

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

Signature.....

545/2

CHEMISTRY

Paper 2

August, 2019

2 hours



JINJA JOINT EXAMINATIONS BOARD

Uganda Certificate of Education

MOCK EXAMINATION - AUGUST, 2019

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 $22,400 \text{ cm}^3$ at s.t.p

1 mole of a gas occupies $24,000 \text{ cm}^3$ 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 (50 marks)**Attempt ALL questions in this section.**

1. Complete the table below by starting one mixture which can be separated by the method named. (5 marks)

Method	Mixture
(i) Sublimation	
(ii) Filtration	
(iii) Fractional distillation	
(iv) Use of a magnet	
(v) Fractional crystallization	

2. (a) State the condition(s) under which magnesium reacts with water to form magnesium oxide as one of the products (1 mark)

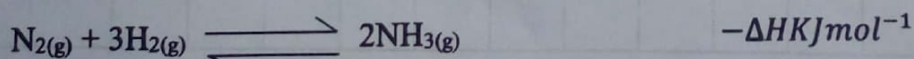
- (b) Write equation for the reaction

- (i) leading to the formation of magnesium oxide under the condition(s) stated in (a) (1 ½ marks)

- (ii) between magnesium oxide and water (1 ½ marks)

- (c) The product for the reaction in b(ii) was tested with litmus paper state what is observed. (1 mark)

3. In the Haber process, hydrogen reacts with nitrogen to form ammonia under appropriate conditions at 450°C.



(a) Explain how the following affects the yield of ammonia

(i) Temperature increased to 700°C (1 mark)

(ii) High pressure (1 mark)

(iii) Iron added to the mixture (1 mark)

(b) During the Haber process, 120cm^3 of hydrogen reacted with nitrogen.

Determine;

(i) The volume of ammonia formed. (1 mark)

(ii) The volume of nitrogen that reacted. (1 mark)

4. The table below shows the number of electrons, neutrons and protons in particles A to F.

Particle	Electrons	Neutrons	Protons
A	19	20	19
B	18	21	18
C	19	22	19
D	18	19	17
E	10	12	10
F	10	12	12

(a) Identify the letter(s) that represent

- (i) a cation _____ (½ mark)
 (ii) an anion _____ (½ mark)
 (iii) a pair of Isotope _____ (1 mark)
 (iv) an inert gas _____ (½ mark)

(b) Write the formular of the compound and state the type of bouding when

(i) Particle F combines with D

Formular _____ (½ mark)

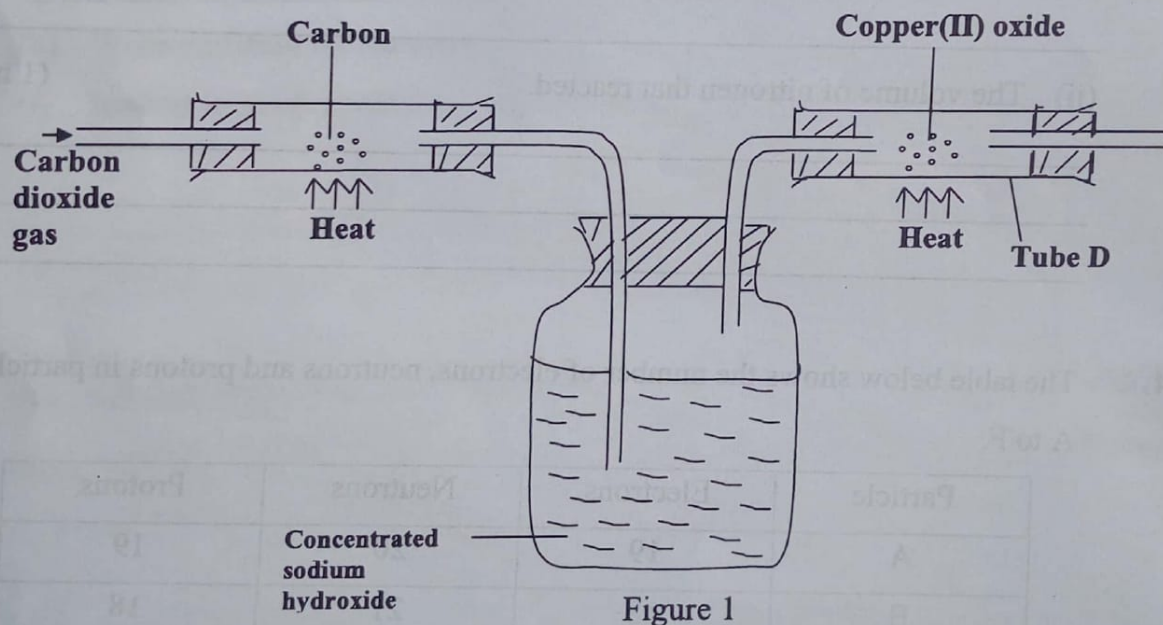
Type of bonding _____ (½ mark)

(ii) Particle D combines with Hydrogen

Formular _____ (½ mark)

Type of bonding _____ (½ mark)

5. The diagram of figure 1 was used to investigate the effect of carbon monoxide on Copper(II)oxide



(a) Write equation for the reaction between carbon dioxide gas and carbon. (½ mark)

(b) State

(i) the function of concentrated sodium hydroxide solution. (½ mark)

(ii) What is observed in tube D (1 mark)

(c) When excess carbon monoxide was passed over 0.54gm of heated oxide of copper, 0.48gm of solid residue remained.

(i) Calculate the formula of the oxide (1 ½ marks)

(ii) Write the correct name of the oxide (½ mark)

6. (a) Ethene can be prepared in the laboratory by heating concentrated Sulphuric acid with an alcohol.

(i) Name the alcohol used. (½ mark)

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

(b) Ethene is an unsaturated compound. (1 mark)

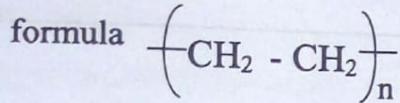
(i) What is meant by unsaturated compound?

- (ii) Name one reagent that can be used to test for unsaturation and state what is

Reagent _____

Observation _____

- (c) Under appropriate conditions, ethane molecules react to form compound Z, of



- (i) State one word which means formation of compound Z (½ mark)

- (ii) State one use of compound Z (½ mark)

- (ii) State the effect of using compound Z on the environment (½ mark)

7. The atomic number to nitrogen and oxygen are 7 and 8 respectively.

- (a) Using the outermost energy electrons, draw the structure of

- (i) oxygen molecule (1 mark)

- (ii) Nitrogen molecule (1 mark)

- (b) Using the structure drawn in (a) above, explain why oxygen is reactive whereas nitrogen is generally inert. (2 marks)

(c) State one industrial use of

(i) Nitrogen (½ mark)

(ii) Oxygen (½ mark)

8. (a) State one difference between Iron(II) Sulphide and a mixture of Iron and Sulphur

(1 mark)

(b) Write an equation to show the reaction between dilute sulphuric acid with;

(i) Iron(II) Sulphide (1½ marks)

(ii) A mixture of Iron and Sulphur (1½ marks)

(c) One of the products of the reaction in b(i) pollutes the environment.

(i) Name the product (½ mark)

(ii) Give a reason why the product named in c(i) pollutes the environment (½ mark)

9. 5gm of a mixture of Zinc carbonate and zinc chloride was added to 400cm³ of water in a beaker, stirred and filtered.

(a) Identify the compound in the (½ mark)

(i) Residue

(ii) Filtrate (½ mark)

- (b) The residue was washed with distilled water, dissolved in dilute hydrochloric acid and 501.76cm^3 of a gas was collected at s.t.p. Calculate the percentage of Zinc chloride in the mixture. (4 marks)

10. The diagram in figure 2 show the electrolysis of acidified water.

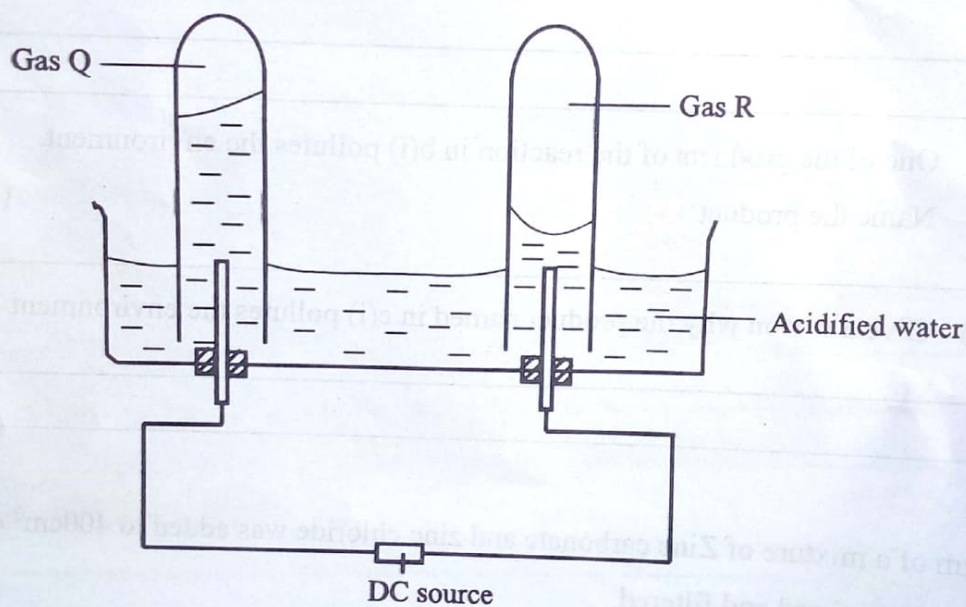


Figure 2

- (a) Identify

Gas Q _____
Gas R _____

(1 mark)

(b) Write equation leading to the formation of

(i) Gas R

(1 ½ marks)

(ii) Gas R

(c) Name one industrial application of
Gas R

(½ mark)

(d) Name a suitable substance used as the electrode

(½ mark)

SECTION B (30 MARKS)

11. (a) (i) Define the term enthalpy of combustion. (1 marks)

(ii) Using a well labeled diagram, describe how the enthalpy of combustion of ethanol can be determined in the laboratory (9 marks)

(b) Ethanol burns in oxygen according to the equation

$\text{C}_2\text{H}_5\text{OH}_{(l)} + 3\text{O}_{2(g)} \longrightarrow 2\text{CO}_{2(g)} + 3\text{H}_2\text{O}_{(l)}$ $\Delta H = -1120\text{KJmol}^{-1}$. Calculate the mass of ethanol required to raise the temperature of 200gm of water by 30°C (specific heat capacity of water = 4.2) (3 marks)

(c) State two practical applications of enthalpy of combustion. (2 marks)

12. Explain each of the following observations clearly.

(a) Lead(II) bromide in molten state conducts electricity whereas solid lead(II) bromide does not. (3 ½ marks)

(b) Aqueous solution of hydrogen chloride reacts with Zinc producing hydrogen gas whereas a solution hydrogen chloride in methyl benzene has no effect on zinc.

- (d) When aqueous ammonia is added dropwise to Zinc Sulphate solution in a test tube, a white precipitate is formed which dissolves in excess ammonia forming a colourless solution. (4 ½ marks)

13. (a) Define the following terms and give an example of each.

(i) a normal salt

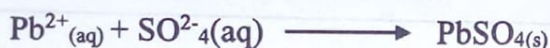
(ii) an acid salt

(3 marks)

- (b) (i) Describe briefly how a pure dry sample of Lead(II) nitrate crystals can be prepared from Lead(II) oxide. (5 marks)

(ii) Name two other compounds from which lead(II) nitrate crystals can be prepared other than lead(II) oxide. (1 mark)

- (c) Lead(II) ions reacts with Sulphate ions according to the ionic equation:



State;

(i) What is observed when lead(II) nitrate solution is added to a solution containing Sulphate ions. (1 mark)

(ii) One practical application of the reaction shown by the ionic equation above. (1 mark)

- (d) 25cm³ of 1M sodium Sulphate solution was added to 40cm³ of a 0.5M lead(II) nitrate solution and the mixture stirred.

(i) Determine the moles of Sulphate ions that reacted. (1 ½ marks)

(ii) the mass of Lead(II) Sulphate that was formed. (2 ½ marks)

14. (a) Spathic iron ore is one of the ores from which iron can be manufactured. Roasted ore and two other substances are introduced into the blast furnace from the top and hot air is fed into the furnace from below.

(i) Write the chemical name and formula of spathic iron ore (1 mark)

(ii) State the purpose of roasting the ore. (1 mark)

(iii) Name the other two substances introduced into the blast furnace with roasted Iron ore (1 mark)

- (b) Describe with the aid of equations how in the blast furnace
- (i) Iron is obtained from the roasted ore. (6 marks)
 - (ii) the major impurity in the ore is removed. (4 marks)
- (c) Steel is an alloy of Iron.
- (i) Name the other common component of steel besides Iron. (1 marks)
 - (ii) Give two reasons why steel is used in construction industry more than Iron. (1 mark)