Name: .....

Index No. ...../.....Signature: .....

545/2
CHEMISTRY
Paper 2
July/August 2022
2 hours

KAMSSA JOINT MOCK EXAMINATIONS

Uganda Certificate Of Education

CHEMISTRY

2 hours

Paper 2

Instructions to candidates

- Section **A** consists of **10 s**tructured 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. Attempt **any two** questions from this section. Answers to the question must be written in the answer booklets provided.
- (1 mole of gas occupies **24litre**s at room temperature)
- (1 mole of gas occupies **22.4litres at s.t.p)**

SECTION A (Attempt all questions in this section)

1. Name the method that can be used to separate the following mixtures.

i. Nitrogen and oxygen **(*1 mark*)**

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……...

ii. Ink **(*1 mark*)**

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iii. Kerosene and water **(*1 mark*)**

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iv. Sand and salt **(*1 mark*)**

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v. Iron fillings and sugar **(*1 mark*)**

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2. The equation below shows a redox reaction between copper(II) oxide and zinc metal.

$CuO_{(S)} + Zn_{(S)} \longrightarrow ZnO_{(S)} + Cu_{(S)}$.

a) State with a reason which is;

i. The oxidizing agent **(*1 mark*)**

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……

ii. The reducing agent **(*1 mark*)**

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b) i) State what is observed when iron fillings is added to a solution of copper(II) sulphate. **(*1 ½ marks*)**

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ii). Write an ionic equation for the reaction that took place **(*1 ½ marks*)**

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3. When concentrated sulphuric acid is added to ethanol and the mixture heated at 180^0C, gas **Y** is evolved.

a) i). write an equation for the reaction leading to production of gas **Y** **(*1 ½ marks*)**

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ii. State the type of reaction that took place in (a (i)) **(½ *mark*)**

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……

b) Ethene undergoes a reaction to form compound **Z** of a higher molecular mass.
State;

i. The name of reaction leading to formation of **Z**. **(½ *mark*)**

……
……

ii. Name of **Z**. **(½ *mark*)**

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……

iii. One use of **Z**. **(½ *mark*)**

……
……

iv. One disadvantage of **Z**. **(½ *mark*)**

……
……

c) Name one reagent that can be used to identify gas **Y**. **(*1mark*)**

……
……

4. Two dilute mineral acids **X** and **Y** were each added separately to solid calcium carbonate and gas **Z** was produced.

Acid **X** produced little bubbles of gas **Z** and the reaction stopped

Acid **Y** produced much more bubbles of gas **Z** and the reaction proceeded to completion.

a) State the possible name of the acid;

i. **X** ……. **(½ *mark*)**

ii. **Y** …… **(½ *mark*)**

b) Give a reason why the reaction between the carbonate and acid **X** stopped **(*1mark*)**

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……

c) Write the equation of the reaction between acid **Y** and the carbonate. **(*1 ½ marks*)**

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d) Explain how gas **Z** can be identified. **(*1 ½ marks*)**

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5. A hydrated compound **M** contains 20.1% iron, 11.5% Sulphur, 45.3% water of crystallization and the rest being oxygen.
   a) Calculate the empirical formula of compound **M**.
   (*Fe=56, S=32, O=16, H=1*) **(3marks)**

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   b) **M** was gently heated in a boiling tube.
      i) State what was observed **(1mark)**

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      ii) Write equation for the reaction that took place. **(1 ½ marks)**

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……

6. Diamond is one of the crystalline allotropes of carbon and it is widely used as a jewellery.
   a) State;
      i) What is meant by the term **"allotrope"**. **(1mark)**

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……
……

      ii) The property of diamond, which makes it useful as jewellery. **(½ mark)**

……
……

      iii) One use of diamond, other than as jewellery. **(½ mark)**

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……

   b) Name
      i) **Another** crystalline allotrope of carbon. **(½ mark)**

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.....

      ii) **one** amorphous carbon. **(½ mark)**

……
……

   c) State;
      i) **one** property of the allotrope you have named in (b) (i). **(½ mark)**

……
……

ii) **one** use of the allotrope you have named in (b)(i) which is because of its property that you have stated in (c) (i). **(½ *mark*)**

……
……

iii) **one** use of the amorphous carbon you have named in (b)(ii). **(½ *mark*)**

……
……

7. The molecular formula of an organic acid **R** is C_4H_{10}.
   a) i) Write the structural formula of **R**. **(*1mark*)**

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……

ii) Name **R**. **(*1mark*)**

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……

iii) Name the group of organic compound to which **R** belongs. **(*1mark*)**

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……

b) Give a reason why it is not wise to burn **R** in a living room with closed windows and doors. **(*1mark*)**

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……

c) State one use of **R** **(½ *mark*)**

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……

8. Excess piece of clean iron wire were added to $100cm^3$ of 0.5M solution of copper(II) sulphate solution in a beaker. A green solution and a brown solid residue were formed. The resultant solution became warm.
   a) Name the;
      i) Green solution **(½ *mark*)**

……
……

ii) Brown solid residue. **(½ *mark*)**

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……

b) Write the equation for the reaction leading to formation of;
   i) the green solution **(*1 mark*)**

……
……

ii) brown solid residue **(*1 mark*)**

……..……
……

c) Name the reaction leading to the formation of;

ii) Green solution **(*½ mark*)**

……
……

iii) Brown solid residue **(*½ mark*)**

……
……

d) Give a reason why the resultant mixture becomes warm. **(*1 mark*)**

……
……

9. Part of the periodic table is shown below. Study it carefully and answer the questions that follow.

I	II		III	IV	V	VI	VII	VIII
X				**K**		**N**	**P**	**R**
Y			**Z**				**Q**	

a) Identify:

i. The most reactive metal **(*½ mark*)**

……..……
……..……

ii. The most reactive non-metal **(*½ mark*)**

……
……..……

iii. The least reactive element in the periodic table **(*½ mark*)**

……..……
……..

b) Write the formula of the compound formed between:

i. Z and N **(*1mark*)**

……
……

ii. K and Q **(*1mark*)**

……..……
……

iii. Z and Q **(*1mark*)**

……
……

c) State the type of bond formed between:

i. Atoms of X: …… **(½ *mark*)**

ii. Z and P: …… **(½ *mark*)**

iii. Atoms of N: …… **(½ *mark*)**

10. Dilute sodium hydroxide was added to a sample of ammonium chloride. On heating the mixture, a **gas J** was evolved, which was tested using moist litmus paper.

a) State;

i) what was observed **(*1mark*)**

……..……

……...

ii) the property of sodium hydroxide upon which the reaction depended. **(*1mar*k)**

……

……

iii) the practical application of the reaction. **(*1mark*)**

……..……

……

b) i) Name the laboratory reagent which is used to identify **J.**

(*1mark*)

……

……

ii) State what is observed when **J** is treated with the reagent you have named in (b)(i) **(*1mark*)**

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SECTION B

*Answer **two** questions only in this section, extra – questions answered will not be marked.*

11. a) Hydrogen gas is prepared in the laboratory using magnesium powder.

i. Name another reagent together with magnesium powder that can be used to prepare hydrogen gas in the laboratory. **(*1mark*)**

ii. Describe with the aid of a well labelled diagram how hydrogen gas can be prepared in the laboratory from the above mentioned reagents in a(i) above **(*6 ½ marks*)**

iii. Write the equation of the reaction leading to the formation of hydrogen gas. **(*1 ½ marks*)**

b) Dry hydrogen gas was burnt in oxygen, a colourless vapour that condenses to form a colourless liquid X was given off.

i. Name liquid X **(*1 mark*)**

ii. Name one reagent that can be used in the laboratory to confirm the presence of liquid X. **(*1 mark*)**

iii. State what is observed when the reagent named in b(ii) above is treated with liquid X **(*2 marks*)**

12. a) Excess copper(II) carbonate was added to dilute Sulphuric acid.

i) State what was observed. **(*1½ marks*)**

ii) Write equation for the reaction that took place. **(*1½ marks*)**

iii) Briefly describe how pure crystals of the production in the reaction in (a)(ii) can be obtained from the reaction mixture. **(*4marks*)**

b) State what would be observed and write equation for the reaction that takes place if to aqueous solution of the crystals in (a)(iii) was added.

i) Zinc powder **(*3marks*)**

iv) Acidified barium chloride solution. **(*2marks*)**

c) **7.5g** of copper(II) chloride were dissolved in water and lead(II) nitrate solution was added, drop wise until in excess. Calculate the maximum mass of lead (II) chloride formed. (*Pb=207, Cl=35.5, $CuCl_2$ = 135*) **(*3marks*)**

13. (a) Magnetite is one of the ores from which iron can be extracted. During the process, a hot blast of air is fed into the furnace from the bottom. The roasted iron ore and two other substances are introduced into the furnace from the top.

i) Write the chemical name and formula of magnetite. **(*01mark*)**

ii) State the purpose of roasting the ore. **(*01mark*)**

iii) Name the two other substances with which the roasted ore is introduced into the furnace. **(*01 mark*)**

iv) Explain the use of hot air in the furnace. **(*04 marks*)**

b) Describe with the aid of equations, how in the blast furnace;

i) iron is obtained from magnetite **(*2 ½ marks*)**

ii) the major impurity in the ore is removed. **(*04 marks*)**

c) Steel is an alloy of iron.

i) Name one other component of steel other than iron. **(*½ mark*)**

ii) Give two reasons why steel is more used in the construction industry than iron. **(*01 mark*)**

14.a) Define the following terms giving two examples in each case.

i. A strong acid **(*03 marks*)**

ii. An alkali **(*03 marks*)**

b) Name the products of the reaction between an acid and a base **(*02 marks*)**

c) Sodium hydroxide solution reacts with dilute hydrochloric acid according to the equation below.

$NaOH_{(aq)} + HCl_{(aq)} \longrightarrow NaCl_{(aq)} + H_2O_{(l)}$

$25cm^3$ of 0.1M sodium hydroxide solution completely reacted with $12.5cm^3$ of dilute hydrochloric acid. Calculate the:

i. Number of moles of sodium hydroxide that reacted. **(*02 marks*)**

ii. Number of moles of dilute hydrochloric acid that reacted with sodium hydroxide solution. **(*01 mark*)**

iii. Molarity of dilute hydrochloric acid **(*02 marks*)**

d) Carbondioxide gas was bubbled in water and the resultant solution was tested with a blue litmus paper.

i. State what was observed. **(*01 mark*)**

ii. Give a reason for your answer **(*01 mark*)**

END