

REGISTRATION CENTRE NUMBER		CENTRE NAME	
<b>CANDIDATE'S FULL NAMES</b>			
CANDIDATE IDENTIFICATION NUMBER	SUBJECT 0515	PAPER NUMBER 2	
FOR OFFICIAL USE ONLY			
<b>CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD ORDINARY LEVEL EXAMINATION</b>			
SUBJECT TITLE <b>CHEMISTRY</b>		SUBJECT CODE <b>0515</b>	PAPER NUMBER <b>2</b>
		EXAMINATION DATE: <b>JUNE 2018</b>	

**Two and a half hours**

Enter the information required in the boxes above.

This paper is arranged in three, A, B and C.

Section A: answer 4 questions out of 5;

Section B: answer 2 question out of 3 and

Section C: answer both questions

In calculations, you are advised to show all the steps in your working, giving your answer at each stage.

Calculators are allowed

You are reminded of the necessity for good English and orderly presentation in your answers.

**USEFUL DATA:**

Relative Atomic Masses

Hydrogen (H) = 1.0

Carbon (C) = 12.0

Oxygen (O) = 16.0

Copper (Cu) = 64.0

1 Faraday = 96000 coulombs.

Molar volume of a gas at r.t.p. = **24000cm<sup>3</sup>**,

Specific heat Capacity of water = 4.2J/g/°C

Avogadro Number = 6.02 x10<sup>23</sup>

0°C = 273K

Turn Over

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Marked by .....	<b>SCORE</b>
Signature of Examiner: ..... Date: .....	
Checked by .....	
Signature: ..... Date: .....	

3-/0515/2/A/Q

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**SECTION A: Answer ALL questions in this sec**

1. Atoms in substances are held together by chemical bonds,

(a) Define a chemical bond

.....  
.....  
.....

**(1 mark)**

(b) Identify the bond type in each of the following. substance

(i) Magnesium chloride .....

(ii) Ammonia .....

(iii) Copper (Cu) .....

**(3 marks)**

(c) Show using diagrams how bonding occurs in magnesium chloride

.....  
.....  
.....  
.....  
.....  
.....

**(3 marks)**

(d) Give two properties of Ammonia and relate each property to the bond type

.....  
.....  
.....  
.....

(e) Which particles in copper are responsible for conducting electricity?

**(2 marks)**

.....

**(1 marks)**

**(Total= 10 marks)**

2. This question concerns Group I and II elements,

(a) Give the general or family name of group I and II elements Group I

.....  
Group II

.....  
**(2 marks)**

(b) List two physical differences between the two groups of elements

.....  
.....  
.....

**(2 marks)**

(c) (i) Give one similarity and one difference between sodium (Na) and magnesium (Mg) in their behaviour towards water.

**Similarity:**

.....  
.....

**Difference:**

.....  
.....

(ii) Write a balanced equation for the reaction which occurs when sodium is added to water

.....  
**(3 marks)**

(d) What type of oxides do elements of group I and II form?

.....  
**(1 mark)**

(e) Lithium (Li) in Group I period 2 resembles magnesium (Mg) in group II, period 3.

Show how Li resembles Mg using two chemical equations.

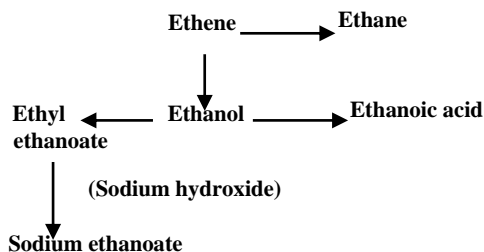
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**(2 marks)**

**(Total= 10marks)**

4

3. This question concerns the following flow diagram



Which one of the compound shown above is a salt

(a)

(1 mark)

(b) Suggest a reagent which could be used to convert

(i) Ethanol to ethene

(ii) Ethanol to Ethylethanoate

(c) (i) Give the reaction conditions necessary to convert ethene to ethane.

(2 marks)

(ii) Write an equation for the reaction

(2 marks)

(d) What is the other product obtained when sodium hydroxide is reacted with ethylethanoate?

(1 mark)

(e) What type of reaction occurs in each of the following changes

(i) Ethanol to ethanoic acid

(ii) Ethene to Ethane

(2 marks)

(f) Ethene is a monomer. Give the polymer formed from ethene, stating the reaction conditions for the polymerisation process

Polymer.....

Conditions.....

(2 marks)

**Total 10 marks)**

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4. The equation A and B below represent two reactions with the energy changes indicated



(a) Define combustion

(1 mark)

(b) (i) What does the symbol  $\Delta H$  above represent?

.....  
.....

(ii) From  $\Delta H$  values, state the type of reaction taking place in each case

Type of reaction A

Type of reaction B

(3 marks)

(c) Represent reaction A on a well-labelled energy diagram.

.....  
.....  
.....  
.....  
.....

(2 marks)

(d) (i) Calculate the heat change if 16g of methanol were completely burnt.

.....  
.....  
.....  
.....  
.....  
.....  
.....

- (ii) The complete combustion of 8g methanol raised the temperature of 500g of water by 40°C. Assuming that no heat was lost determine the heat of combustion of methanol

.....  
.....  
.....  
.....

**(4 marks)**  
**Total 10 marks**

1. This question concerns the industrial production of ammonia and nitric acid

- (a) State the raw materials used in the production of

(i) Ammonia

.....  
**(1 mark)**

(ii) Nitric acid

.....  
**(1 mark)**

- (b) Write equations starting from the raw materials to illustrate the production of nitric acid.

.....  
.....  
.....  
**(3 marks)**

- (c) State the catalyst needed in the production of nitric acid

.....  
.....  
**(1 marks)**

- (d) Pure nitric acid is colourless but often it has a yellowish brown colour Explain

.....  
**(1 marks)**

- (e) Ammonia and nitric acid are used for the production of fertilizers. State a fertilizer produced from

(i) Ammonia

.....  
(ii) Nitric acid

.....  
**(2marks)**

- (f) Why is an all. glass apparatus used in the laboratory preparation of nitric acid?

.....  
**(1 marks)**  
**Total 10 marks**

**SECTION B**

Answer any two questions. All questions carry equal marks. Where appropriate, equations and diagrams should be used to illustrate your answer. Write your answer on the sheets that follow section.

6. Temperature, concentration, surface area and light are factors that affect the rate of chemical reactions using a Suitable example in each case, discuss how each of these factors affects the reaction rate.

**(20 marks)**

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7. Electrolysis is used in the industry to manufacture compounds and to purify elements. Choose one compound and one element and show the application of electrolysis in each case

**(20 marks)**

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8. Write short notes on each of the following;

- (a) Polymerisation
- (b) Cracking
- (c) Isomerism
- (d) Saturated and unsaturated hydrocarbons

**(20 marks)**

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**SECTION C**

**ANSWER ALL QUESTIONS IN THIS SECTION**

9. You are provided with the following laboratory apparatus and reagents: dilute hydrochloric acid 0.05M sodium hydroxide, pipette, burette and phenolphthalein.  
You are required to design an experiment to determine the concentration of dilute hydrochloric acid.

- (i) Sketch the set-up used to determine the concentration of dilute hydrochloric acid indicate clearly the contents of each container

.....

.....

.....

.....

**(4 marks)**

- (ii) Which apparatus is used to transfer 25cm<sup>3</sup> of dilute hydrochloric acid into the conical flask

.....  
**(1 mark)**

(Ni) State the use of phenolphthalein

(1 mark)

(iv) What colour change will occur in the beaker containing phenolphthalein

Initial colour.....

Colour at end point.....

(2 marks)

(v) The following table shows the results obtained by the students

Burette reading	Approximate	First accurate	Second accurate
Final	20cm <sup>3</sup>	16.1cm <sup>3</sup>	15.7cm <sup>3</sup>
Initial	0.0cm <sup>3</sup>	0.0cm <sup>3</sup>	0.0cm <sup>3</sup>
Titre			

From the table above calculate the titre of the acid

(1 mark)

(vi) If 20cm<sup>3</sup> of dilute hydrochloric acid was used for the titration, write the equation of the reaction taking place and calculate the concentration of dilute hydrochloric acid.

.....

.....

.....

(3 marks)

(vii) What type of reaction is this?

.....

(1 mark)

(b) You are given two gases: hydrogen chloride (HCl<sub>(g)</sub>) and carbon dioxide (CO<sub>2(g)</sub>). Draw an experimental set up that could be used to dissolve each of these gases in water.

(HCl<sub>(g)</sub>).....

.....

.....

(2 marks)

CO<sub>2(g)</sub>

.....

.....

(2marks)



- (c) You are provided with the following mixtures: sulphur/iron fillings, Kerosene/water and green pigment of a leaf. State the separating method you would use to separate each mixture

Mixture	Method of separation
Sulphur/iron fillings	
Kerosene/water	
Green pigments of leaves	

(3marks)

Total =20 marks

10. (a) Below is a table of some procedures and observations carried out to analyse compounds A,B,C and D. Read the procedures and observations carefully and draw the necessary and logical conclusion as requested in the questions that follow.

Procedure/observation	Conclusion
(i)-To 2cm <sup>3</sup> of a solution of compound A in a test-tube is added 2cm <sup>3</sup> of AgNO <sub>3(aq)</sub> -A white precipitate is formed	Which ion is present in compound A?
	(1 mark)
(ii) To 2cm <sup>3</sup> of a solution of compound B in a test-tube is added drops of NaOH <sub>(aq)</sub> -A green precipitate formed	Identify the ion present in compound B?
	Write an ionic equation to show the formation of this precipitate
	(2 marks)
(iii)- To 2cm <sup>3</sup> of a solution of compound A in a test-tube is added solid PCl <sub>5</sub> -White fumes of HCl <sub>(g)</sub> are produced	Which functional group is present in compound C
	Give an example of a compound with this functional group
	(2 marks)
(iv) -To 2cm <sup>3</sup> of a solution of compound D in a test-tube is added bromine water -Bromine water is decolorised	Which functional group is present in compound D?
	Give an example of a compound with this functional group
	(2marks)

(b) While carrying out a flame test on a compound W, a bluish flame is observed and on heating W, the compound decomposes producing a brown gas X and another gas Y, that rekindles a glowing splint.

- (i) Which cation in compound W is responsible for the blue flame?
- (ii) Identify gases X and Y

Gas Y.....

Identify compound W

Compound W.....

(iv) Write an equation for the decomposition of W.

.....

**(4 marks)**

(c) Into 3 different test-tubes, A, B and C, containing  $2\text{cm}^3$  of unknown solutions K,L and M.  $2\text{cm}^3$  of acidified  $\text{BaCl}_2$  solution was added into each of the 3 test-tubes.

(i) In test-tube A, a white precipitate is immediately formed

Identify the likely ion present in solution

**(1 mark)**

(ii) In test-tube B an effervescence occurs, producing a colourless gas that decolorises acidified  $\text{KMnO}_4$

Identify the gas evolved and the ion present in solution Describe a simple laboratory test for this gas

Gas evolved

Ion present .....

**(5 marks)**

(iii) In test-tube C, effervescence occurs producing a gas commonly used in fire extinguishers. Describe a simple laboratory test for this gas.

Test.....

.....

**(3 marks)**

**(Total =20 marks)**