Name.....

Random No.....Signature.....

545/2
CHEMISTRY
PAPER 2
July/August 2019
2 hours

KALUSSA JOINT MOCK EXAMINATIONS COMMITTEE
Uganda Certificate of Education

CHEMISTRY
Paper 2
2 hours

INSTRUCTIONS TO CANDIDATES

*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. Answer any **two** questions from this section. Answers to these questions must be written in the answer sheets provided.*

*In both sections all working **must** be clearly shown.*

Where necessary use;

(C=12, H=1, Pb=207, O=16, 1 mole of gas occupies 22.4dm³ at s.t.p.)

1mole of gas occupies 24l at room temperature

1mole of gas occupies 22.4l at s.t.p.

FOR EXAMINERS' USE ONLY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total

SECTION A:(50 marks)

1.An atom of element X is represented as $^{27}_{15}X$.

a(i)State the number of neutrons in X. (0½ mark)

.....

.....

(ii)write the electronic configuration of X. (01mark)

.....

.....

b(i)State the group in the periodic table to which the element belongs. (0½ mark)

.....

(ii).Give a reason for your answer in b(i) above (01)mark.

.....

.....

c(i).Write the formula of a compound that can be formed between X and oxygen.

(01 mark)

.....

.....

(ii)State the bond type in the compound in C(i) above (01 marks)

.....

2.During the preparation of soap, sodium hydroxide was boiled with substance Y.

(a)Identify substance Y

(01 mark)

.....

(b)Name the substance that can be used to precipitate the soap from the solution

..... (01mark)

(c).State what would be observed if soap solution was reacted with aqueous calcium hydrogen carbonate.

(01 mark)

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4

3. 6.8 of a mixture containing calcium carbonate and calcium sulphate was reacted with excess hydrochloric acid and 896cm^3 of carbon dioxide measured at s.t.p was evolved.

(a).Write the equation for the reaction. (01½mark)

.....

(b).Calculate;

(i).the mass of calcium carbonate in the mixture (04marks)

.....

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(ii).The percentage of calcium carbonate in the mixture. (02 marks)

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4.The table below shows atomic numbers of elements E,D,F and G.

Element	Atomic number
E	12
D	17
F	19
G	20

(a).What two of the elements are in the in the some group? (01 mark)

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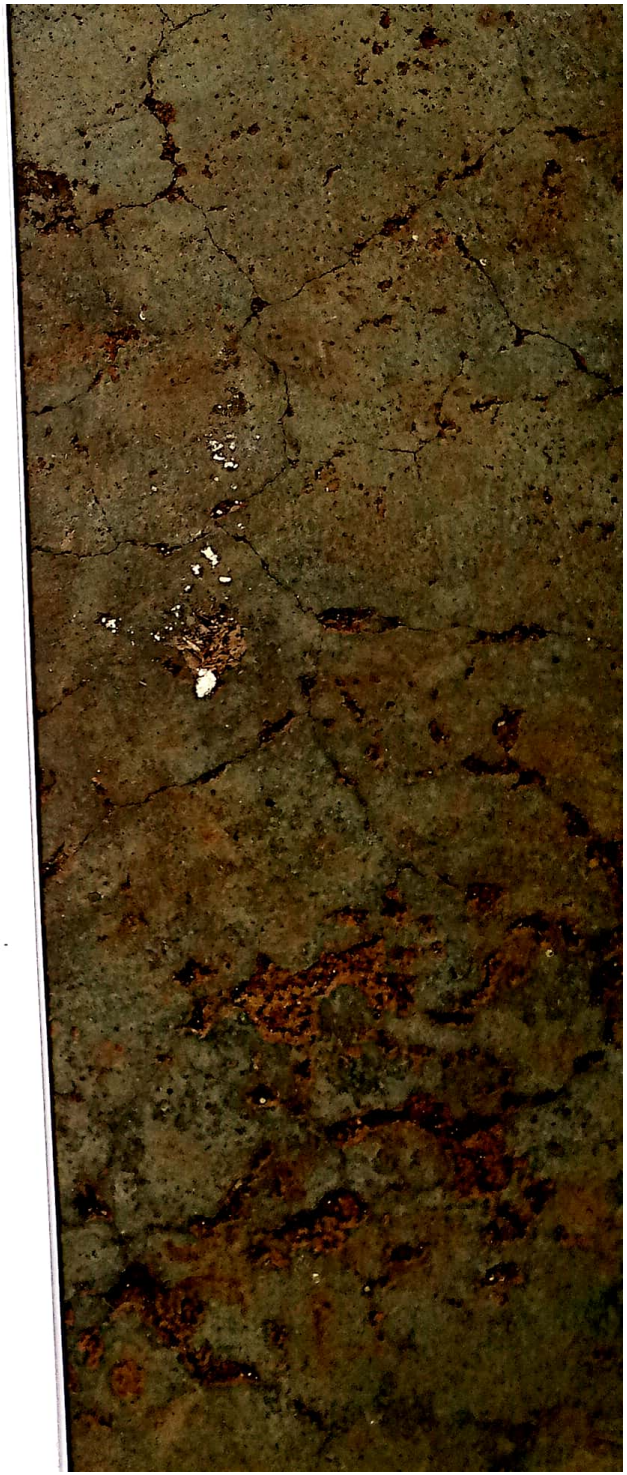

(b.)i).Which one of the elements is the most reactive? (0½ mark)

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ii).Identify one element which is a non-metal.

Give a reason for your answer. (01 mark)

.....

.....

(c).Write the formula of ;

(i).The sulphate formed by F (01 mark)

.....

(ii).The nitrate formed by G (01 mark)

.....

5. Water was added to sodium peroxide powder.

(a).State what was observed? (0½ marks)

.....

.....

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

.....

.....

ii).State what would be observed if a litmus paper is dropped into the resultant solution. (1mark)

.....

.....

C. (i) One drop of the resultant solution was added to an aqueous solution of lead nitrate .i).State what was observed (ii) (1 mark)

.....

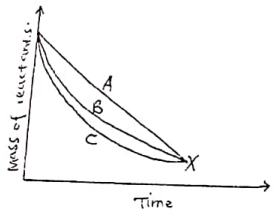
.....

ii).Write an equation for the reaction in above (1½ mark)

.....

.....

6.The variation of mass of reactants with time when calcium carbonate is reacted with dilute hydrochloric acid is shown in figure below.



(a).If B is for the reaction at 30°c which curve would be obtained if the reaction is carried out at.

(i).25°c (0½ mark)

.....

(ii).45°c (0½ mark)

.....

(b).Explain why the curves meet at point X (01 mark)

.....

.....

(c).(i).How can the decrease in mass of reactants be increased? (02 mark)

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(ii).If 1.0g of calcium carbonate reacted completely with 20cm³ of the dilute hydrochloric acid, what is the molar concentration of the acid? (04marks)

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7. Complete the table below (03 mark)

Mixture	Method of separation	Principle behind method of separation
(a).Ethanol and water		
(b).Ink		
(c).Water and petroleum		

8. When a green solid **Q** is heated, a colourless liquid which condenses on the cooler parts of the test tube is formed .A colorless gas which turns acidified potassium dichromate (VI) solution green is evolved and a reddish brown residue ,**S** is formed .

When chlorine gas is bubbled into a solution of **Q** in water the solution turns yellow.

(a).Identify the colorless gas, **Q** and **S.**

Colorless gas..... .(0½ mark)

Q..... (0½mark)

S..... (0½mark)

(b).Name

(i).The cation in the yellow solution (0½ mark)

.....

(ii).The reagent that can be used to confirm the anion in **Q** (01 mark)

.....

.....

(c).Write an ionic equation for the reaction between the anion in **Q** and the reagent in b(ii) above. (1½ marks)

.....

.....

9(a).Write equation for the reaction during which nitric acid is prepared from potassium nitrate (1½ marks)

.....

.....

(b).Nitric acid reacts with most metals to produce oxides of nitrogen instead of hydrogen.

Give a reason (½ mark)

.....

.....

(c).Write equation to show the reaction of concentrated nitric acid with

(i).Sulphur (1½ marks)

.....

(ii).Copper (1½ marks)

.....

10. Glucose $C_6H_{12}O_6$, reacts in the presence of yeast to produce ethanol.

a) (i).State what the reaction is called . (½ marks)

.....

(ii)Write equation for the reaction. (1½ marks)

.....

b)(i).State the conditions under which ethanol can react with concentrated Sulphuric acid to produce ethene. (1 mark)

.....

.....

(ii).Ethene decolorizes bromine water where as ethane does not. Give a reason. (1 mark)

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SECTION B (30 Marks)

Attempt any two questions from this section.

11.(a).Describe

(i).The effect of heat on ammonium chloride (3 marks)

(ii).How sodium hydroxide reacts with ammonium chloride. (3 marks)

(b) State one practical application of the reactions in (a) (2 marks)

(c).Two equal portions of aqueous ammonium chloride were taken in separate test tubes **A** and **B**. To the portion in test tube **A** was added of lead (ii) nitrate solution and to the portion in test tube B was added drops of silver nitrate solution. Solution in both test tubes were heated, and then cooled under tap water.

State what was observed in test tube.

(i) **A** (1½ marks)

(ii) **B** (1 mark)

(d).Although mmonium sulphate and ammonium nitrate are common fertilizers, in practice farmers prefer ammonium nitrate, which they claim is more effective.

Explain (H=1, N=14, O=16 , S=32) (4½marks)

12. Haematite is an ore of iron from which the metal is extracted.

(a).Write the chemical name and formula of haematite. (1 marks)

(b).During the extraction of iron in the blast furnace, carbon monoxide is formed, which converts the ore into iron and slag is also produced.

(i).Outline the reactions leading to the formation of carbon monoxide and subsequently to the conversion of the ore to iron. (6marks)

(ii).Write the chemical name of the slag and explain how it is formed. (5 marks)

(c). Most of the iron that is extracted is used for making steel, which is more commonly used instead of pure iron.
State what steel is and give two reasons why it is more commonly used instead of pure iron. (3 marks)

13(a).Name the two allotropes of Sulphur (1 mark)
(b).How you would show that the two named in (a) above are allotropes ? (4 marks)

(c).Describe how Sulphuric acid can be prepared on a large scale by using Sulphur as the starting material. (Diagrams not required) (9½ marks)

14.(a).Write equations for the reactions that occur when dilute Sulphuric acid is added to;
(i).Sodium carbonate solution (1½ marks
(ii).Sodium hydroxide solution (1½ marks)
(iii).Iron fillings (1 mark)

(b).Name one chloride, other than sodium chloride, that can be prepared by neutralization reaction. (½ marks)

(c).Briefly describe how a dry sample of the salt you named in (b) above can be obtained. (10 ½ marks)