Candidate's Name………………………………………………………………………………………………………

Signature……………**Random No**……../……/…./…/…../…… **Personal No**……………………

(*Don't write your school/Centre name or number anywhere on this booklet*)

545/2

CHEMISTRY

Paper 2

Oct/Nov.2021

2 hours.

CHEMISTRY DEPARTMENT.

Resourceful Chemistry revision Set 1.

UGANDA CERTIFICATE OF EDUCATION.

PAPER 2.

TIME. 2 hours.

INSTRUCTIONS TO CANDIDATES.

Section **A** *consists of* **10** *structured numbers. Attempt* **all** *questions in this section.*

Answers to this section must be written in the spaces provided.

Section **B** *consists of* **4** *semi-structured questions. Attempt only* **2** *questions from this section. Answers to this section must be written in the answer booklets provided. In both sections,* **All** *working must be clearly shown.*

Where necessary use, (Al =27, C=12 O =16 N= 14 S= 32 Pb =207 Na = 23)

1 mole of a gas occupies **24*l*** at room temperature.

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

For Examiner's 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. During the industrial separation of the **major two** components of air **W** and **Z**, carbon dioxide and water vapour are first removed from air , the resultant air, is compressed and then cooled repeatedly forming ***liquid mixture*** of gases **W** and **Z** .
   When ***liquid mixture*** is fractionally distilled, liquid of gas **W** distills off first from it's liquid mixture with gas **Z.**

   (a) Name gas,

   (i) **W**………………………………………………………………………..(½ *mark)*

   (ii) **Z**……………………………………………………………………….(½ *mark)*

   (b) Give a reason why liquid of gas **W** distills off first, from it's ***liquid mixture*** with gas **Z.**   (½ *mark)*

   ……………………………………………………………………………………………………

   ……………………………………………………………………………………………………

   (c)State how each of the following components of air are removed,

   during the industrial separation of gases named in (a).

   (i) Carbon dioxide.   (½ *mark)*

   ………………………………………………………………………………………………

   ……………………………………………………………………………………………………

   (ii) Water Vapour.   (½ *mark)*

   ………………………………………………………………………………………………..

(d) (I) State what would happen if carbon dioxide and water vapour are not removed from air first, during the industrial separation of the gases named in (a). (½ mark)

....

....

(ii) Write the equation of reaction that takes place during the removal of carbon dioxide from air. (1 ½ mark)

....

....

(e) State,

(I)how the concentration of gas **W** can be decreased from the atmosphere. (½ mark)

....

(ii)One industrial use of gas **Z.** (½ mark).

....

2. The number of particles (Protons, electrons and neutrons) in atoms **B, D, E, H** and **M**) are shown in the table below.

Atom	Protons	Neutrons	Electrons
B	20	20	20
D	14	14	14
E	17	19	17
H	12	12	12
G	8	8	8

(a) State the *atomic mass* of **E.** (½ mark)

....

(b)(i) Identify the atoms that belong to the elements in the group of the

Periodic table.   (½ mark)

………

(ii)State the group of the periodic table to which the atoms in (b)(i) b

Belong.   (½ marks)

………

(iii)Give a reason for your answer in (b) (ii).   (½ mark).

………

(c) Write the electronic configuration of the ion formed by atom **B.**

…… (½ mark)

(d)(*i)* Briefly ***explain*** how atom **H** forms a compound with atom **E.**

(*3 marks)*

………

………

………

………

………

………

(ii)State one difference between the compound formed by atoms

H and **E**   and compound formed by atoms **D** and **E.**   (½ mark).

………

………

3. (a) State what would be observed if a crystal of each of the following

Compounds is left in an open place , for about 1 hour.

(i) Sodium carbonate – 10 -water. (*1 mark)*

....

....

(ii) Anhydrous copper (II) sulphate. (*1 mark)*

....

....

(iii) Anhydrous iron(III) chloride. (*1 mark)*

....

....

(b)Name the process that occurred , leading to your observation in (a)(III)

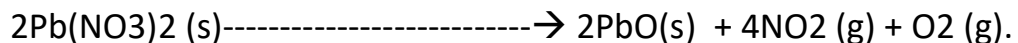..(*½ mark)*

(c)Name any other compound which when left in open place , behaves

In a similar way as Anhydrous copper(II) sulphate. (*½ mark)*

....

(d)Write equation of reaction that takes place when Sodium carbonate

- 10 -water is left in an open place, leading to your observation in

(a) (I) above. (*1 ½ marks).*

....

....

4. (a)Lead(II) nitrate decomposes according to the following equation.

$2Pb(NO_3)_2$ (s)-------------------------→ $2PbO(s) + 4NO_2 (g) + O_2 (g)$.

(I)State what was observed?   (*1 ½ marks)*

……..

……………………………………………………………………………………………………....................

(ii) Calculate the mass of lead (II) nitrate required to produce 15000 cm3 of

total gaseous products at s.t.p (*N =14, O =16 , Pb = 207, 1 mole of a*

a gas occupies 22.4dm3 at s.t.p).   (*2 ½ marks).*

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……..

(b) Excess dry hydrogen gas was passed over heated solid residue
obtained from (a).
Write equation of reaction that took place.   (*1 ½ marks)*

…….

………..

5. Excess pieces of clean iron wire were added to 250cm3 of 0.5M solution of Copper(II) sulphate in a beaker. A green solution and brown solid residue Were formed. The resultant mixture becomes warm.

(a) Name the,

    (i)   Green solution.   (½ mark)

....

    (ii)   Brown solid residue.   (½ mark)

....

(b) Write the equation for reaction leading to the formation of ,

    (I).   Green Solution.   Excessively   (

1 mark)

....

    (iii)   Brown solid residue.   (1 mark)

....

(c) Name the reaction leading to the formation of ,

    (I).   Green solution.   (½ mark)

....

    (ii) Brown solid residue.   (½ mark)

....

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

....

....

6. During the preparation of carbon dioxide gas in the laboratory from hydrochloric acid and calcium carbonate, the gas is first passed through Water, and then through **liquid L** before collection .

(a)(I)State the condition (s) of reaction leading to the formation of carbon dioxide gas .   (*1 mark)*

………

………

(ii)Write ionic equation of reaction leading to the formation of carbon

dioxide gas.   (*1 ½ mark).*

……..

……..

(b)(i)Name *liquid L.*   (*½ mark)*

……..

(ii)State the role of *liquid L* in the preparation of carbon dioxide gas

……(*½ mark)*

(c)Excess dry carbon dioxide gas was bubbled through a fairly concentrated

Solution of sodium hydroxide, then filtered and residue dried.

(I)Write equation for the reaction to show the effect of heat on the dried

residue.   (*1 ½ marks)*

………

……..

(ii)State one industrial use of the product formed in (c)(I).   (*½ mark)*

……..

(d)Carbon dioxide changes on cooling to a solid called *dry ice*, used as a

refrigerating cooling agent. Give a reason why *dry ice* is a better

coolant in *deep freezers* than any other refrigerating cooling agents.

………………………………………………………………………………………………..(*½ mark)*

....

7. (a) A direct current was passed through concentrated sugar solution using graphite electrodes for about 15 to 30 minutes.

(I)State what was observed at the electrodes. (½ marks)

....

(ii)Give a reason for your observation in (i). (½ mark)

....

(b) The experiment in (a) was repeated using concentrated copper(II) chloride solution.
(I)State what was observed at the cathode. (½ mark)

....

(ii)Write equation for reaction that took place at the cathode(1 mark)

....

(ii)The solution around the anode was tested with litmus solution. State What was observed. (½ mark)

....,..

(c)(I)Comment on the concentration of the electrolyte in (b) at the end of electrolysis. (½ mark)

....

(ii)Give a reason for your comment in (C)(I). (1 mark)

....

(d)State one industrial application of electrolysis. (½ mark)

....

8. (a) write equation that takes place during the fermentation of glucose.

(*1 mark))*

………

………

(b)The product of fermentation of glucose in (a) , can be converted to

alkene **Q** .

(i)Name alkene **Q ,** and write it's structural formula.   (*1 mark)*

………

(ii)State the conditions leading to the formation of alkene **Q** from the

Product of fermentation in (a).   (*1 mark)*

…….

………

(iii))Write equation for the reaction leading the formation of alkene **Q**

Named in **(**i).   (*1 mark)*

………

(c) When many molecules of alkene **Q** are joined under high pressure and
Temperature in presence of oxygen gas catalyst, a single large complex
R of larger molecular mass is formed.

(I)Write the structural formula of **R.**   (*½ mark)*

……

(ii)Name the process leading to the formation of large complex **R** from
alkene **Q.**   (*½ mark)*

…….

(ii)Name one use of **R.**   (*½ mark).*

……..

9. (a) State what is meant by the term **allotropy of sulphur.** (*1 mark).*

....

....

(b) Sulphur exists in two different crystalline forms. Name the

(I) Crystalline form of sulphur which Is needle-like shaped.(*½ mark)*

....

(ii) other crystalline form of sulphur , and state the nature of it's shape

....(*1 mark)*

(c) State two other difference between the two crystalline forms of Sulphur

Named in (b) apart from their structures. (*1 mark)*

....

....

(d) Sulphur was completely burnt in air. The resultant product was
Bubbled into acidified solution of potassium dichromate.
(I) State what was observed when the resultant product was bubbled
Into the solution. (*½ mark)*

....l

(ii) Give a reason for your observation. (*1 mark)*

....

....

(ii) State the practical application of the above reaction. (*½ mark)*

....

(e) State one industrial use of sulphur. (*½ mark)*

....

10. (a) Define *rate of reaction .*   (*1 mark*)

………

………

(b)Dilute sulphuric acid was reacted with magnesium powder at room
   Temperature.

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

………..

………

(c)State two ways by which the rate of reaction between the acid and

   Magnesium in (b) can be increased.   (*1 mark*)

………..

……

………..

(d)Using the space below , on the same axes, sketch graphs of the change

   in the mass of the reactants verses time for the reaction between acid

   and magnesium powder at,

   (I)room temperature for reaction in (b)   (*1 mark*)

   (ii)one of the conditions you have named in (c).   (*1 mark*)

*Answer **two** questions from this section.*

*Additional question(s) answered will **not** be marked.*

NB. Section B , to be completed.

Set by ***Tr. Hakim ssemogerere k.(Hasems@2021)***