

A level Chemistry B

H433/03 Practical skills in chemistry

Question Set 7

- 1 (a) (i) Iodine, I₂, is an essential dietary element. The recommended maximum daily intake of iodine for an adult is 1.5 × 10⁻⁴ g (150 μg).

A group of chemistry students read that fish is a good source of iodine in the form of iodide ions. They decide to extract the iodine from 600 g of fish.

The students blend the fish in a food processor with 100 cm³ of water, leave it to stand overnight and then filter the mixture into a beaker.

One of the students suggests that if they add silver nitrate solution they can confirm the presence of iodide ions in the solution.

Describe what the students would observe if the only halide ion present in the solution was the iodide. [1]

- 1 (a) (ii) Write an **ionic** equation for this reaction. Include state symbols. [1]

- 1 (b) (i) The students pour the filtered mixture into a separating funnel containing 20 cm³ of hexane, 5 cm³ of dilute sulfuric acid and 5 cm³ of hydrogen peroxide solution.

Iodine is formed and dissolves in the hexane layer which goes purple. The purple layer is separated from the aqueous layer and transferred to a conical flask.

The purple coloured solution is titrated with standard 0.0010 mol dm⁻³ sodium thiosulfate solution. The end point is indicated by the disappearance of the purple colour.

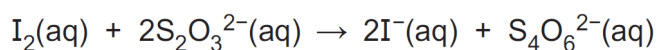
The hydrogen peroxide oxidises the iodide ions in the fish to iodine.

Write a half equation for this oxidation reaction.
Explain why this reaction is classified as oxidation.

Half equation.....

Explanation..... [1]

- 1 (b) (ii) The equation for the titration reaction is given below.



Name the element oxidised in this reaction. Give its oxidation state before and after the reaction.

Element oxidised

Oxidation state before reaction oxidation state after reaction..... [2]

- 1 (b) (iii) The students obtained an average titre of 5.30 cm³ of 0.0010 mol dm⁻³ sodium thiosulfate.

Calculate the **mass** of iodine in µg in a **120 g** portion of fish.

Give your answer to **two** significant figures.

mass of iodine =µg [4]

- 1 (b) (iv) One of the students suggests that the titre value is too small and will lead to an unacceptably high percentage error.

Calculate the percentage error based on the students' titre value.

percentage error =% [1]

- 1 (b) (v) Suggest how the experiment could be modified to improve the accuracy of the result. [1]

- 1 (c)* The mass of the iodine in the hexane solution could also have been determined using colorimetry.

Suggest a suitable method that could be used to measure the mass of iodine in the hexane solution using a colorimeter or visible spectrophotometer.

Show how you would process the results.

[6]

Total Marks for Question Set 7 = 17

OCR

Oxford Cambridge and RSA

Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact The OCR Copyright Team, The Triangle Building, Shaftesbury Road, Cambridge CB2 8EA.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge