

NAME:		INDEX NO:	
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545/2  
CHEMISTRY  
Paper 2  
August, 2019  
2hrs



## UNNASE MOCK EXAMINATIONS

*Uganda Certificate of Education*

**CHEMISTRY**

**PAPER 2**

**2hours**

### Instructions;

- This paper consists of **two** sections **A** and **B**.
- Section **A** is **compulsory**. Attempt only **two** questions in section **B**.
- Answers to section **A** must be written in the **spaces provided** only. While those to questions in section **B** must be written on answer sheets provided.
- **Do not** use a pencil.

**For Examiner's use only.**

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

## SECTION A

All questions are **compulsory**.

1. State what would be observed if the following substances were heated.

a) Zinc oxide

(1 ½ marks)

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b) Iodine

(2marks)

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c) Silver nitrate

(1 ½ marks)

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2. Part of the Periodic Table is shown below. The letters used are not the symbols of the elements.

I						VII	VIII
	II	III	IV	V	VI		
			Y				
W		X			Z		

- a) Which of the letters represents the;

i) Most reactive metal?

( ½ mark)

.....

.....

ii) least reactive non-metal?

( ½ mark)

.....

.....

- b) Write the formula of the compound that would be formed between;

i) X and Z

(1mark)

.....

.....

ii) Y and Z

(1 mark)

.....  
.....

c) i) State whether the compound formed between **Y** and **Z** will conduct electricity. (½ mark)

.....

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

.....

3. a) Lead(II) carbonate was heated strongly.

i) State what was observed. (1½ marks)

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.....

ii) Write equation for the reaction that took place. (1½ marks)

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.....

b) Dilute nitric acid was added to lead(II) carbonate and to the resultant solution was added dilute ammonia solution.

i) State what was observed. (1 mark)

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ii) Write equation for the reaction that took place. (1½ marks)

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4. Carbon is one element that is both isotopic and allotropic.

a) Differentiate between the terms allotrope and isotope. (1 marks)

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b) A carbon atom has six protons;

i) Write the full symbol of carbon-14 isotope. (1 mark)

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ii) State the number of neutrons in carbon – 14 isotope. (1 mark)

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c) State one property, which is the reason for using.

i) graphite in manufacturing electrodes. (1 mark)

.....

.....

iii) carbon-14 for determining ages of old objects. (1 mark)

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5. Barium is an element just below calcium in Group II of the Periodic table, whereas Chlorine is a halogen.

a) i) Write the formula of barium chloride. ( $\frac{1}{2}$  marks)

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ii) Predict the solubility of barium chloride in water. ( $\frac{1}{2}$  mark)

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b) State what would be observed if carbon dioxide was bubbled into a saturated solution of barium hydroxide until the gas was in excess.

(1 mark)

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.....

c) i) State a suitable method for preparing barium carbonate. (1 mark)

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.....

ii) Write an ionic equation to show the effect of adding excess dilute sodium hydroxide solution to an aqueous barium ion. (1½ marks)

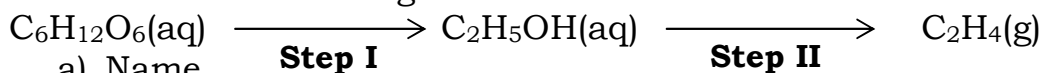
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d) To a solution containing barium ions was added sodium sulphate solution. State what was observed.

(½ mark)

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.....

6. Ethanol obtained from glucose can be converted to ethene as shown below.



a) Name

**Step I**

**Step II**

i) the process that takes place in step 1

(½ mark)

.....

ii) the reagent used in step II

(½ mark)

.....

b) Ethene can be converted to a polymer J of relevant molecular mass 16,800.

i) Write equation to show the conversion of ethene to polymer J.

(1 mark)

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.....

ii) Determine the number of ethene molecules that make up one molecule of J. (2marks)

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iii) Give one disadvantage of continued use of J. (1mark)

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7. a) An oxide, **T**, of iron consists of 70% of iron by mass. Determine the formula of the oxide, (Fe=56, O=16, T=160) (3½ marks)

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c) **T** is one of the important ores from which iron is extracted.  
Write,

i) the common name of the iron ore that contains the oxide. (½ mark)

.....

ii) an equation which shows how iron is extracted from the ore in the blast furnace. (1½ marks)

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.....

.....

- iii) the chemical name of the corresponding sulphate to the oxide. (½ mark)

.....

.....

8. When a mixture of a compound **R** and concentrated Sulphuric acid was warmed, effervescence took place and brown fumes were given off, that condensed into a yellow liquid W. Aqueous W liberated carbon dioxide from sodium carbonate solution.

a) i) Name **W**. (1mark)

.....

ii) Suggest a possible identity of the anion in **R**. (1mark)

.....

iii) Name a reagent(s) which would be used to confirm the identity of the anion which you have suggested in a(ii) (1mark)

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iv) State what would be observed if the reagent(s) you have named in (iii) was used to confirm the identity of the anion in **R**. (½ mark)

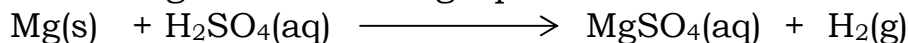
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b) Write equation for the reaction that led to the formation of brown fumes. (1½ marks)

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9. a) Magnesium can react with dilute Sulphuric acid to produce hydrogen according to the following equation.

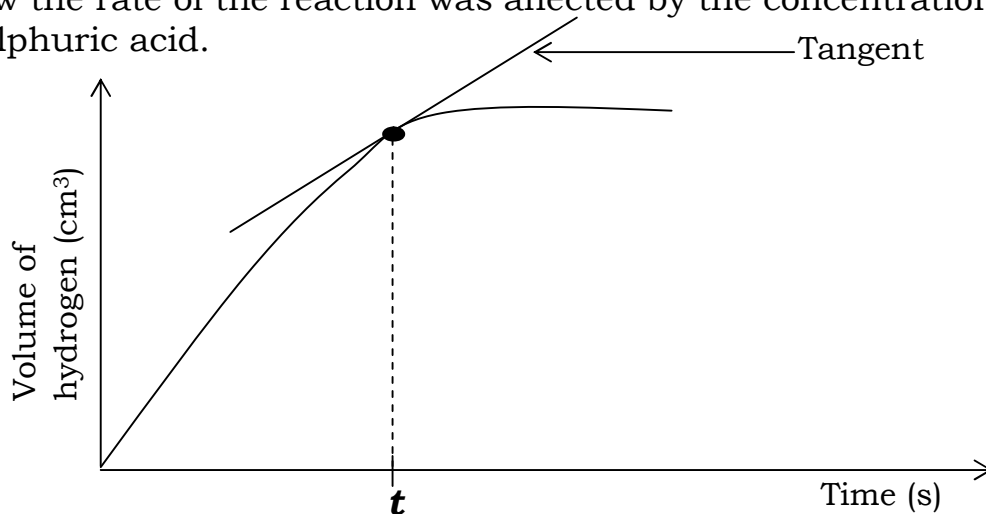


State the effect of concentration of Sulphuric acid on the rate of the reaction. (1mark)

.....

.....

- b) The sketch graph below shows a tangent that was drawn on the graph of 'volume of hydrogen evolved against time', while trying to determine how the rate of the reaction was affected by the concentration of Sulphuric acid.



Using the graph,

- i) State how you would treat the tangent to determine the rate of the reaction. (1 mark)

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- ii) Write an expression for the rate of the reaction at time 't' seconds. (1 mark)

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- c) State two ways in which the rate at which hydrogen is evolved would be increased, other than by varying the concentration of Sulphuric acid. (1 mark)

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.....

.....

10. a) Copper(II) sulphate solution was electrolyzed between platinum electrodes. State what was observed at;

- i) the anode ( ½ mark)

.....

.....



ii) the cathode

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

.....

.....

b) Write equation for the reaction at the anode.

(1½ marks)

.....

.....

.....

c) The electrolysis of copper(II) sulphate solution was repeated using copper electrodes.

i) State what was observed at the anode.

(1 mark)

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.....

ii) Write equation for the reaction that illustrates the observation in (c) (i).

(1 mark)

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## SECTION B (30MARKS)

Answer any **two** questions only from this Section.

11. a) Briefly explain how a dry sample of hydrogen chloride can be prepared in the laboratory and write equation to illustrate your answer. (No diagram is required.) (5½ marks)
- b) State;
- i) What an aqueous hydrogen chloride is called. (½ mark)
- ii) A suitable procedure for preparing a sample of aqueous hydrogen chloride in the laboratory. (1 ½ marks)
- c) Two equal masses of magnesium powder were added separately to solutions of hydrogen chloride in water and in methylbenzene, respectively. State what was observed in each case; and give a reason for each observation that you have stated. (4marks)
- d) Dry hydrogen chloride was bubbled into acidified silver nitrate solution. Write an ionic equation for the reaction that took place. (1 ½ marks)
- e) A mixture of manganese (IV) oxide and a concentrated hydrogen chloride solution was heated.
- i) Write equation for the reaction that took place. (1 ½ marks)
- ii) State the practical application of the reaction in (e)(i). (½ mark)
12. a) i) Name one ore from which sodium can be extracted. (1mark)
- ii) Describe how sodium can be extracted from the ore you have named in (a) (i) and write equations for the reactions that take place. (6marks)
- b) Describe with the aid of equations, how sodium can react with
- i) chlorine (2marks)
- ii) oxygen (4marks)
- iii) water (2marks)
13. a) Excess copper(II)Oxide was added to warm dilute nitric acid.
- i) State what was observed. (1mark)
- ii) Write equation for the reaction that took place. (1½ marks)
- iii) Briefly describe how crystals of copper(II) nitrate can be obtained from the reaction mixture in (a) (ii). (4marks)

- b) To a mixture, magnesium nitrate and Lead (II) nitrate was added dilute sodium hydroxide dropwise until the alkali was in excess.  
The resultant mixture was filtered. Name the cation that was in;
- the filtrate (½ mark)
  - the residue (½ mark)
- c) i) Name one reagent that would be used to identify the cation that was in the filtrate and state what would be observed to confirm the presence of the cation. (1½ marks)
- Write equation for the reaction that would take place. (1½ marks)
- d) Describe how that cation in the residue would be identified. Illustrate your answer with equations where applicable). (4½ marks)
14. a) Ethanol, C<sub>2</sub>H<sub>5</sub>OH, is used as a fuel and its enthalpy of combustion can easily be determined experimentally.
- Define the term ‘fuel’ (1mark)
  - State one use of ethanol other than as a fuel. (1mark)
  - Explain what is meant by the term ‘enthalpy of combustion.’ (2marks)
  - Write equation of the combustion of ethanol in air containing plenty of oxygen. (1½ marks)

- b) The formulae and enthalpies of combustion of some four alcohols are shown in the table below.

Alcohol	CH <sub>3</sub> OH	C <sub>3</sub> H <sub>7</sub> OH	C <sub>4</sub> H <sub>9</sub> OH	C <sub>5</sub> H <sub>11</sub> OH
Enthalpy of combustion (kJmol <sup>-1</sup> )	-715	-2020	-2680	-3320

- Plot a graph of enthalpy of combustion against number of carbon atoms for the four alcohols. (4marks)
  - From your graph, determine the enthalpy of combustion of ethanol. (1mark)
  - Compute the enthalpy of combustion of the alcohol with six carbon atoms. (1mark)
- c) i) Using your answer in (ii), calculate the mass of ethanol that when burnt, would release heat energy enough to raise the temperature of 200cm<sup>3</sup> of water by 20.0°C. (2½ marks)
- (Specific heat capacity of water = 4.2Jg<sup>-1</sup> and density of water = 1.0gcm<sup>-3</sup>)
- State one application of enthalpy of combustion determination. (1mark)

\*\*\*\* END \*\*\*\*