NAME .....Personal No.....

SIGNATURE: .....

545/2

CHEMISTRY

PAPER 2

July/Aug/022.

2 HOURS

CHEMISTRY DEPARTMENT

Uganda Certificate of Education

End of term 2 Examination 2022

CHEMISTRY

S.3

PAPER 2

INSTRUCTIONS;

- *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 the questions must be written in the answer booklet(s) provided.*
- *In both sections all working must be clearly shown.*
- *Where necessary use:*

  [H = 1, C = 12, N = 14, O = 16, Na = 23, S = 32, Cl = 35.5]

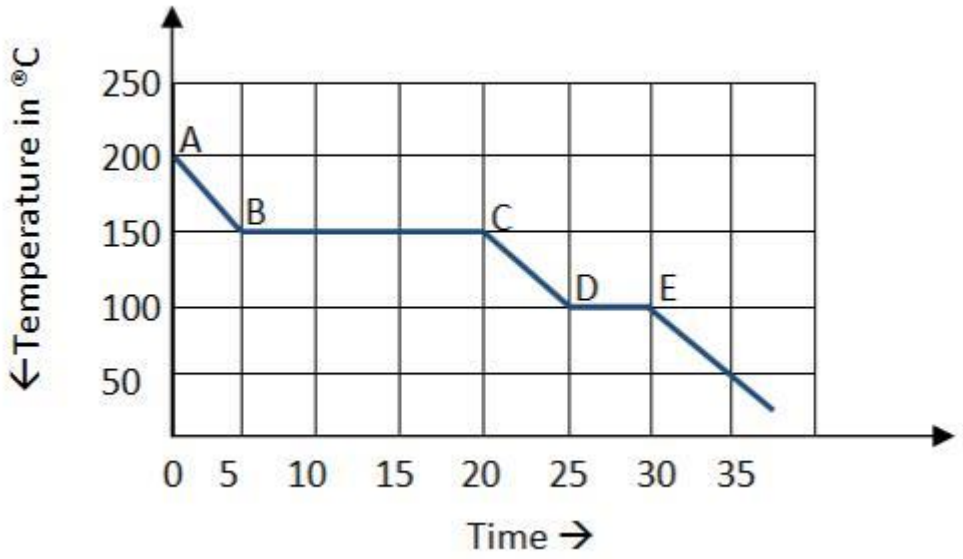
  1 mole of gas occupies 24 litres at room temperature

  1 mole of gas occupies 22.4litres 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)
Answer all questions in this section.

1. Below is a temperature- Time graph for cooling of a pure sample **Q** until there was no further change. Study it and answer the questions that follow.



(a) From the graph, state the,

(i) Melting point of **Q**. (01 mark)

.....

(ii) Boiling point of **Q**. (01 mark)

.....

(b) Name the state of substance **Q** at,

(i) Point A. (01 mark)

.....

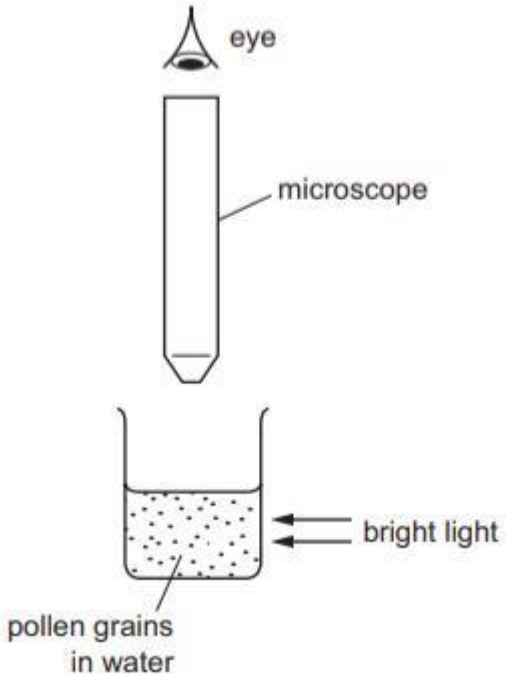
(ii) Point C (01 mark)

.....

(iii) Point E. (01 mark)

.....

2. Finely ground pollen grain particles were poured on to water in a glass beaker and a beam of light was passed through a glass beaker. The pollen grain particles were observed under the microscope moving a zig zag pattern as the experimental set up below.



a) State why the pollen grain particles were seen moving in a zig zag pattern (01 mark)

.....

.....

b) State what the experiment indicated? (01 mark)

.....

.....

c) The temperature of the water in the glass beaker was increased. State what was observed? (01 mark)

.....

.....

d) Give a reason for your answer in (c) (1 mark)

.....

.....

3. An equal amount of anhydrous sodium carbonate and copper(II) hydroxide were each separately heated in a hard glass tube.

a). State what was observed when,

i) anhydrous sodium carbonate was heated. (½ mark)

.....

.....

ii) copper(II) hydroxide was heated. (1marks)

.....

.....

b). Write equation of reaction that took place in (a). (1½ marks)

.....

.....

c). Name the type of the change that took place when,

i) anhydrous sodium carbonate was heated. (½ mark)

.....

ii) copper(II) hydroxide was heated. (½ mark)

.....

d)Give a reason for each answer in (c) above. (01 mark)

.....

.....

4. a) Name one liquid, which is;

i) Miscible with water. (½ mark)

.....

ii) Immiscible with water. (½ mark)

.....

b) i) state a suitable method used to separate a mixture of miscible liquids with different boiling points. (½ mark)

.....

ii) Draw a labelled diagram of the setup of apparatus showing how a mixture of two immiscible liquids A and E can be separated. (A is denser than E) (2 marks)

c) i) State a suitable method which can be used to separate components of a green leaf extract. (½ mark)

.....

ii) Give a principle on which the method stated in (i) is based on.
(01 mark)

.....

5. The atomic numbers of elements Q, R and X are 17, 6 and 19 respectively.
   a) Write the electronic configuration of element.
      i) Q (01 mark)

.....

      ii) R. (01 mark)

.....

      iii) X. (01 mark)

.....

   b) Q reacted with both R and X to form compounds Y and Z respectively. Write formula of compound,
      i) Y. (½ mark)

.....

      ii) Z. (½ mark)

.....

   c) State one difference in properties between compounds Y and Z in (b).
(01 mark)

.....

.....

6. A worker on a farm forgot a new pang and a slasher made of iron in a garden for two weeks.

   a)State what was observed on the tools after two weeks (½ mark)

.....

.....

b).Explain your observation in (a). (02 marks)

.....

.....

.....

c)Write the formula of the resultant compound formed on the tools, leading to your observation in (a) above. (½ mark)

.....

d)State one disadvantage of the process that took place leading to your observations in (a) above. (½ mark)

.....

e)State two ways that can be used to prevent the observation made on the garden tools in (a). (01 mark)

.....

.....

7).Below is part of the periodic table. The letters indicated are not the usual symbols of the elements but use the letters to answer the questions that follows.

	I	II	III	IV	V	VI	VII	VIII
3	A	D	F	G	H	L	M	O
4	B	E					N	R

a)Name the family name given to the group to which the following elements belongs.

i) A and B. (½ mark)

.....

ii) D and E. (½ mark)

.....

iii) M and N. (½ mark)

.....

b)State the,

i) most reactive metal element. (½ mark)

.....

ii) least reactive metal element. (½ mark)

.....

ii) Most reactive non metal element. (½ mark)

.....

c). i) Identify the element which doesn't react with other elements.

(½ mark)

.....

ii) Give a reason for your answer in c (i) (½ mark)

.....

d)State the type of the bond that is formed when elements D reacts with element M. (½ mark)

.....

.....

b) i) write the formula of the ion formed by element D. (½ mark)

.....

ii) State the number of electrons which are contained in ion formed by L. (½ mark)

.....

.....

8. When excess zinc powder was added to a sulphate solution which is **blue**, and left to Stand for about 1 hour, one of the observations made is **brown metallic solid Q** solid was deposited.

(a) (i) Identify the **brown metallic solid Q** (½ mark)

.....

(ii)State what else was observed? (01 mark)

.....

.....

(b) Write equation of reaction that took place. (1½ marks)

.....

.....

(c) Explain your observations in (a). (1 ½ marks)

.....

.....

.....

9. a) State the conditions of reaction between the following elements with water.

(i) sodium. (½ mark)

.....

.....

(ii) Aluminium. (1marks)

.....

.....

b) Write equation of reaction that took place when each of the elements react with water.

(i) Sodium. (1½ marks)

.....

.....

(ii) Aluminium. (1½ marks)

.....

.....

c) Name one metal element that can't react with water under any conditions stated in (a) (½ mark)

.....

.....

10. Ammonium nitrate and calcium nitrate are fertilizers used by farmers to improve agricultural productivity. They both contain nitrogen nutrient.

a) Write equation of reaction that can lead to formation of each fertilizer in the laboratory

i) Ammonium nitrate. (1½ marks)

.....

.....

ii) Calcium nitrate. (1½ marks)

.....

.....

b) Calculate the percentage amount of nitrogen in each fertilizer

(**N = 14, H = 1 O = 16, Ca = 40,)**

(i) Ammonium nitrate. (1½ mark)

.....

.....

.....

.....

.....

(ii) Calcium nitrate. (1½ mark)

.....

.....

.....

.....

.....

c) State which of ammonium sulphate and calcium nitrate can be selected by a farmer as a better fertiliser than the other. Give a reason for your answer.
(01 mark)

.....

.....

SECTION B (**30 marks)**

Attempt two questions in this section.

11. (a) Write equation of reaction leading to the formation of oxygen gas from sodium peroxide. (1½ marks)

(b) state the condition under which oxygen gas reacts with each of the following elements; and in each write equation of reaction.

i) Magnesium. (02 marks)

ii) Sulphur. (02 marks)

iii) Zinc. (02 marks)

(c) Giving a reason in each case, state which of the products formed in (b) would react with,

i) both sodium hydroxide solution and dilute sulphuric acid.
(01 mark)

ii) only sodium hydroxide solution but dilute sulphuric acid.
(01 mark)

iii). only dilute sulphuric acid but not sodium hydroxide solution.
(01 marks)

(d).A mixture of magnesium and the product formed in (b) (iii) was strongly heated until there was no further change. Explain the changes that took place. (4½ marks)

12. Explain the following observations. Include equations of reaction where necessary.

a) Sodium chloride has a higher melting point. (02marks)

b) A sample of water containing dissolved calcium hydrogen carbonate does not readily form lather with soap but when sodium carbonate is first added to the same sample of water; and then used with soap, lather readily forms. (04 marks)

c) Graphite is extensively used as a lubricant whereas diamond is used in making drilling and cutterly tools. (04 marks)

d) When excess carbon dioxide gas is bubbled into calcium hydroxide solution; a white precipitate is formed first, and later the resultant product is a colourless solution. (05 marks)

13. (a) Describe with the aid with the aid of a well labelled diagram how a dry sample of hydrogen gas can be prepared in the laboratory using zinc. (6 ½ marks)

(b) (i) Name the suitable catalyst that can be used in the preparation of Hydrogen gas. (01 mark)

(ii)State how hydrogen gas can be identified in the laboratory.(01 mark)

(c)State how hydrogen gas reacts with triiron tetraoxide. Include equation of reaction. (4½ marks)

(d)Write equation for the complete combustion of hydrogen gas in air. (1½ marks)

(e)State one industrial use of hydrogen gas. (½ mark)

14. (a)Write equation of reaction leading to the formation of ammonia gas in the laboratory from calcium hydroxide ammonium sulphate. (1½ marks)

(b)Draw a well labelled diagram for the preparation of ammonia gas in the laboratory from the reactants in (a) (04 marks)

(c)Give a reason for the;

i) compound used as a drying agent for ammonia gas in your set up apparatus drawn in (b). (01 mark)

ii)method of collection of ammonia gas used in your set up apparatus drawn in (b). (01 mark)

(d)Ammonia gas in presence hot copper wire catalyst is oxidized forming a colourless gas **W** ; which on exposure to air turns to reddish- brown fumes. Write equation of reaction leading to the formation of,

(i) colourless gas **W** . (1½ marks)

(ii) reddish- brown fumes. (1½ marks)

(e)On a large scale, reddish- brown fumes; can be converted to nitric acid. Write equation of reaction leading to the formation of nitric acid.(1½ marks)

(f)Write equation of reaction to show the reducing property of ammonia gas, and state the conditions of reaction. (2½ marks)

(g) State one other industrial use of ammonia gas apart from that in (e) (½ mark)

END

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