



TEST CODE **02212032**

FORM TP 2011157

MAY/JUNE 2011

C A R I B B E A N E X A M I N A T I O N S C O U N C I L

A D V A N C E D P R O F I C I E N C Y E X A M I N A T I O N

C H E M I S T R Y

U N I T 2 – P a p e r 0 3 / 2

A L T E R N A T I V E T O I N T E R N A L A S S E S S M E N T E X A M I N A T I O N

2 hours

**You are advised to use the first 10 minutes
for reading through the paper carefully.**

READ THE FOLLOWING DIRECTIONS CAREFULLY.

1. Answer ALL questions on this paper.
2. Use this answer booklet when responding to the questions. For EACH question, write your answer in the space indicated and return the answer booklet at the end of the examination.
3. The use of silent non-programmable calculators is allowed.
4. A data booklet is provided.

2. (a) An experiment was carried out to investigate the changes in pH during the titration of 20 cm^3 of a 0.1 mol dm^{-3} solution of HCl with a solution of a base X.

The graph shown in Figure 1 on page 5 was obtained by observing the volume of X added to the acid which produced values of pH 1.2, 1.4, 1.8, 2.3, 3.6, 5.5, 7.1, 8.2, 8.7, 8.8.

- (i) Using the graph provided in Figure 1, construct a table to record observations of volume of X added in dm^3 and values of pH.

- (ii) Account for the shape of the graph. [5 marks]

[3 marks]

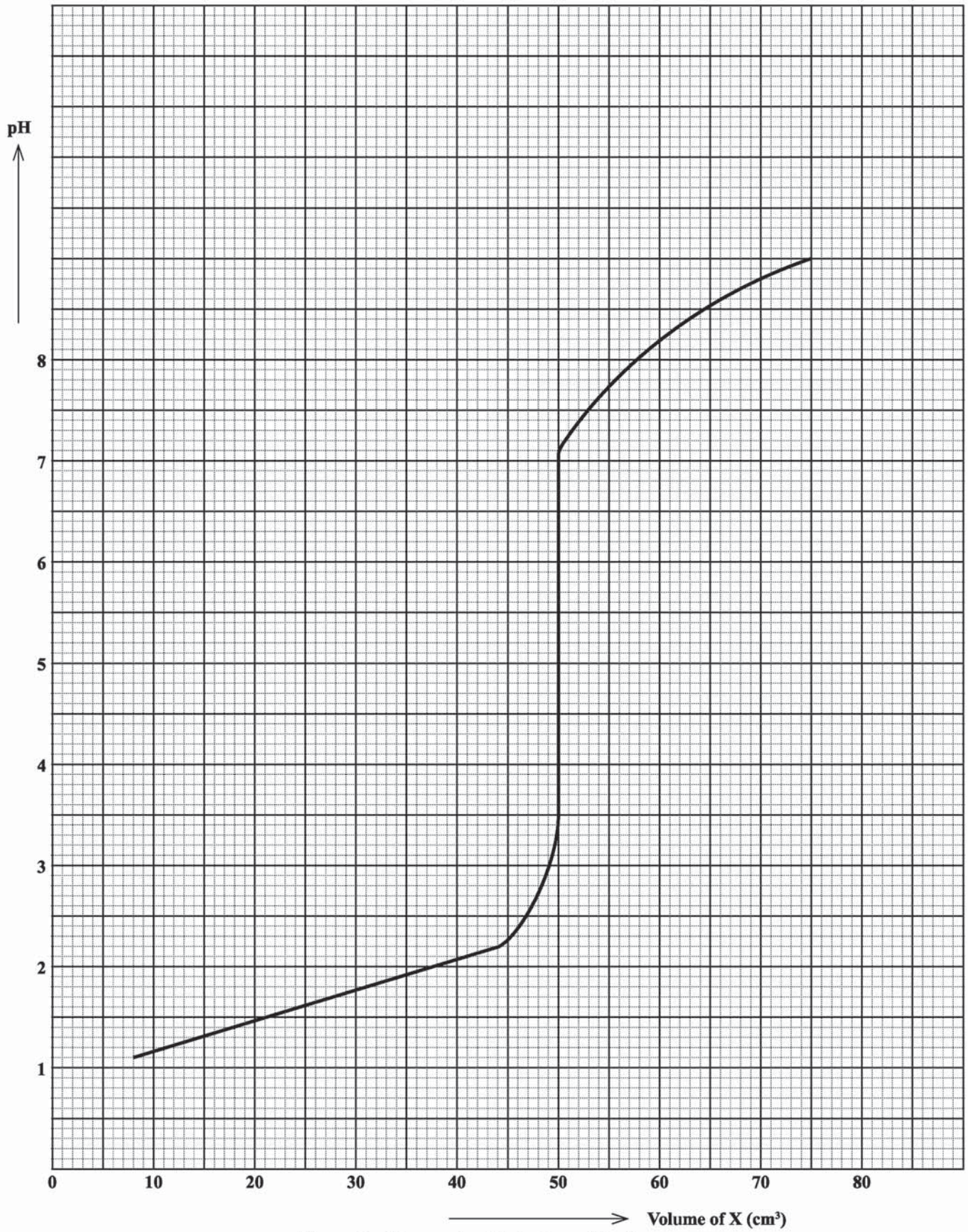


Figure 1. Changes in pH during a titration

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- (b) (i) Define the term 'equivalence point' as it applies to titrations.

[1 mark]

- (ii) State the pH at the equivalence point during the titration of HCl and X.

[1 mark]

- (c) (i) Suggest the strength of X in terms of 'strong' or 'weak' and give a reason for your choice.

Strength

Reason

[2 marks]

- (ii) Identify X.

[1 mark]

- (d) Given the reacting mole ratio of acid to base as 1:1, calculate the concentration of the solution of X.

[3 marks]

Total 16 marks

3. A young chemist was challenged to test his assertion that fats become saturated after they undergo hydrogenation.

Plan and design an experiment that would allow the young chemist to positively test his claim. Your answer should include:

- (a) Aim

[1 mark]

- (b) Hypothesis

[1 mark]

- (c) Apparatus and materials

[2 marks]

- (d) Method

[3 marks]

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(e) Variables

(i) Controlled

[1 mark]

(ii) Manipulated

[1 mark]

(iii) Responding

[1 mark]

(f) Data to be collected

[1 mark]

(g) Discussion of expected results

[2 marks]

(h) Precautions

[1 mark]

Total 14 marks

END OF TEST