

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2011

# 71 Candidate Num

# **Chemistry**

Assessment Unit AS 3

assessing

Module 3: Practical Examination 2

[AC132]

**WEDNESDAY 11 MAY** 



# TIME

2 hours 30 minutes.

# **INSTRUCTIONS TO CANDIDATES**

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Answer all five questions.

Write your answers in the spaces provided.

# INFORMATION FOR CANDIDATES

The total mark for this paper is 90.

### Section A

Question 1 is a practical exercise worth 25 marks.

Question 2 is a practical exercise worth 29 marks.

### Section B

Question 3 is a planning exercise worth 20 marks. Questions 4 and 5 are written questions worth a total of 16 marks, testing aspects of experimental chemistry. Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

A Periodic Table of Elements (including some data) is provided.

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| Teacher<br>Mark | Examiner<br>Check |
|-----------------|-------------------|
|                 |                   |
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| Total<br>Marks |  |
|----------------|--|
|                |  |

### Section A

### 1 Titration exercise

Vinegar is a 4–5% aqueous solution of ethanoic acid.

You are required to carry out a titration and use the results to calculate the concentration of ethanoic acid in a sample of vinegar.

You are provided with:

Sodium hydroxide solution of concentration 0.05 mol dm<sup>-3</sup> A sample of vinegar of unknown concentration Phenolphthalein indicator

# (a) Carry out the titration by:

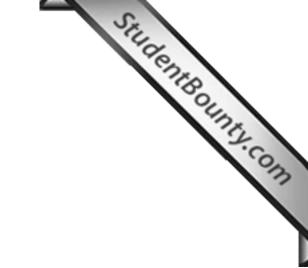
- rinsing out a burette with the 0.05 mol dm<sup>-3</sup> sodium hydroxide solution
- filling the burette with the 0.05 mol dm<sup>-3</sup> sodium hydroxide solution
- transferring 25.0 cm<sup>3</sup> of the vinegar to the conical flask
- adding 2–3 drops of phenolphthalein indicator to the solution in the conical flask and titrating until the end point is reached

Present your results in a suitable table and calculate the average titre.

[12]



\_\_\_\_\_ [1]



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(Questions continue overleaf)

### 2 Observation/deduction

Safety glasses must be worn at all times and care should be taken during this practical examination.

Te<sub>c</sub> Man

(a) You are provided with a mixture of two salts, labelled A, which have a common cation. Carry out the following experiments on the mixture. Record your observations and deductions in the spaces below and identify the two salts.

|   | Experiment   | Observations | Deductions |
|---|--|--------------|------------|
| 1 | Describe A.  |              |            |
|   |  | [1]          | [1]        |
| 2 | (a) Make a solution of A by dissolvir<br>spatula measure of A in a test to<br>half full of water.  |              |            |
|   | (b) Acidify 2 cm <sup>3</sup> of this solution with 1 cm <sup>3</sup> of dilute nitric acid and the add 1 cm <sup>3</sup> of silver nitrate solution | n            |            |
|   | (c) Add 5 cm <sup>3</sup> of dilute ammonia solution to the test tube.   | [3]          | [3]        |
| 3 | (a) Add 1 cm <sup>3</sup> of the solution formed part 2(a) above to another test to  |              |            |
|   | (b) Acidify with 3 drops of dilute nitri<br>acid and then add 3 drops of<br>barium chloride solution.  | c [1]        | [1]        |
| 4 | (a) Make a solution of A by dissolvir half a spatula measure of A in a test tube one third full of water.  | ng           |            |
|   | <b>(b)</b> Add 3 drops of dilute ammonia solution to the test tube.  |              |            |
|   | (c) Add excess dilute ammonia soluto the same test tube.   | tion [3]     | [2]        |
| 5 | (a) Place a spatula measure of A or<br>watch glass and add a few drops<br>concentrated hydrochloric acid.  | s of         |            |
|   | (b) Use a clean loop of nichrome wi<br>to place a small amount of this<br>acidified sample of A in a blue<br>Bunsen flame.                           | re [2]       | [2]        |
| 6 | Place a spatula measure of A in a dr   |              |            |
|   | test tube and heat gently.   | [1]          | [1]        |

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### **Planning** 3

The value of x in the formula  $Ni(NO_3)_2.xH_2O$  (hydrated nickel(II) nitrate) may be determined by gently heating a known mass of the solid to drive off all the water of crystallisation and reweighing.

| (a) | (i)   | What is meant by the term water of crystallisation?   |                    |
|-----|-------|---|--------------------|
|     |       |   | [1]                |
|     | (ii)  | Hydrated nickel(II) nitrate is a green crystalline solid. State <b>one</b> observation which may be made during the dehydration of the hydrated nickel(II) nitrate. | [1]                |
|     | (iii) | State how you could ensure, using weighings, that all of the water was removed.   |                    |
|     |       |   | [2]                |
| (b) |       | in experiment 3.22g of hydrated nickel(II) nitrate, NO <sub>3</sub> ) <sub>2</sub> .xH <sub>2</sub> O, produced 2.02g of the anhydrous salt.                        |                    |
|     | (i)   | Write the equation for the dehydration.   |                    |
|     | (ii)  | Using the above data calculate the mass of water given  | [1]<br>off.<br>[1] |
|     | (iii) | Calculate the number of moles of water given off.   | [1]                |

(vi) Suggest one reason why the value of x determined by this experiment may be less than the actual value.

(vii) Prolonged strong heating will result in a higher value of x being determined. Suggest what effect strong heating may have on the salt.

\_\_\_\_\_ [1]

(c) Hydrated magnesium sulfate, MgSO<sub>4</sub>.7H<sub>2</sub>O, may be prepared by reacting magnesium metal with excess dilute sulfuric acid.

 $Mg(s) + H_2SO_4(aq) \rightarrow MgSO_4(aq) + H_2(g)$ 

(i) State **two** observations during the reaction.

Tec Yemark Marı

THIS IS THE END OF THE QUESTION PAPER

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