

1 A student was given four compounds in solution.



The student was told the names of the compound, but not which was which.

The names of the compounds are:

Lithium sulfate

Potassium carbonate

Sodium nitrate

Describe the test that could be would identify each solution.

[8 marks]

Lithium sulfate

Add barium chloride solution [1 mark]
and dilute hydrochloric acid [1 mark]
White precipitate formed [1 mark]

Potassium carbonate

Add hydrochloric acid [1 mark]
Carbon dioxide produced [1 mark]
test for carbon dioxide with limewater or carbon dioxide turns limewater
cloudy or milky [1 mark]

Sodium nitrate

Flame test [1 mark]
Yellow colour produced [1 mark]

A common error that examiners report is students getting the colours wrong for flame tests. Make sure you remember the coloure as they won't be given in the exam.

2 Cleaning chemicals sometimes contain ammonia in solution.

The amount of ammonia in ammonia solution can be found by titration using nitric acid.

25.0 cm³ of ammonia solution is placed in a conical flask.

Describe how the volume of dilute nitric acid required to neutralise this amount of household ammonia can be found accurately by titration.

Name any other apparatus and materials used.

[4 marks]

nitric acid in burette [1 mark]

Add indicator to ammonia solution (or named indicator, e.g. phenolphthalein) [1 mark]

Add nitric acid until indicator changes (colour) [1 mark]

Note (burette) volume used or final reading [1 mark]

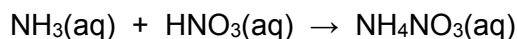
Repeat for accuracy, e.g. add drop wise on the second and third go. [1 mark]

accept white tile or drop wise near end or white background or swirling the flask or read meniscus at eye level

Careful with the spelling of burette (a common error is 'biuret'). There are various indicators that can be used so any one will get the mark.

2 (a) It was found that 25.0 cm³ of household ammonia was neutralised by 20.0 cm³ of dilute nitric acid with a concentration of 0.25 moles per cubic decimetre.

The balanced symbol equation which represents this reaction is



Calculate the concentration of the ammonia in this household ammonia in moles per cubic decimetre.

[2 marks]

25 × concentration of NH₃ = 0.25 × 20 [1 mark]

0.2 [2 marks]

or moles NH₃ = moles HNO₃

= 0.02 × 0.25 = 0.005 moles [1 mark]

= 0.2 [1 mark]

Concentration = 0.2 moles per cubic decimetre