

Study the reaction sequence given below:



- a) Identify the chemicals **W**, **X**, **Y** and **Z** by writing their formulae in the spaces provided below:
- W** is ..... **X** is .....
- Y** is ..... **Z** is .....
- b) Write the balanced chemical equation for the reaction between **W** and aqueous sodium hydroxide to form **Y**:
- .....
- c) i) Write the balanced chemical equation for the reaction between **W** and aqueous barium nitrate to form **X**:
- .....
- ii) Write the ionic equation for the reaction between **W** and aqueous barium nitrate to form **X**:
- .....

**Question 11:**

The following table shows the tests that a student did on a solution of substance **H**, and the deductions made from the observations. Complete the table by describing the *observations* that led to each of the deductions:

Test	Observation	Deduction
1 a) Add aqueous sodium hydroxide until a change is observed. b) Add excess aqueous sodium hydroxide.		Cu <sup>2+</sup> ions are present.
2 a) Add aqueous ammonia until a change is observed. b) Add excess aqueous ammonia.		Cu <sup>2+</sup> ions are present.
3) Add dilute nitric acid followed by an aqueous solution of barium nitrate.		SO <sub>4</sub> <sup>-</sup> ions are absent.
4) Add dilute nitric acid followed by an aqueous solution of silver nitrate.		Cl <sup>-</sup> ions are present.

- Give the formula of substance **H**? .....

- Scan the QR code below for the answers to this assignment.



[http://www.chemist.sg/qualitative\\_analysis/qa\\_assignment\\_6\\_ans.pdf](http://www.chemist.sg/qualitative_analysis/qa_assignment_6_ans.pdf)