

Name.....

Index No...../.....

233/3

CHEMISTRY

Paper 3

PRACTICAL

Oct./Nov. 2011

2¼ hours

Candidate's Signature.....

Date.....

THE KENYA NATIONAL EXAMINATIONS COUNCIL

Kenya Certificate of Secondary Education

CHEMISTRY

Paper 3

PRACTICAL

2¼ hours

Instructions to candidates

1. Write your name and index number in the spaces provided above.
2. Sign and write the date of examination in the spaces provided above.
3. Answer **ALL** the questions in the spaces provided in the question paper.
4. You are **NOT** allowed to start working with the apparatus for the first 15 minutes of the 2¼ hours allowed for this paper. This time is to enable you to read the question paper and make sure you have all the chemicals and apparatus that you may need.
5. All working **MUST** be clearly shown where necessary.
6. Mathematical tables and silent electronic calculators may be used.
7. **This paper consists of 8 printed pages.**
8. **Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**

For Examiner's use only

Question	Maximum Score	Candidate's Score
1	22	
2	12	
3	6	
Total Score	40	

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2011(MMXI) KCSE (11212)
CHEMISTRY (PRACTICAL)
Paper 3



1 You are provided with:

- 1.60g of solid **A**, a dibasic acid.
- Solution **B** containing 4.75g per litre of salt **B**.
- Aqueous sodium hydroxide, solution **C**.
- Phenolphthalein indicator.

You are required to prepare a solution of solid **A** and use it to determine the:-

- Concentration of sodium hydroxide, solution **C**
- React salt **B** with excess sodium hydroxide and then determine the relative molecular mass of salt **B**.

Procedure I

- Using a burette, place 25.0cm^3 of solution **B** in each of two 250ml conical flasks. Using a pipette and **pipette filler**, add 25.0cm^3 of solution **C** to each of the two conical flasks. (The sodium hydroxide added is in excess). Label the conical flasks 1 and 2.
- Heat the contents of the first conical flask to boiling and then let the mixture boil for 5 minutes. Allow the mixture to cool.
- Repeat procedure (b) with the second conical flask.

While the mixtures are cooling, proceed with procedure II.

Procedure II

- Place **all** of solid **A** in a 250 ml volumetric flask. Add about 150cm^3 of distilled water, shake well to dissolve the solid and then add water to make up to the mark. Label this as solution **A**.
- Place solution **A** in a clean burette. Using a pipette and **pipette filler**, place 25.0cm^3 of solution **C** in a 250ml conical flask. Add 2 drops of phenolphthalein indicator and titrate with solution **A**. Record your results in Table 1. Repeat the titration two more times and complete the table.

Table 1

	I	II	III
Final burette reading			
Initial burette reading			
Volume of solution A used (cm ³)			

(4 marks)

Calculate the:-

- (i) average volume of solution A used: (½ mark)

.....

- (ii) concentration in moles per litre of the dibasic acid in solution A; (2 marks)
(Relative molecular mass of A is 126).

.....

.....

.....

- (iii) moles of the dibasic acid used; (1 mark)

.....

.....

- (iv) moles of sodium hydroxide in 25.0cm³ of solution C. (1 mark)

.....

.....

- (v) concentration of sodium hydroxide in moles per litre. (2 marks)

.....

.....

.....

Procedure III

Add 2 drops of phenolphthalein indicator to the contents of the first conical flask prepared in procedure I and titrate with solution A. Record your results in Table 2. Repeat the procedure with the contents of the second conical flask and complete the table.

Table 2

	1st conical flask	2nd conical flask
Final burette reading		
Initial burette reading		
Volume of solution A used (cm ³)		

(3 marks)

Calculate the:-

(i) average volume of solution A used; (½ mark)

.....

(ii) moles of the dibasic acid used; (1 mark)

.....

.....

(iii) moles of sodium hydroxide that reacted with the dibasic acid. (1 mark)

.....

.....

(iv) moles of sodium hydroxide that reacted with 25.0cm³ of salt B in solution B; (2 marks)

.....

.....

.....

(v) Given that 1 mole of salt **B** reacts with 2 moles of sodium hydroxide, calculate the:

I. number of moles of salt **B** in 25.0cm³ of solution **B**; (1 mark)

.....

.....

.....

II. concentration in moles per litre of salt **B** in solution **B**; (1 mark)

.....

.....

III. relative molecular mass of salt **B**; (2 marks)

.....

.....

.....

2 (a) You are provided with solid **D**. Carry out the following tests and write your observations and inferences in the spaces provided.

(i) Place about one half of solid **D** in a test-tube and heat it strongly. Test any gases produced with both red and blue litmus papers.

Observations	Inferences
(2 marks)	(1 mark)

- (ii) Place the rest of solid **D** in a boiling tube. Add about 10cm^3 of distilled water. Shake well.

To a 2cm^3 portion of the solution, add about 1cm^3 of hydrogen peroxide and shake well. To the resulting mixture, add aqueous sodium hydroxide dropwise until in excess.

Observations	Inferences
(1 mark)	(1 mark)

- (b) You are provided with solution **E**. Carry out the following tests and write your observations and inferences in the spaces provided. Divide solution **E** into **two** portions.

- (i) To one portion of solution **E** in a test-tube, add 3 drops of barium nitrate. **Retain the mixture for use in test (ii) below.**

Observations	Inferences
(1 mark)	(2 marks)

- (ii) To the mixture obtained in (i) above, add about 5cm^3 of 2M nitric (V) acid.

Observations	Inferences
(1 mark)	(1 mark)

- (iii) To portion two of solution **E** in a test-tube, add 2 drops of acidified potassium dichromate (VI) and warm the mixture.

Observations	Inferences
(1 mark)	(1 mark)

- 3 You are provided with liquid **F**. Carry out the following tests and record your observations and inferences in the spaces provided.

- (a) Place five drops of liquid **F** on a clean dry watch glass and ignite it.

Observations	Inferences
(1 mark)	(1 mark)

- (b) Place about 2cm³ of liquid **F** in a clean dry test-tube, add all the sodium hydrogen carbonate provided.

Observations	Inferences
(1 mark)	(1 mark)

- (c) Place about 2cm^3 of liquid **F** in a test-tube, add about 1cm^3 of acidified potassium dichromate (VI) and warm the mixture.

Observations	Inferences
(1 mark)	(1 mark)

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