

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

Signature:.....School:.....

545/2

CHEMISTRY

Paper 2

2 hours

STANDARD HIGH SCHOOL ZZANA

Uganda Certificate of Education

CHEMISTRY

Paper 2

2 hours

INSTRUCTIONS TO CANDIDATES:

*This paper consists of **two** sections **A** and **B**.*

*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 section **B** **must** be written on separate answer sheets provided and stapled at the back of the question paper.*

*Show **all** your working clearly in both sections.*

1 mole of gas occupies 24000cm^3 at room temperature.

1 mole of a gas occupies 22400cm^3 at s.t.p.

For Examiner's use only														
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	Total

Turn Over

SECTION A: (50 marks)

*Answer **all** questions in this section.*

1. (a) A strip of zinc metal was dipped in a solution of copper(II) sulphate.
- (i) State what was observed. (1½ marks)
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-
- (ii) Write the ionic equation for the reaction. (1½ marks)
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-
- (b) (i) What would be observed if a strip of silver metal was dipped into copper(II) sulphate solution? (01 mark)
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-
- (ii) Explain your answer in (b) (i). (01 mark)
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-
-
-
2. Large scale preparation of nitrogen is done by passing air through solution *A* and then over heated metal *Z*.
- (a) Identify
- (i) solution *A* (½ mark)
-
- (ii) metal *Z* (½ mark)
-
- (b) State the role of solution *A* and metal *Z* in the above process.
- (i) solution *A* (½ mark)
-
-

(ii) metal *Z* (½ mark)

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.....

(c) Write equation of the reaction that took place when air was passed

(i) through solution *A* (1½ marks)

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.....

(ii) over heated metal *Z*. (1½ marks)

.....
.....

3. (a) An element *W* has mass number 27 and 14 neutrons.

(i) Write down the electronic configuration of *W*. (01 mark)

.....

(ii) *W* combines with oxygen to form compound *R*. Write down the formula of *R* and state the type of bond in *R*.

Formula (01 mark)

.....

Type of bond (½ mark)

.....

(b) *R* was dissolved in dilute hydrochloric acid and to the resultant solution was added ammonia solution drop wise until in excess.

(i) State what was observed. (01 mark)

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(ii) Write ionic equation to explain the observation in (b) (i) above. (1½ marks)

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Turn Over

4. 1.5g of a hydrocarbon *M* consists of 1.2g of carbon.

(a) Calculate the empirical formula of *M*. (02 marks)

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(b) 0.125g of hydrocarbon *M* occupies a volume of 100cm³ at room temperature.

(i) Calculate the relative molecular mass of *M*. (1½ marks)

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(ii) Determine the molecular formula of *M*. (1½ marks)

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5. Classify the following oxides as acidic, basic, neutral, amphoteric or mixed oxides.

(05 marks)

Name of oxide

Type of oxide

Sulphur dioxide

.....

Carbon monoxide

.....

Copper(II) oxide

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Aluminium oxide

.....

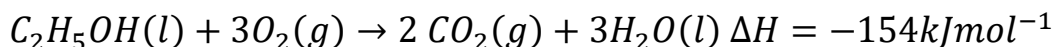
Tri lead tetra oxide

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6. (a) Define the term heat of combustion. (01 mark)

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.....

- (b) Ethanol burns in oxygen according to the following equation.



Calculate the;

- (i) heat evolved when 11.5g of ethanol is reacted with oxygen at stp. (1½ marks)

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.....
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.....

- (ii) volume of carbon dioxide produced at stp. (02 marks)

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7. Electrolysis of 1M sulphuric acid was carried out using zinc cathode and copper anode.

- (a) State what was observed at the anode. (½ mark)

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- (b) Write equations for the reaction that took place at the;

- (i) cathode (1½ marks)

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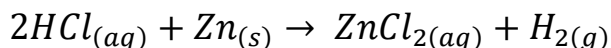
- (ii) anode (1½ marks)

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.....

(c) Write equation for the overall cell reaction. (1½ marks)

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8. Hydrogen is produced in the laboratory according to the following equation:



(a) State **three** ways in which the rate of reaction of hydrogen can be increased. (03 marks)

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.....
.....

(b) Sketch a graph to show how the rate of production of hydrogen varies with time. (2½ marks)

9. (a) (i) Name **one** reagent that can be used to identify iodide ions in the laboratory. (½ mark)

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(ii) State what would be observed when the solution containing iodide ions is treated with the reagent named in (a) (i) above. (½ mark)

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

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.....

(c) Chlorine gas was bubbled through a solution of sodium iodide.

(i) State what was observed. (½ mark)

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.....

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

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.....

10. Polythene is a plastic made of numerous monomers known as ethene.

(a) Write down the structural formula of ethene. (01 mark)

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.....

(b) Name the homologous series to which ethene belongs. (01 mark)

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.....

(c) (i) State how ethene can be tested in the laboratory. (01 mark)

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(ii) State the conditions under which ethanol can be converted to ethene. (1½ marks)

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(iii) Suggest **one** other use of ethene apart from making polythene. (01 mark)

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SECTION B: (30 marks)

*Attempt any **two** questions from this section.*

11. (a) (i) Briefly explain how a pure and dry sample of carbon dioxide can be prepared in the laboratory (diagram not required). (5½ marks)
- (ii) Write the equation for the reaction. (1½ marks)
- (b) State what is observed and write equations where possible when;
- (i) burning magnesium is lowered in a gas jar containing carbon dioxide. (3½ marks)
- (ii) carbon dioxide is bubbled through a solution of calcium hydroxide until excess. (4½ marks)
12. Glucose can be converted into ethanol by a catalytic reaction caused by the enzymes produced by yeast.
- (a) Name;
- (i) the reaction in which yeast converts glucose into ethanol. (01 marks)
- (ii) the enzyme produced by yeast during the above reaction. (01 mark)
- (b) Write the equation for the reaction leading to the formation of ethanol by the process named in a (i). (1½ mark)
- (c) When ethanol was strongly heated together with concentrated sulphuric acid, gas *W* was formed.
- (i) Identify gas *W*. (01 mark)
- (ii) Write equation for the reaction leading to the formation of gas *W*. (01 mark)
- (d) (i) Name **one** reagent that can be used to identify *W* in the laboratory. (01 mark)
- (ii) State what is observed when the reagent is treated with gas *W*. (01 mark)
- (iii) Write equation for the reaction that takes place in (d) (ii) above. (01 mark)

- (e) When treated at high pressure and heat, in the presence of a catalyst, *W* reacts to form a plastic *P* of high molecular mass.
- (i) Identify *P*. (½ mark)
- (ii) Write the equation leading to formation of *P* from *W*. (01 mark)
- (iii) State any **three** uses of *P*. (03 marks)
- (f) Differentiate between thermosetting and the thermo softening plastics. (02 marks)

13. (a) Define the following terms and give **one** example in each case;
- (i) normal salt (02 marks)
- (ii) acid salt (02 marks)
- (b) Mention any **three** methods of preparing salts. (1½ marks)
- (c) Describe how a pure sample of lead(II) chloride can be prepared from lead(II) nitrate. (6½ marks)
- (d) (i) Copper(II) nitrate and zinc nitrate were heated in separate test tubes. State the difference between what was observed. (1½ marks)
- (ii) Write the equation of reaction for the decomposition of zinc nitrate solid. (1½ marks)
14. (a) Define the term rate of chemical reaction. (01 mark)
- (b) State how the following factors affect the rate of chemical reaction.
- (i) temperature (1½ marks)
- (ii) concentration (1½ marks)
- (c) The table below shows the variation in volume of hydrogen evolved with time when dilute sulphuric was reacted with excess magnesium.

Volume of hydrogen (cm^3)	0	20	35	46	56	72	78	78
Time (s)	0	10	20	30	40	60	80	90

Plot a graph of volume of hydrogen evolved against time. (06 marks)

- (d) Use your graph to determine the time taken to collect 65cm^3 of hydrogen gas. (01 mark)
- (e) (i) Draw tangents on your graph at points when the time is 20 and 60 seconds and determine the gradients. (03 mark)
- (ii) Comment on your results in (e) (i) above. (01 mark)

END

