Name……. **Index No……/…….**

School…… **Candidates Signature……**

Date ……..

233/3
CHEMISTRY
Paper 3
PRACTICAL
July/August 2009
2 ¼ Hours

KIRIMA JOINT EVALUATION TEST - 2009

Kenya Certificate of Secondary Education (K.C.S.E)

233/3
CHEMISTRY
Paper 3
PRACTICAL
July/August 2009
2 ¼ Hours

Instructions to candidates

- Write your name and Index Number in the spaces provided above.
- Sign and write date of examination in the spaces provided above.
- Answer **ALL** questions in the spaces provided in the question paper.
- You are not allowed to start working with the apparatus for the first 15 minutes of the 2 ¼ 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.
- All workings **MUST** be clearly shown where necessary.
- Mathematical tables and silent electronic calculators may be used.

For Examiners use only.

Question	Maximum Score	Candidates Score
1	12	
2	12	
3	16	
TOTAL SCORE	40	

This paper consists of 6 Printed pages.
Candidates should check the question paper to ensure that all the Papers are printed as indicated and no questions are missing

1. You are provided with

- Solution Y_1 containing $7.3gl^{-1}$ of hydrochloric acid
- Solution Y_2, containing 14.3g of hydrated sodium carbonate, $Na_2CO_3.XH_2O$ (washing soda) dissolved in $500cm^3$ of water and diluted to one litre
- You are required to standardize Y_2 ($Na_2CO_3.XH_2O$) using Y_1(HCl)
- Determine the number of moles of water of crystallization in hydrated sodium carbonate.

Procedure:

- Fill the burette with solution Y_2($Na_2CO_3.XH_2O$)
- Pipette $25.0cm^3$ of solution Y_1 into $250cm^3$ conical flask
- Add 2 – 3 drops of phenolphthalein indicator and titrate with Y_2. Record your readings in table 1 below.

(a)

	I	**II**	**III**
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of solution Y_2 Used (cm^3)			

(4mks)

(i) Determine the average volume of solution Y_2used (1mk)

(ii) Write the chemical equation for the reaction between dilute hydrochloric acid and sodium carbonate solution. (1mk)

(b) Calculate:

(i) The molar concentration of hydrochloric acid solution Y_1 (2mks)

(ii) The molar concentration of Na_2CO_3. xH_2O solution Y_2. (2mks)

(iii) The relative formula mass of $Na_2CO_3.XH_2O$ (1mk)

(iv) The volue of X in $Na_2CO_3.XH_2O$ (1mk)

2. You are provided with:
   - Magnesium ribbon labeled solid G
   - 2.0M hydrochloric acid labeled solution L
   - Stop watch/clock

   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 volume of 2.0M hydrochloric acid solution L as shown in table 2 and pour them into the corresponding test tubes. Wash the measuring cylinder and use it to measure the volumes as indicated in the table. Pour into corresponding test tubes
2. Cut out five pieces each exactly 1cm length of magnesium ribbon.
3. Transfer all the solution in tube 1 into a clean $100cm^3$ beaker. Place one piece of magnesium into the beaker and start a stop watch immediately. Swirl the beaker

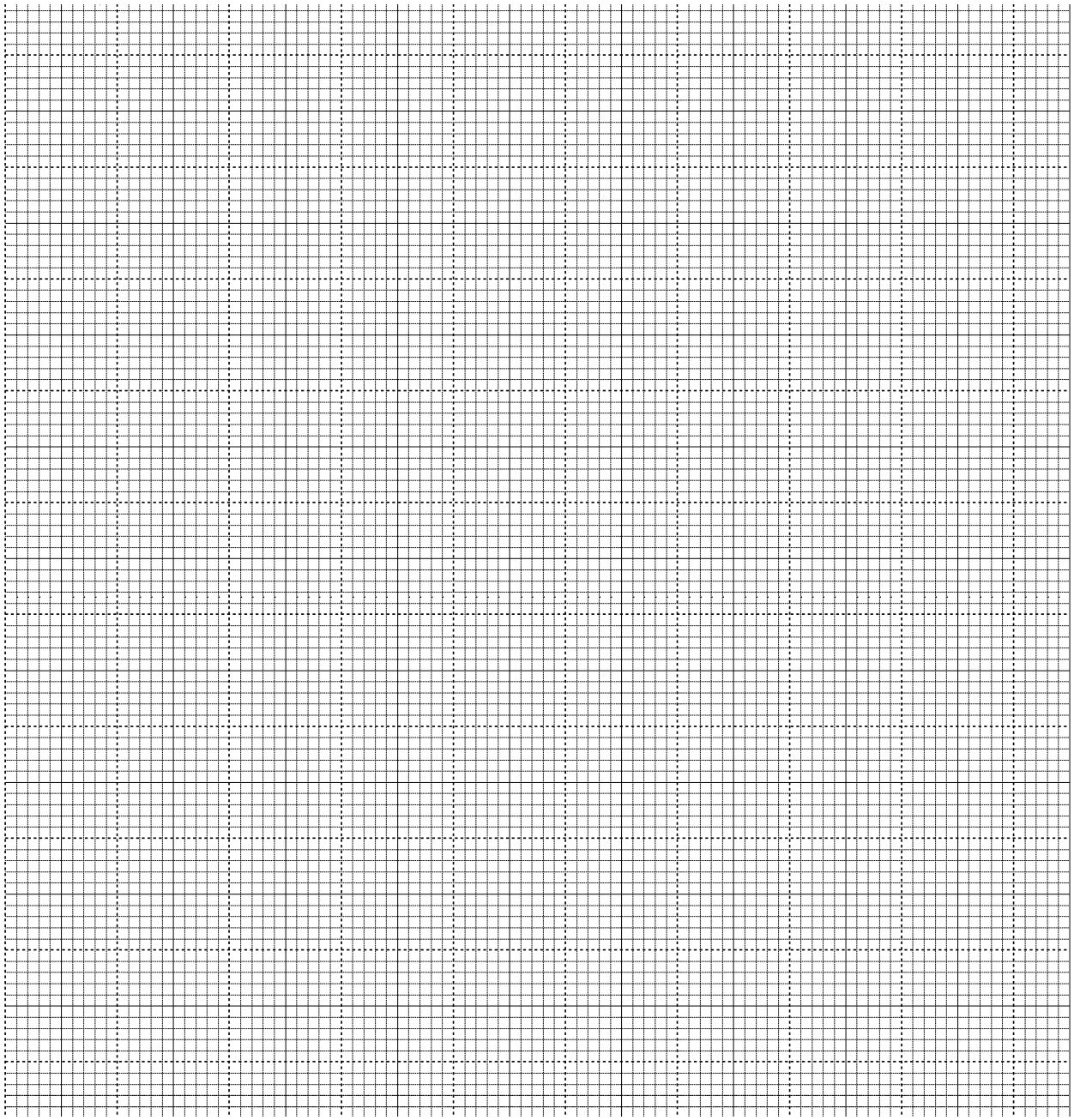
continuously ensuring magnesium is always inside the solution. Record in the table the time taken for the magnesium ribbon to disappear. Wash the beaker each time.

4. Repeat procedure 3 for each of the solution in the test tubes 2, 3, 4, 5 and 6 and complete the table.

Table 2

Test tube	1	2	3	4	5
Volume of solution L (cm^3)	10	9	8	7	6
Volume of water (cm^3)	0	1	2	3	4
Time taken (sec)					
Rate of reaction ($^1/_{time}$)					

(i) Plot a graph of rate of reaction; $^1/_t$ (y-axis). Against volume of solution L. (3mks)



(ii) Use the graph to determine the time taken for 1cm length of magnesium ribbon to disappear if the volume of the acid, solution L used was 6.5cm^3. (1 ½ mks)

(iii) In terms of rate of reaction, explain the shape of your graph (1mk)

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3. You are provided with solid P. carry out the tests below. Write your observations and inferences in the spaces provided.

Test	**Observations**	**Inferences**
a) Put a small amount of solid P in a dry boiling tube and heat gently, then strongly. Test for any gas produced with moist blue and red litmus paper Leave the residue to cool.	(2 mks)	(2mks)
b) Put the remaining sample into another boiling tube and add about 10cm^3 of distilled water. Shake well. Divide the mixture into five portions.	(1mk)	(1mk)
i) To the 1st portion add sodium hydroxide solution dropwise until in excess	(1mk)	(1mk)
ii) To the 2nd portion, add ammonia solution dropwise until in excess	(1mk)	(1mk)
iii) To the 3rd portion, add a few drops of barium chloride solution followed by dilute nitric acid	(1mk)	(1mk)

iv) To the 4^{th} portion, add a few drops of silver nitrate solution	(1mk)	(1mk)
v) To the 5^{th} portion, add fleshly prepared iron (II) sulphate, then pour concentrated sulphuric acid carefully into the slanting test tube.	(1mk)	(1mk)