Name ..... Adm No..... Class..... No..... Sign .....

NYABURURU GIRLS' NATIONAL SCHOOL

OUR LADY OF LOURDES

Date done	
Invigilator	
Date returned	
Date revised	

233/1
CHEMISTRY PAPER 1
MARCH SERIES 2016
TIME: 2 HOURS

Instructions

- Write your name, Admission number, class and class number
- Answer all questions in the spaces provided

For official use only

Questions	Max Score	Candidate's Score
1 - 24	**80**	

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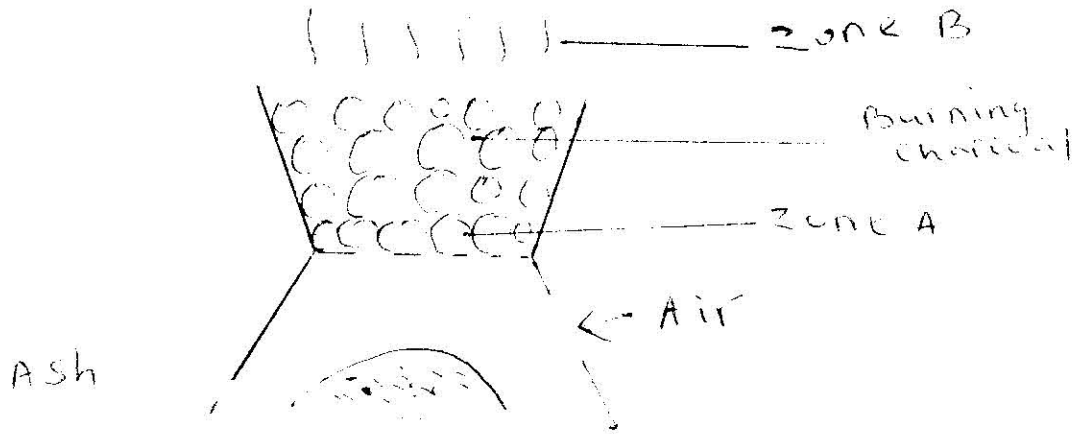
1. The diagram below shows a jiko when in use. Study it and answer the questions that follow.



(a) Identify the gas formed at zone A. (1mk)

A –

(b) State and explain the observation made at zone B. (2mks)

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2. 15.0cm^3 of ethanoic acid (CH3COOH) was dissolved in water to make 500cm^3 of solution. Calculate the concentration of the solution in moles per litre.
(C = 12.0, H = 1.0, O = 16.0)^0, density of ethanoic acid is 1.05g/cm^3). (3mks)

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3. Both chlorine and iodine are halogens.

   (a) What are halogens? (1mk)

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   (b) In terms of structure and bonding, explain why the boiling point of chlorine is lower than that of iodine. (2mks)

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4. a) Distinguish between a deliquescent and a hygroscopic substance. (2mks)

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   (b) Give one use of hygroscopic substances in the laboratory. (1mk)

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5. Draw the structures and give the names of three alkanes having molecular formula C_5H_{10}. (3mks)

6. Aluminium oxide reacts with both acids and bases.

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   .....

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   (b) Give one use of hygroscopic substances in the laboratory. (1mk)

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5. Draw the structures and give the names of three alkanes having molecular formula C_5H_{10}. (3mks)

6. Aluminium oxide reacts with both acids and bases.

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(a) Write an equation for the reaction between aluminium oxide and hydrochloric acid. (1mk)

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(b) Using the equation in (a) above, calculate the number of moles of hydrochloric acid that would react with 15.3g of aluminium oxide (Al=27, O=16) (2mks)

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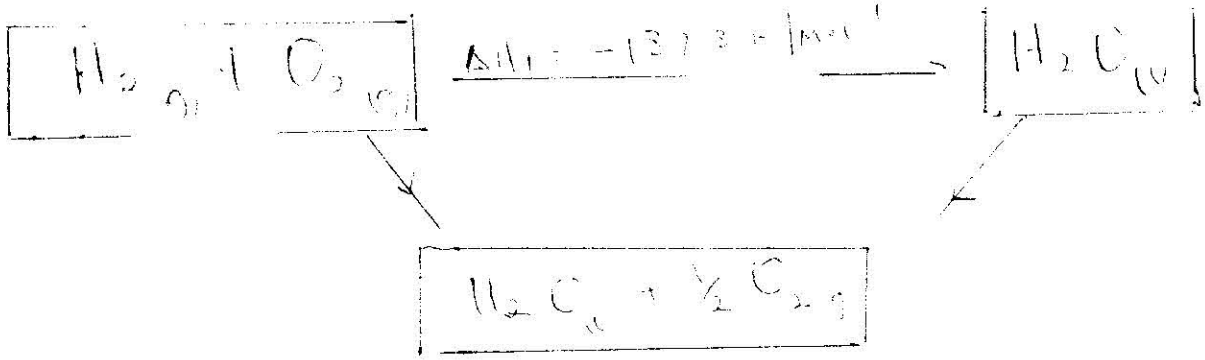
7. The figure below shows an energy cycle.



(a) Give the name of the enthalpy change ΔH_1 (1mk)

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(b) Determine the value of ΔH_3. (2mks)

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8. Hydrogen sulphide is a highly toxic and flammable gas. It is normally prepared in a fume chamber.

   (a) Name two reagents of hydrogen sulphide is to produce sulphur as shown.

   (i) 1mk

   (ii) 1mk

   (b) One of the uses of hydrogen sulphide is to produce sulphur as shown.

   $2H2S_{(q)} + SO2_{(q)} \longrightarrow 3\ S_{(s)} + 2H_2O_{(1)}$

   Identify the reducing agent in this reaction and give a reason for your answer.(2mks)

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9. Explain why the following substances conduct an electric current.

   (a) Magnesium metal (1mk)

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   (b) Molten magnesium chloride (1mk)

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10. A sample of river water is suspected to contain zinc and sulphate ions. Describe how the presence of zinc ions and sulphate ions can be established. (3mks)

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11. The table below gives the number of electrons, protons and neutrons in substances X, Y and Z. Study it and answer the questions that follow.

Substance	Electrons	Protons	Neutrons
X	10	10	10
Y	10	8	10
Z	8	8	8

(a) Which letter represents an ion. (1mk)

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(b) Which of the substances is an isotope? Give a reason. (2mks)

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12. (a) State Gay Lussac's law. (1mk)

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(b) $10cm^3$ of a gaseous hydrocarbon, C_2H_x required $30cm^3$ of oxygen for complete combustion. If steam and $20cm^3$ of carbon (IV) oxide were produced, what is the value of X? (2mks)

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13. Soap dissolves in water according to the equation below.

$NaSt(q) \longrightarrow Na^+(aq) + St^-(aq)$ where St- is the stearate ion.

(a) Write the formula of the scum formed when soap is used in hard water. (1mk)

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(b) Write the ionic equation for the reaction that occurs when sodium carbonate is used to remove hardness in water. (1mk)

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14. Nitrogen oxide gas is prepared in the laboratory by adding copper metal to concentrated nitric (V) acid.

A) Describe three observations you could makefor this reaction 3mks

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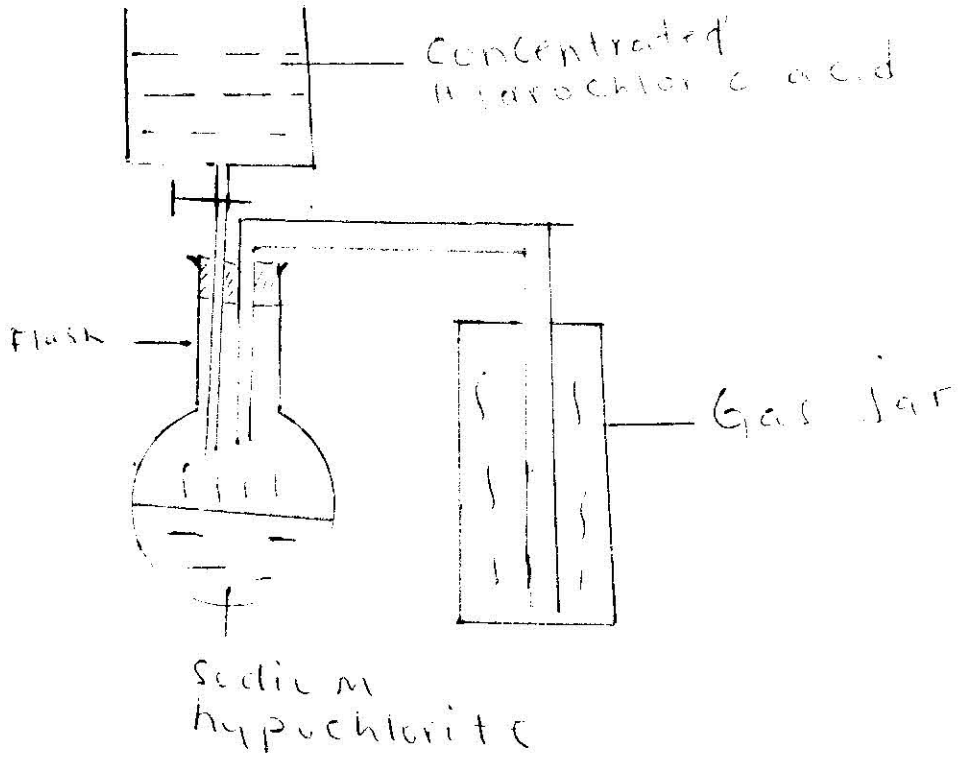
b) why must this reactionbe carried out in the chamber? 1mk

.....

C Complete and balancethe chemical equationfor the reaxtion betweencopper metal and concentrated nitric acid 1mk

$Cu + HNO_3 \longrightarrow$

15. Chlorine gas can be made in the laboratory by the reaction of concentrated hydrochloric acid with sodium hypochlorite, NaOCl. The figure below shows how the preparation of chlorine can be carried out.



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(a) What is the colour of chlorine (gas). (1mk)

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(b) Another product of this reaction of NaCl. What is the chemical name of NaCl? 1mk

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(c) Explain why chlorine gas can be collected in the way shown in the diagram rather than over water. (2mks)

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(d) When NaCl is reacted with concentrated sulphuric (VI) acid. hydrogen chloride gas is formed. Write a balanced chemical equation for this reaction. (1mk)

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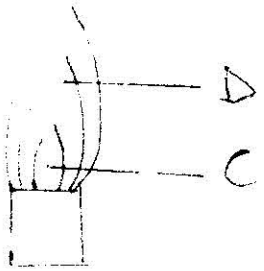
16. The diagram below shows a bunsen burner when in use.



a) Name the regions labeled C and D 2mks

.....C.....

.....D.....

17. When a student was stung by a bee, a teacher applied an aqueous solution of ammonia to the affected area of the skin and the student was relieved of pain. Explain. (2mks)

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18. In an experiment a few drops of concentrated nitric acid were added to aqueous iron (II) sulphate in a test tube. Excess sodium hydroxide solution was then added to the mixture made when:

(i) Concentrated nitric acid was added to aqueous iron (II) sulphate. (1mk)

.....

(ii) Excess sodium hydroxide was added to the mixture. (1mk)

.....

(iii) Write an ionic equation for the reaction in a (ii) above. (1mk)

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(i) What type of physical changes are taking place at H and W. (1mks)

(ii) .....

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(iii) What are the physical states of the substance at Y and K? (2mks)

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(iv) Using the Kinetic theory of matter, explain what happens to substance between points A and C. (2mks)

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(v) In the same axes above, draw the heating curve of an impure substance using dashes. (2mks)

21. Elements A, B and C have the following electronic arrangements.

A. 3:2:2 B. 2:8:2 C. 2,8.2

(a) Are the elements metals or non-metals? Explain. (2mks)

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(b) Give the formula of the compounds formed when B reacts with chlorine. (1mk)

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(c) Give the formula of the oxide of C and state its nature. (1mks)

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22. Describe and give a result of a chemical test to show that magnesium sulphate contains sulphate ions.

Test:.....

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(2mks)

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19. The grid below is part of the periodic table. Use it to answer the questions that follow. (The letters are not the actual symbols of the elements)

				A			C	
D			E	F			G	
							H	

(a) Which is the most reactive non-metal in the table above? Explain. (2mks)

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(b) (i) Write the formula of the compound formed when A reacts with element B. (1mk)

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(ii) Name the bond type in the compound formed in b(i) above. (1mk)

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(c) (i) What is the name given to the group of elements where G and H belong? (1mk)

(d) .....

(ii) Write an equation for the reaction that occurs when C in gaseous form is passed through a solution containing ions of element H. (1mk)

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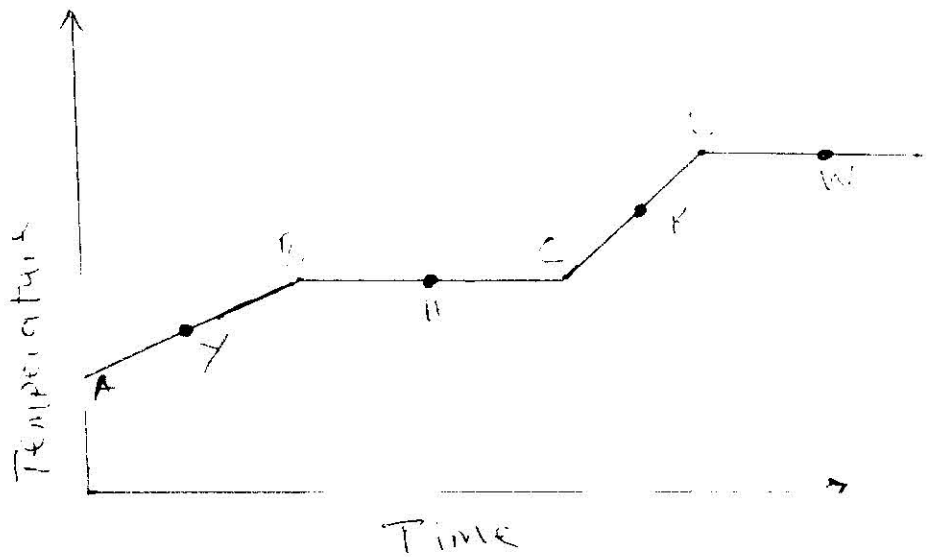
20. The diagram below shows the heating curve of a pure substance. Study it and answer the questions that follow.



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Result:

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. (1mk)

23. Lithium, sodium and potassium are group 1 elements. Group 1 elements become more reactive down the group. Explain why in terms of electronic structure. (2mks)

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24. (a) According to Arrhenius, acids are chemicals that produce hydrogen ions in aqueous solution. Complete the following equation to show why ethanoic acid (CH3COOH) is an acid in aqueous solution.

CH3COOH(aq) $\xrightleftharpoons{\text{water}}$ .....(aq) + ...(aq) (1mk)

(b) Explain the meaning of weak acid in terms of ionization. (1mk)

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