Name_____IndexNo._____

Candidate's Signature _____ ADM _____

233/3
CHEMISTRY
PAPER 3
PRACTICAL
17TH JULY 2015
2 ¼ HOURS

ALLIANCE HIGH SCHOOL PRE-TRIAL EXAMINATION
Kenya Certificate of Secondary Education
CHEMISTRY
PAPER 3
2 ¼ HOURS

INSTRUCTIONS TO CANDIDATES

(a) Write your name and index number in the spaces provided above.

(b) Answer all the questions in the spaces provided.

(c) Mathematical tables and silent electronic calculators may be used.

(d) All working must be clearly shown where necessary.

FOR EXAMINER'SUSE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1	17	
2	12	
3	11	
TOTAL SCORE	40	

This paper consists of 7 printed pages.Candidates should check the question paper to ensurethat all the printed pages are printed as indicated and no questions are missing.

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 the determine the relative molecular mass of salt **B.**

Procedure I

a) Using a burette, place 25.0cm^3 of solution **B** in each of the 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.

b) Heat the contents of the first conical flask to boiling and then let the mixture boil for 5 minutes. Allow the mixture to cool.

c) Repeat procedure (b) with the second conical flask.

While the mixtures are cooling, proceed with procedure II.

Procedure II

a) 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.**

b) 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 mks)

.culate the:-

i) Average volume of solution **A** used:

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

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iii) Moles of the dibasic acid used; (1 mk)

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iv) Mole of Sodium Hydroxide in 25.0cm^3 of solution **C**. (1 mk)

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v) Concentration of Sodium Hydroxide in moles per litre. (2 mks)

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Procedure III

Add 2 drops of Phenolphthalein indicator to the contents of the first conical flask prepared in procedure 1 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 mks)

Calculate the:-

i) Average volume of solution **A** used;

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ii) Moles of the dibasic acid used; (1 mk)

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iii) Moles of Sodium Hydroxide that reacted with the dibasic acid. (1 mk)

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iv) Moles of Sodium Hydroxide that reacted with 25.0cm^3 of salt **B** in solution **B.** (2 mks)

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2. You are provided with:
Magnesium ribbon labelled solid **K**
2.0**M** Hydrochloric acid labelled solution **P.**
Stop clock/watch.

You are required to determine the rate of reaction between Magnesium and Hydrochloric acid at different concentrations.

Procedure

1. Place five test-tubes on a test-tube rack and label them 1,2,3,4 and 5.
Using a $10cm^3$ measuring cylinder, measure out the volumes of 2.0**M** Hydrochloric acid, solution **P** as shown in table II and pour them into the corresponding test-tubes.
Wash the measuring cylinder and use it to measure the volumes of water as indicated in the table and pour into the corresponding test-tubes.

II. Cut out five pieces each of exactly 1cm length of magnesium ribbon.

III Transfer all of the solution in test-tube 1 into a clean $100cm^3$ beaker. Place one piece of Magnesium into the beaker and start a stop clock/watch immediately. Swirl the beaker continuously ensuring that the Magnesium is always inside the solution.

Record in the table the time taken for the Magnesium ribbon to disappear. Wash the beaker each time.

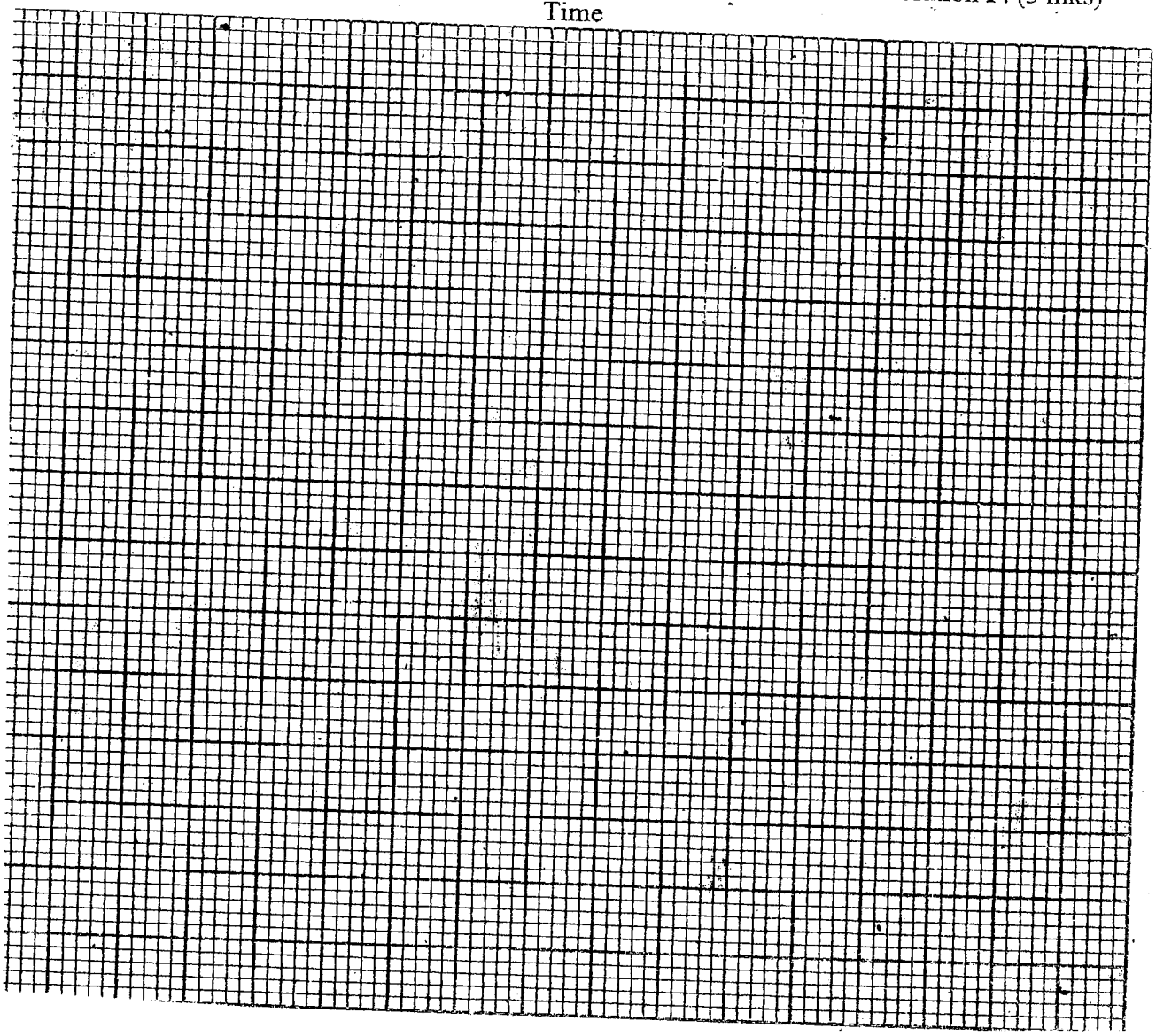
IV. Repeat procedure III for each of the solutions in the test-tubes 2,3,4 and 5 and complete the table.

a)

Test-tube Number	1	2	3	4	5
Volume of solution **P** (cm^3)	10	9	8	7	6
Volume of water (cm^3)	0	1	2	3	4
Rate of reaction = $\frac{1}{\text{Time } (S^{-1})}$					

(5 mks)

(b) Plot a graph of rate of reaction; $\frac{1}{\text{Time}}$ (y-axis) against volume of solution **P**. (3 mks)



(ii) Use the graph to determine the time that would be taken for a 1cm length of Magnesium ribbon to disappear if the volume of the acid, solution **P** used was $7.5cm^3$. (2 mks)

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(iii) In terms of rate of reaction, explain the shape of your graph. (2 mks)

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QUALITITATIVE ANALYSIS

3. You are provided with solid **E**. Carry out the experiments below. Write your observations and inferences in the spaces provided.

a) Place all of solid **E** in the boiling tube. Add about 20cm^3 of distilled water and shake until all the solid dissolves, label the solution as solution **E**. Use solution **E** for experiments (i) and (ii).

i) To 2 cm^3 of solution E, in a test – tube in each of experiments I, II, III and IV add:

I. Two drops of aqueous Sodium Sulphate;

Observations	**Inferences**
(1 mk)	(1 mk)

II. Five drops of aqueous Sodium Chloride;

Observations	**Inferences**
(1 mk)	(1 mk)

III. Two drops of Barium Nitrate;

Observations	**Inferences**
(1 mk)	(1 mk)

IV. Two drops of aqueous Lead (II) Nitrate;

Observations	**Inferences**
(1 mk)	(1 mk)

V. To 2 cm^3 of solution E, in a test – tube, add 5 drops of aqueous Sodium Hydroxide. Add the piece of Aluminium foil provided to the mixture and shake. Warm the mixture and test any gas produced with both blue and red litmus papers.

Observations	**Inferences**
(2 mks)	(1 mk)