KAPSABET HIGH SCHOOL

POST MOCK 2024

CHEMISTRY

233/3 (PRACTICAL)

PAPER 3

TIME: 2¼ HOURS

NAME…… SIGN……

INDEX NO…… ADM NO……

Kenya Certificate of Secondary Education.

CONFIDENTIAL INSTRUCTIONS TO SCHOOLS

In addition to fittings and apparatus found in a chemistry laboratory, each candidate will need the following.

Question one.

(a) Burette
(b) Pipette
(c) Filter Funnel
(d) Retort stand and clamp
(e) Conical flask, 250ml
(f) White tile
(g) Phenolphthalein indicator
(h) 100cm^3 of Solution K, 0.1M hydrochloric acid
(i) 100cm^{3}Solution L 2g per litre of sodium hydroxide.
(j) Solid **N** 0.5 g of an impure calcium carbonate, (**N** is made by mixing $CaCO_3$ and Sodium Chloride in the ratio 4:1)
(k) An empty 250ml beaker

Question two and three

- Solid T **sodium sulphite**
- Solid J mixture of ammonium sulphate and hydrated zinc sulphate ratio 1:1

Access to

- Distilled water in wash bottle
- Barium chloride solution
- 2M hydrochloric acid
- Acidified potassium manganate vii
- Source of heating
- Barium nitrate
- 2M nitric v acid
- Lead ii nitrate
- 2M NaOH
- Aqueous ammonia solution
- Litmus papers

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INSTRUCTIONS TO THE CANDIDATES:-

(a) Write your name and adm number in the spaces provided

(b) ***Sign*** *and write the* ***date*** *of examination in the spaces provided*

(c) ***Answer all the questions in the spaces provided.***

(d) *Mathematical tables and electronic calculators may be used.*

(e) *All working* ***MUST*** *be clearly shown where necessary.*

(f) *Use the first 15minutes of the 2 hours to ascertain you have all the chemicals and apparatus tha you may need.*

For Examiners use Only

QUESTION	MAX. SCORE	SCORE
1	22	
2	08	
3	10	
TOTAL	**40**	

1 You are provided with;

- Solution K, hydrochloric acid
- Solution L, containing 2g per litre of sodium hydroxide.
- 0.5 g of an impure calcium carbonate, solid **N.**
- You are required to determine the :

(a)Concentration of solution K in moles per litre.

(b) Percentage purity of calcium carbonate, solid **N**

Procedure I

Fill the burette with hydrochloric acid, solution K. pipette 25cm^3 of sodium hydroxide, solution L

into a conical flask. Add 2-3 drops of phenolphthalein indicator and titrate. Record the results in the table. Repeat the procedure two more times.

Table 1

	I	II	III
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of solution Kused (cm^3)			

4mks

(a) What is the average volume of solution **K** used **(1mk)**

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……

……

(b) Determine the concentration of solution L in moles per litre. **(1mk(Na= 23,O = 16, H = 1)**

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c) Determine the number of moles of solution L that reacted with solution K **(1mk)**

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d) Write the equation of the reaction that took place **(1mk)**

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……

e) Calculate the number of moles of solution K that reacted **(1mk)**

……

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……

(f) Calculate the concentration of solution K in moles per litre. **(1mk)**

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……

Procedure II

Using a measuring cylinder, measure out 100cm^3 of solid K into a 250ml beaker. Add all of solid N into the beaker containing solution K. Swirl the mixture and allow the reaction to proceed until offervescence stops. Label this as solution P. Fill the burette with solution P. pipette 25cm^3 of solution L into a conical flask. Add 2-3 drops of phenolhthalein indicator and titrate. Record your results in table II below repeat the titration two more times and complete the table **4mks**

Table II	I	II	III
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of solution Pused (cm^3)			

(a) Determine the average volume of solution **P** used. **1mk**

……

……

(b) Calculate the number of moles of hydrochloric acid in solution P used. **(1mk)**

……

……

……

c) Determine the number of moles of hydrochloric acid in $100cm^3$ of solution P. **(1mk)**

……

……

……

d) Calculate the:

(i) Moles of hydrochloric acid in $100cm^3$ of the original hydrochloric acid solution K **(1mk)**

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……

……

(ii) Moles of the hydrochloric acid that were used up in the reaction with solid N. **(1mk**

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……

(iii) Moles of calcium carbonate that reacted with hydrochloric aci**d.** **(1mk)**

……

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……

……

e) Given that the relative formula mass of calcium carbonate is 100,calculate the:

(i) Mass of the calcium carbonate that reacted. **(1mk)**

……

……

……

……

(ii) Percentage purity of the calcium carbonate, solid N. **(1mk)**

……

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……

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

Place all solid T in a boiling tube. Add about $6cm^3$ of distilled water to the solid T and shake the mixture well. Retain the mixture for use in the following tests.

a) Dip a clean glass rod in the mixture obtained above and burn it on a Bunsen burner flame.

Observation	**Inference**
(1 mark)	**(1 mark)**

b) Divide the mixture in the boiling tube into 3 portions.

(i) To the 1st portion, add about 1cm^3 of barium chloride solution. Retain the resulting mixture for use in (iii) below.

Observation	Inference
(1 mark)	**(1 mark)**

(ii) To the mixture in (ii) above, add about 4cm^3 of dilute hydrochloric acid.

Observation	Inference
(1 mark)	**(1 mark)**

Observation	Inference

(1 mark)	**(1 mark)**

(iii) To the 3rd portion, add about 3 drops of acidified potassium manganate (VII) solution.

3. You are provided with **solid J.** Carry out the test below to identify the compound.

(a) Place ½ spatula of solid J in a hard test tube and heat strongly until no further change. Test the gas produced with litmus paper.

Observation	Inference
(1/2 mark)	**(1/2 mark)**

(b) Place the remaining **solid J** into a clean boiling tube. Half fill it with distilled water and shake well. Divide the solution into four portions.

(i) To the first portion add dilute sodium hydroxide solution dropwise till in excess.

Observation	Inference
(1 mark)	**(1 mark)**

(ii) To the second portion add ammonia solution dropwise till in excess.

Observation	Inference
(1 mark)	**(1 mark)**

(iii) To the third portion add drops of dilute barium nitrate.

Observation	Inference
(1 mark)	**(1 mark)**

(iv) To the fourth portion add a few drops of dilute nitric acid followed by lead (II) nitrate solution and warm.

Observation	Inference

(1 mark)	**(1 mark)**

Identify Compound J**……..…** **(1 mark)**