Name.....Centre/Index No...../.....

Signature.....

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

JINJA JOINT EXAMINATIONS BOARD

Uganda Certificate of Education

MOCK EXAMINATION – JULY / AUGUST, 2022

CHEMISTRY

Paper 2

2 hours

INSTRUCTIONS TO CANDIDATES:

SECTION A: Consists of 10 structured questions.
Answer all questions in this section.
Answers to questions in section A should be written in the spaces provided on this question paper.

SECTION B: Consists of Semi – structured questions.
Attempt any TWO questions from this section.
Answers to the questions must be written in the answer sheet provided.
In both sections, all working must be clearly shown.

1 mole of a gas occupies 22,400 cm^3 at s.t.p
1 mole of a gas occupies 24,000 cm^3 at room temperature.
Use the following where necessary
H=1, C=12, O=16, Mg=24, Fe=56, Pb= 207, S = 32

For Examiner's use only														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	TOTAL

SECTION A

Attempt ALL questions in this section.

1. When heated, ammonium chloride undergoes both physical and chemical changes.

(a) State what would be observed when a physical change occurred.

(b) Name the process which took place in (a).

Name one other substance which when heated undergoes the named process in (b).

(c) Write equation for the reaction that would take place when a chemical change occurs

2. (a) State what would be observed if litmus was added to each of following aqueous substances.

(i) Lemon juice.

(ii) Sodium carbonate. (½ mark)

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(iii) Ammonium sulphate. (½ mark)

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(iv) Sodium chloride. (½ mark)

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(b) Account for the observations in (a)(ii). (3 marks)

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3. (a) State the difference between **hard water** and **soft water**.

(b) State what would be observed if the following aqueous solutions

(i) magnesium sulphate.

(ii) calcium hydrogencarbonate.

(c) Write equation for the reaction that took place in (b).

(d) State the application of the reaction in (b)(ii).

4. Carbon dioxide can be prepared in the laboratory by reacting calcium carbonate with a suitable dilute acid **V**.

(a) Identify **V**.

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(1 mark)

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Write ionic equation for the reaction leading to formation of carbon dioxide. $(1\frac{1}{2}$marks)

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When excess carbon dioxide was passed through concentrated sodium hydroxide, a white solid **W** was formed.

(i) Identify **W**.

(1mark)

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(ii) Write equation for the reaction that took place. $(1\frac{1}{2}marks)$

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5. When sucrose, $C_{12}H_{22}O_{11}$, was reacted with sulphuric acid, a black solid **Q** was formed.

(a) Name solid **Q**.

(1mark)

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(b) State the conditions for the reaction to take place. (1 mark)

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Write equation for the reaction leading to formation of Q.(1mark)

(c) State the property shown by sulphuric acid.

Name one other substance other than sucrose which when reacted with sulphuric acid under the conditions produces Q.

6. The number of protons in atoms X, Y and Z are 13,6 and 11 respectively.

(a) Write the electronic configuration of atom;

(i) X

(ii) Y

(1 mark)

(iii) Z 7

(1 mark)

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(b) When X and Y each react with oxygen separately, they form an oxide. Write the formula of the oxide formed by:

(i) X

(1 mark)

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(ii) Y

(1mark)

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(c) Name the two classes of oxides formed when Z combines with oxygen.

(1 mark)

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7. 20.0 cm^3 of 0.5M copper (ii) sulphate solution was added to excess sodium hydroxide solution and the mixture shaken.

(a) State what was observed. ($\frac{1}{2}$ mark)

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(b) Write equation for the reaction that took place. ($1\frac{1}{2}$ marks)

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Calculate the mass of the solid product formed. ($2\frac{1}{2}$ marks)

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8. When excess dry ammonia was passed over 0.80g of a heated oxide of iron,0.56g of iron was formed.

(a) Calculate the formula of the oxide. ($2\frac{1}{2}$ marks)

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(b) State the chemical name of the oxide. (1 mark)

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(c) Write equation for the reaction that took place. ($1\frac{1}{2}$marks)

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(9) (a) Aqueous copper (ii) sulphate was electrolyzed between graphite electrodes.

(i) State what would be observed at the cathode. ($\frac{1}{2}$ *mark*)

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Write equation for the reaction that would take place at the cathode. ($1\frac{1}{2}$ marks)

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($\frac{1}{2}$mark)

State the application of the set-up.

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(b) The electrolysis in (a) was repeated using copper anode. ($\frac{1}{2}$ mark)

(i) State what would be observed at the anode

(ii) Write equation for the reaction that would take place in(b)(i) ($1\frac{1}{2}$ marks)

(iii) State the application of this set-up. ($\frac{1}{2}$ mark)

10. Excess aqueous sodium chloride was added to 25.0 cm^3 of 0.1M silver nitrate solution.

(a) State what would be observed. ($\frac{1}{2}$ mark)

(b) Write ionic equation for the reaction that would take place. ($1\frac{1}{2}$ marks)

(c) Calculate the mass of the solid product formed. $(2\frac{1}{2}\ marks)$

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(d) State the practical application of the reaction. $(\frac{1}{2}\ mark)$

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SECTION B

Attempt any two questions from this section

11. When heated strongly copper (ii) nitrate gives a black solid G.

(a) (i) State the other observations made during the decomposition. $(1\frac{1}{2}$ marks)

(ii) Write equation for the reaction leading to formation of G. $(1\frac{1}{2}$ marks)

$(\frac{1}{2}$ mark)

(iii) Identify G.

(b) Starting with G describe how pure crystals of a salt can be prepared using sulphuric acid. (5 marks)

(c) State what would be observed if to the aqueous solution of the salt prepared in (b) was added excess;

(i) sodium hydroxide solution. (1 mark)

(ii) ammonia solution (2 marks)

(iii) Write ionic equation for the reaction that would take place in (c)(i). (1½ marks)

(iv) Write the chemical name and formula of the compound in the final product in (c)(ii). (1½ marks)

12. Sodium is extracted from its ore by electrolysis where the ore is mixed with calcium chloride.

(a) (i) State what is meant by the term "ORE." (1 mark)

(ii) Write the name and formula of the ore from which sodium is extracted. (2marks)

(iii) State why sodium is extracted by electrolysis but not reduction of its oxides. (1mark)

(iv) State the role of calcium chloride in the extraction of sodium. (1mark)

(b) (i) Name the substance that is used as the anode and cathode respectively during the extraction of sodium. (2marks)

(ii) Name the electrode at which sodium is formed and describe the reaction that would take place. (3marks)

(iii) State one use of sodium. (½mark)

(c) (i) Name the bi-products obtained during the extraction of sodium from its ore. (1mark)

(iii) State the industrial use of the bi-products obtained during the extraction of sodium from its ore. (1mark)

(d) When sodium reacts with oxygen, it forms two different products. Write equations showing how sodium reacts with oxygen. (3marks)

13. (a) In the laboratory, pure chlorine can be prepared at room temperature by reacting hydrochloric acid with solid L.

(i) Identify L. (1 mark)

(ii) State the other condition for the reaction. (1mark)

(iii) Write equation for the reaction that would take place. (1½ 2marks)

(b) The gas evolved in (a)(iii) was purified using some substances.

(i) Name the substances. (2marks)

(ii) Explain the role of the substances named in b(i). (3marks)

(c) The chlorine obtained in (b) was passed through aqueous Iron(ii) nitrate .

(i) State what was observed. (1 mark)

(ii) Explain the observations made in (c)(i) . (3marks)

(d) Aqueous chlorine was exposed to sunlight and a colourless gas **M** was evolved.

(i) Identify **M**. (½ 2mark)

(ii) State the other observations made. (1mark)

(iii) Write equation for the reaction that would take place. (1½ 2marks)

14. (a) When sulphuric acid reacts with sodium chloride, two types of salts are formed.

(i) state what is meant by the term "salt" (1mark)

(ii) Write the name and formula of each of the salts formed. (2marks)

(iii) Name the class of salts to which each of the salts named in (a)(ii) belong. (2marks)

(b) During the preparation of lead(ii)nitrate starting with lead(ii)carbonate, the salt was heated to obtain compound **R** which was later reacted with a dilute acid **T** to form lead(ii)nitrate.

(i) Identify the substance **R** and **T**. (2marks)

(ii) Write the equations for the reactions leading to formation of **R** and lead(ii)nitrate. (3marks)

(c) When heated, excess sulphuric acid reacts with ethanol to form gas **E**.

(i) Identify **E**. (1mark)

(ii) State the conditions for the reaction. (2marks)

(iii) Write equation for the reaction that would take place. (1½ 2marks)

(iv) State one application of sulphuric acid. (½ 2mark)

End