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545/2
CHEMISTRY
PAPER 2
July/August 2023
2 HOURS

KANUNGU DISTRICT JOINT MOCK EXAMINATIONS
UGANDA CERTIFICATE OF EDUCATION
Chemistry
Paper 2
2 hours

INSTRUCTIONS TO CANDIDATES

- *This paper consists of two sections A and B*
- *Section A consists of 10 structured questions.*
- *Answer all questions in this section, Answers to these questions MUST be written in the spaces provided.*
- *Section B consists of 4 semi structured questions, Answers to these questions MUST be written in the booklets provided.*
- *In this section, all working must be clearly shown.*
- *H=1, C=12, N=14, O=16, Na= 23, Cl=35.5.*
- *1 mole of a gas occupies 24dm at room temperature*
- *1 mole of gas occupies 22.4dm at S. T. P*

FOR EXAMINERS USE ONLY														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	TOTAL

Turn Over

SECTION A (50 MARKS)

1) a) State the method you would use to separate the following components. In each give a reason for your answer.

i) Sand and salt?

Method..... (½marks)

Reason.....

.....(01marks)

ii). Iron particles and calcium carbonate powder.

Method..... (½marks)

Reason.....

.....(01marks)

iii). Liquid oxygen and Nitrogen mixture.

Method..... (½marks)

Reason.....

..... (01 marks)

2) a) A mixture of magnesium particles and copper (ii) oxide powder was strongly heated until there was no further change and cooled after heating.

i) What was observed during heating? (01marks)

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ii) What was observed after heating? (01marks)

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b. (i) Write an equation for the reaction that took place. (1½marks)

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ii) Using the equation in b (I) explain the reaction that took place. (01marks)

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3) River water from lakes containing calcium sulphate and magnesium sulphate salts was used by people for domestic work. People in the area had a problem of using a lot of soap especially during washing clothes.

I) Why was there a problem of using a lot of soap during washing. (½marks)

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ii) Name any two substances that were responsible for soap wastage. (01marks)

b. (i) State one chemical method that you would use to remove the substances stated in a (ii) above. (½marks)

ii) State an equation for the reaction showing how one of the substances can be removed. (01½mks)

iii) State one advantage of using such type of river water. (01marks)

4) Define.

i) Basicity of an acid. (01marks)

ii) A base (01marks)

iii) A salt (01marks)

b). Write an equation for the,

i) Reaction between sodium hydroxide solution and lead (ii) nitrate solution. (1½marks)

ii) Lead (ii) nitrate and sulphuric acid. (1½marks)

5. a (i) Definite allotropy? (01marks)

ii) Give three allotropes of carbon. (1½marks)

.....

b) State any two differences between the two main allotropes of carbon. (02marks)

.....

.....

6. a) Define (01marks)

i) Atomic mass

.....

.....

ii). Atomic number (01marks)

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.....

b) State three differences between, (03marks)

Ionic bond compounds.	Covalent bond compounds.
i)	.....
.....	.....
ii)	.....
.....	.....
iii)	.....
.....	.....
	.....

c) An element x with proton number 3 and neutron number 4 combined with another element y with proton number 8 and neutron number 8 to form a compound. Using only the outmost energy levels (valency electrons), show how the compound was formed. (02marks)

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7. What do you understand by?

i) A hydrocarbon substance? And give any two examples of hydrocarbon substances. (02marks)

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b). A hydrocarbon consists of 85.7% carbon and 14.3% hydrogen. Calculate the empirical formula of the hydrocarbon. (02marks)

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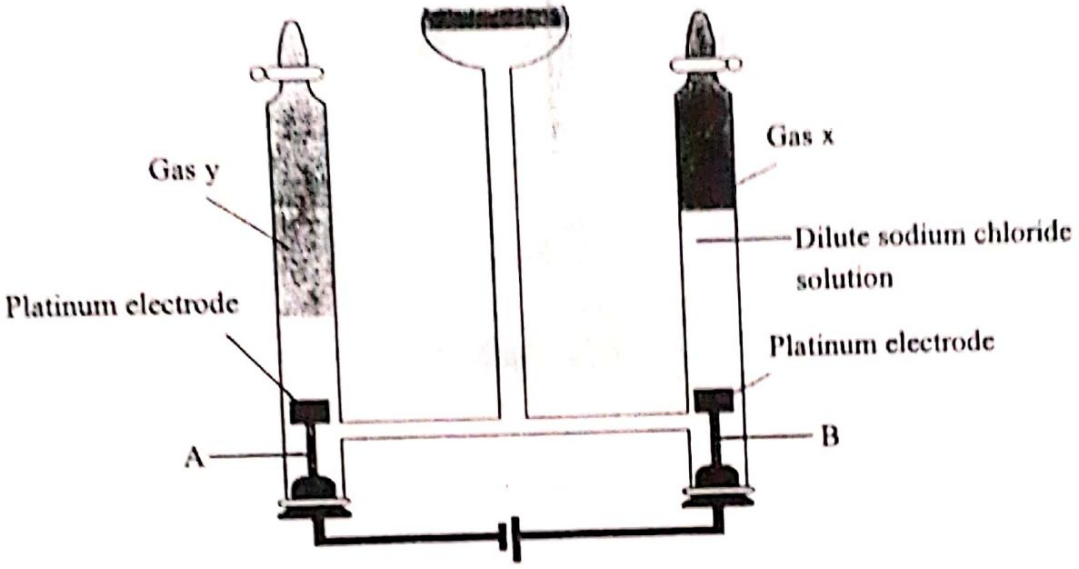
8. The apparatus below is used for electrolysis of dilute sodium chloride solution (sea water).



a) Name;

I). Gas y.....(½ marks)

ii). Gas x..... (½marks).

b). Name the cathode and anode using labels A and B.

A.....(½marks)

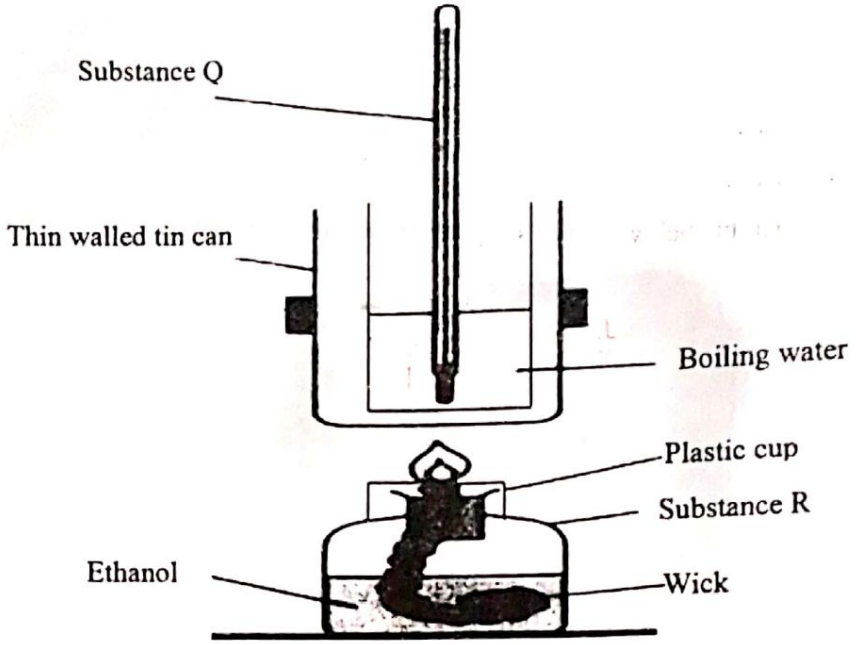
B .....(½ marks)

c). Write the equation for the reaction at electrode.

i). A .....(01½marks)

ii) B.....(01½marks)

9. The apparatus below is used for the determination of the enthalpy of combustion of a substance.



a). Name the substances

I). Q.....(½marks)

ii). R..... (½marks)

b). Why was the substance R and boiling water covered with a shield? (01marks)

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c). During the experiment, the following results were obtained

Initial temperature of water=21°C

Final temperature of water=28.2°C

Mass of water is 100g

Mass of ethanol used =3.2g

Calculate the enthalpy of combustion of ethanol, specific heat capacity of water is 4.2. (03marks)

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10. Name one reagent that may be used in the laboratory to distinguish between a pair of the following ions, in each case state the observation made and write equation for the reaction that takes place when the named reagent is treated separately with each ion.

a). Cu^{2+} and Fe^{2+}

(03marks)

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b). NO_3^- and SO_4^{2-} (02marks)

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SECTION B. (30 MARKS)

Attempt any two questions from this section.

11.a (i). Name one of the substances that can be used to prepare dry carbon dioxide gas with dilute hydrochloric acid in the laboratory. (½marks)

(ii). Write an ionic equation for the preparation of dry carbon dioxide gas in the laboratory. (01½marks)

b). Carbon dioxide gas was first passed in little amounts and then in excess through sodium hydroxide solution. State what was observed and write an equation in each case. (03½marks)

c). (i). Write an equation for the combustion of carbon in little amounts of air. (01½marks)

(ii). The product formed is used in the reduction of one of the main ores of iron, haematite to iron metal, Write the formula of haematite. (½marks)

d). (i) Name other raw materials for extraction of iron from haematite. (01marks)

(ii) Write equations for the reactions that take place during the extraction iron from hematite. (04½marks)

(iii) Name one impurity that is found in such iron ore. (½marks)

(iv) Write an equation showing how the impurity named in d (iii) above is removed. (01½marks)

12. Chlorine gas is prepared in the laboratory by oxidation of concentrated hydrochloric acid with potassium permanganate. (01½marks)

(i). Write equation for the preparation of chlorine.

(ii). State what was observed when dry chlorine is passed over heated wire in a combustion tube and write an equation for the reaction. (02½marks)

b). Describe how you can prepare hydrogen chloride gas from sodium chloride and concentrated Sulphuric acid. (07½marks)

c). Describe how you can prepare salt of lead (ii) chloride in the laboratory. (04½marks)

13. (i) Name the chemical substances used for preparation of ammonia gas in the laboratory. (01marks)

(ii). Name the drying agent used and give a reason for your answer. (02marks)

(iii). Write equation for the reaction of its preparation. (01½marks)

b). Using equations only, show how nitric is manufactured on a large scale by catalytic oxidation of ammonia. (04½marks)

c). state what is observed and write an equation where possible when the following metal nitrate salts are heated.

i) Copper (ii) nitrate. (03marks)

ii) Lead (ii) nitrate. (03marks)

14. Describe how sulphuric acid is manufactured on a large scale (no diagram is required). (04marks)

b). Dilute sulphuric acid reacts with zinc granules producing hydrogen gas.

i). Write an equation for the reaction. (01½marks)

ii). State any four factors that would promote the rate of such reactions. (02marks)

c). Draw a diagram of apparatus you would use to measure volume of hydrogen gas produced by a reaction between dilute sulphuric acid and zinc granules (01½marks)

d). The table below shows the results obtained during such a reaction above.

Time (sec)	0	10	20	30	40	50	60	70	80
Volume(cm^3)	0	18	30	40	48	53	57	58	58

d). Plot the graph of volume of the gas produced against time. (03marks)

e). Explain your graph. (03marks)

END