NAME……..Index Number……..…….

Candidate's Signature…….

233/3
CHEMISTRY
Paper 3
(PRACTICAL)
Jul./Aug. 2011
2 ¼ hours

Date…….

THE BARINGO COUNTY EDUCATIONAL IMPROVEMENT 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.
(b) Sign and write the date of examination in the spaces provided above.
*(c) Answer **ALL** the questions in the spaces provided in the question paper.*
(d) Read the question paper and make sure you have all the chemicals and apparatus that you may need before you start..
(e) All working MUST be clearly shown where necessary.
(f) Mathematical tables and electronic calculators may be used.
(g) This paper consists of 7 printed pages.
(h) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no question(s) are missing.

For Examiner's Use Only

Question	Maximum score	Score
1	**22**	
2	**18**	
Total Score	**40**	

1. Your are provided with;
   Magnesium ribbon labeled solid **E**
   2.0M hydrochloric acid labeled solution **F**
   0.375M sodium hydroxide solution **H**

You are required to determine;

(i) the rate of reaction between magnesium and hydrochloric acid at different concentrations
(ii) the mass of magnesium ribbon solid **E** that reacted.

Procedure I

Step 1. Cut out five pieces each of exactly 1 cm length of magnesium ribbon solid **E**. Carefully put all solution **F** provided into a clean burette.

Step 2. Drain from the burette 10 cm^3 of solution **F** into a clean 100ml beaker. Place one piece of magnesium solid **E** into the beaker and **immediately** start a stop clock/watch.
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.

Step 3. Transfer all the contents of the 100ml beaker into a 250ml volumetric flask. **Rinse** the beaker with a little distilled water and put all the rinsing water into the volumetric flask.

Repeat step 2 and 3 by placing 9cm^3 of solution **F** into the 100ml beaker, add 1 cm^3 of water using a 10ml measuring cylinder before reacting with solid **E** and complete table I below. After each experiment transfer the reaction mixture into the volumetric flask.
Retain the solution in the volumetric flask for procedure II

Table I

Experiment	1	2	3	4	5
Volume of solution **F (** cm^3)	10	9	8	7	6
Volume of water (cm^3)	0	1	2	3	4
Time taken (seconds)					
Rate of reaction = $\frac{1}{time}$					

(5mks)

(a) (i) On the grid provided; plot a graph of rate of reaction (y-axis) against volume of solution **F.** (3mks)

(ii) Use the graph to determine the time that would be taken for 1cm length of magnesium ribbon to disappear if the volume of the acid, solution **F** used was 8.5 cm^3. (2mks)

……

……

……

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

……

……

Procedure II

Add distilled water into solution in the 250cm^3 volumetric flask until the level reaches the mark. Label it solution **G**. Clean the burette and fill it with sodium hydroxide solution **H**. Using a pipette and a pipette filler, place 25cm^3 of solution **G** into a 250 cm^3 conical flask. Add two drops of phenolphthalein indicator and titrate. Record your results in the table below. Repeat the procedure two more times to complete table II below.

Table II

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

(4mks)

(b) Determine the:

(i) Average volume of solution H used. (1mk)

……..

(ii) moles of the hydrochloric acid in 250 cm^3 of solution **G**. (2mks)

…….…….

…….….

……..

(iii) the number of moles of hydrochloric acid solution **F** that reacted with solid **E**. (2mks)

……..

…….

…….

(iv) The mass of magnesium ribbon solid **E** that reacted (Mg = 24.0) (2mks)

……..

……

2. a) You are provided with solid **P.** Carry out the following tests and record the observations and inferences in the table below.

i). Place all the substance **P** provided in a boiling tube. Add about $10cm^3$ of distilled water and shake thorougly for about 1 minute.
Filter the mixture into a 100ml beaker and **retain the residue for use in (a)(v)**. Divide the filtrate into three proportions

OBSERVATIONS	**INFERENCES**
(1mk)	(1mk)

ii) To about $2cm^3$ portions, add 2M sodium hydroxide solution dropwise until in excess.

OBSERVATIONS	**INFERENCES**
(1mk)	(1mk)

iii). To about $2cm^3$ portion, add aqueous ammonia dropwise until in excess

OBSERVATIONS	**INFERENCES**
(1mk)	(1mk)

iv). To about $3.0cm^3$ portion in a test tube add some $2.0cm^3$ of iron(II) Sulphate solution. Carefully run about $1cm^3$ of concentrated sulphuric (VI) acid a long the sides of the test tube.(**Caution**: Concentrated Sulphuric(VI)acid is corrosive)

OBSERVATIONS	**INFERENCES**
(1mk)	(1mk)

v). Place the residue on a metallic spatula and burn it directly on a non-luminous flame until the solid on the spatula becomes red hot.

OBSERVATIONS	**INFERENCES**
(½ mk)	(½ mk)

(b) You are provided with liquid **T.** Carry out the tests below and write your observations and inferences in the spaces provided.

i). Pour a small portion of liquid **T** into a **clean** metallic spatula and ignite it using a non-luminous flame of a Bunsen burner.

OBSERVATIONS	**INFERENCES**
(1mk)	(1mk)

ii). Measure 1cm^3 of liquid **T** into a test-tube, add 2cm^3 of distilled water and shake. **Retain** the mixture for the test (iii) below.

OBSERVATIONS	**INFERENCES**
(½ mk)	(½ mk)

(iii) To the mixture in (b)(ii) above add 2 drops of universal indicator solution and determine its pH.

OBSERVATIONS	**INFERENCES**
(½ mk)	(½ mk)

(iv).To about $2cm^3$ of liquid **T** in a test tube, add $1cm^3$ of ethanol followed by 2 drops of concentrated sulphuric (VI) acid. **Warm** the mixture gently.

OBSERVATIONS	**INFERENCES**
(1mk)	(1mk)

(v). To about $1cm^3$ of liquid **T** in a test-tube add 3 drops of acidified potassium chromate (VI) solution and warm.

OBSERVATIONS	**INFERENCES**
(1mk)	(1mk)

(vi). To about $1cm^3$ of liquid **T** put half a spatula of powdered sodium carbonate.

OBSERVATIONS	**INFERENCES**
(½ mk)	(½ mk)