

Candidate Name

Centre Number

Candidate Number



**ZIMBABWE SCHOOL EXAMINATIONS COUNCIL**  
**General Certificate of Education Advanced Level**

**CHEMISTRY**  
 PAPER 5 Practical Test

9189/5

NOVEMBER 2013 SESSION

1 hour 20 minutes

Candidates answer on the question paper.  
 Additional materials:  
 As listed in Instructions to Supervisors  
 Insert

TIME 1 hour 20 minutes

**INSTRUCTIONS TO CANDIDATES**

Write your name, Centre number and candidate number in the spaces at the top of this page.  
 Answer **all** questions.  
 Write your answers in the spaces provided on the question paper.

**INFORMATION FOR CANDIDATES**

The number of marks is given in brackets [ ] at the end of each question or part question.  
 You are advised to show all working in calculations.  
 Use of a Data Booklet is unnecessary.

**FOR EXAMINER'S USE**

1	
2	
<b>TOTAL</b>	

**This question paper consists of 5 printed pages and 3 blank pages.**

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1 **FA1** is a sample of impure water, suspected to be containing halide ions.

**FA2** is  $0.005 \text{ mol dm}^{-3} \text{ AgNO}_{3(\text{aq})}$ .

You are required to determine the concentration of the halide ions present in **FA1**.

Using a burette place between  $28.20 \text{ cm}^3$  and  $28.80 \text{ cm}^3$  of **FA1** into a  $250 \text{ cm}^3$  volumetric flask.

Make it up to the mark using distilled water and label it **FA3**. Record your results in the **Dilution Table**.

#### Dilution table

final burette reading / $\text{cm}^3$	
initial burette reading / $\text{cm}^3$	
volume of <b>FA1</b> used / $\text{cm}^3$	

[3]

Pipette  $25 \text{ cm}^3$  of **FA3** into a conical flask and add four drops of  $\text{K}_2\text{CrO}_{4(\text{aq})}$  indicator.

Titrate against **FA2** until the first permanent colour change.

Record your results in the **Titration Table**.

Repeat the titration as many times as you think necessary to obtain accurate results.

#### Titration Table

<b>titration number</b>					
final burette reading / $\text{cm}^3$					
initial burette reading / $\text{cm}^3$					
volume of <b>FA2</b> used					

[15]

#### Summary

$25 \text{ cm}^3$  of **FA3** required \_\_\_\_\_  $\text{cm}^3$  **FA2** for complete precipitation.

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- (a) Calculate the number of moles of  $\text{Ag}^+_{(\text{aq})}$  in the titre given that the concentration of  $\text{AgNO}_{3(\text{aq})}$  is  $0.005 \text{ mol dm}^{-3}$ .

[1]

- (b) (i) Assuming the halide ions present to be  $\text{Cl}^-$  and  $\text{I}^-$ , calculate the total number of moles of anions in the volume of impure water used.

[4]

- (ii) Calculate the concentration of the halide ions in the impure water.

[3]

- (c) Suggest a possible source of error in this experiment.

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[1]

## ASSESSMENT OF PLANNING SKILLS

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## DO NOT CARRY OUT YOUR PLAN

- 2 You are required to design an experiment to show how you can use the results in **question 1** to estimate the proportions of  $Cl^-$  and  $I^-$  in **FA1**.

Assume you are provided with the following:

filter paper and funnel  
balance  
burette  
beaker  
conical flask  
dilute  $NH_3(aq)$

State in a sequence of numbered steps how you would

1. perform the experiment,
2. determine the proportions of  $Cl^-$  and  $I^-$  in **FA1**.

[13]