Name …….. Index No…….. Sign……

545/2
CHEMISTRY
PAPER 2
2HOURS

UGANDA CERTIFICATE OF EDUCATION
INTERNAL MOCKS
545/2 CHEMISTRY PAPER 2
TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES

- Section A consists of 10 structured questions. Answer all the questions in this section.
- Answers to questions in section A must be filled in the spaces provided. And those for section B consists of 4 semi-structured questions. Answers to the questions must be written on the answer sheets provided.
- In both sections all working must be clearly shown below
  (Where necessary use H =1, C=12, O =16, Na = 23, Ca =40, Cl =35.5)
  1 mole of a gas occupies 24L at room temperature
  1 mole of a gas occupies 22.4L s.t.p)

FOR EXAMINER'S ONLY

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

Turn over

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1. a) State what would be observed of to aqueous Lead(II)nitrate was added to: -

(i) Dilute sulphuric acid (1mk)

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(ii) Potassium iodide solutions (1mk)

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b) Write ionic equation for the reaction in ; (1 ½ mk)

(i) (a) (i)

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(ii) (a) (ii) (1 ½ mk)

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2.a) Carbon dioxide can best be prepared by reacting calcium carbonate with dilute hydrochloric acid. The reaction proceeds according to the following equation

$CaCO_{3(s)} + 2HCl_{(aq)} \longrightarrow CaCl_{2(aq)} + CO_{2(g)} + H_2O_{(l)}$

(i) Give a reason why sulphuric acid is not normally used instead of hydrochloric acid.

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(ii) Calculate the mass of calcium carbonate that would liberate 0.25dm^3 of carbon dioxide at room temperature [Ca =40, C = 12, 0 =16, I mole of a gas occupies 24dm^3 at room temperature]

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b) Carbon dioxide was bubbled through calcium hydroxide solution a long time. State what was observed. (3mks)

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3.a) Glucose, $C_6H_{12}0_6$, in the presence of an enzyme undergoes fermentation to form ethanol.

(i) Write equation for the fermentation of glucose (1 ½ mks)

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(ii) Name the enzyme used in the fermentation process (1mk)

……

b) Ethanol burns in oxygen according to the following equation

$C_2H_50H_{(e)} + 3\ 0_{2(g)} \longrightarrow 2\ C0_{2(g)} + 3\ H_20_{(e)}$ + heat.

When 15.07g ethanol was completely burnt in oxygen; 466.50kJ of heat was liberated. Calculate the heat if combustion of ethanol (5mks)

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Name …….. Index No…….. Sign……

4.a) An aqueous solution of copper(II) sulphate was electrolyzed between graphite electrodes.

(i) State what was observed at the cathode (1mk)

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(ii) Write equation for the reaction that took place at the anode (1 ½ mks)

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b) The solution that remained after electrolysis in (a) was tested with litmus solution

(i) State what was observed (½ mk)

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(ii) Give a reason for your answer in (b) (i) (1mk)

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c) The electrolysis in(a) was repeated using copper electrodes that had been weighed before the experiment. State the change in mass of the electrode that took place after the electrolysis. (1mk)

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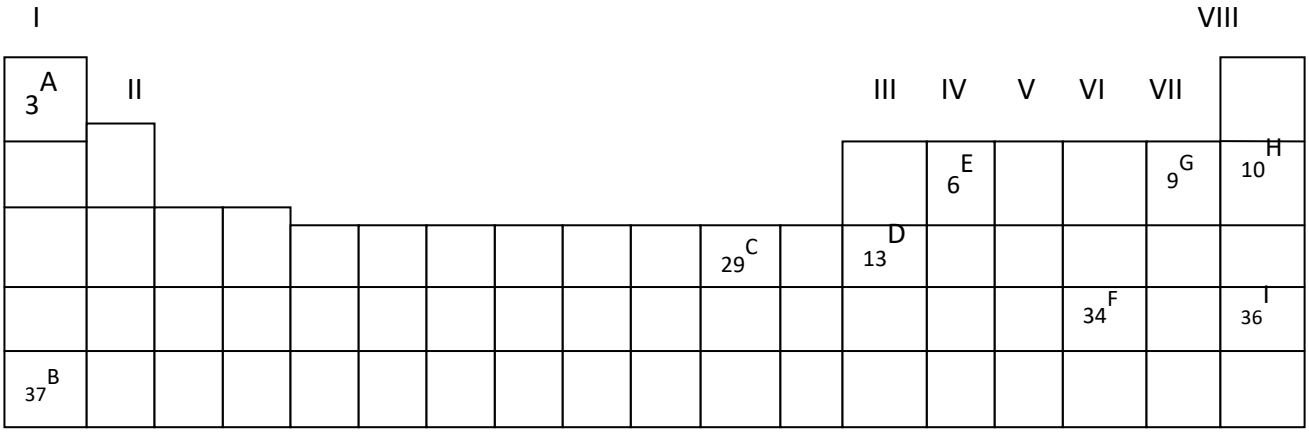
5) The atomic numbers and the positions of the elements A, B, C, D, E, F, G, H and I in the periodic table are shown below: The letters are not the normal symbols of the elements.



a) Which one of the elements is a noble (an inert) gas? (½mk)

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……

b) What name is given to the elements in the group to which G belong? (½mk)

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……

c) Which element is likely to: -

(i) React most violently with chlorine? (½mk)

……

……

(ii) Form a coloured compound ? (½mk)

……

……

d) Write the formula of the: -

(i) Nitrade of element D (½mk)

……

……

(ii) Compound formed between element F and sodium (1mk)

……

……

e) State the type of bond that would exist in the oxide of element E (1mk)

……

……

6. When aqueous ammonia was added drop wise to a solution containing Zinc sulphate, a white precipitate R was formed. R dissolved in excess aqueous ammonia to form a colourless solution.

a) Write;

(i) An ionic equation for the reaction leading to the formation of R (1½mks)

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(ii) The formula of the cation present in the colourless solution (1mk)

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b) (i) Name a reagent that can be used to identify the sulphate ions in solution (1mk)

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(iii) State what would be observed when the reagent you have named in b)(i) is used (1mk)

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7.a) A compound Y contains 52.17% carbon, 13.04% hydrogen and 34.78% oxygen . The relative molecular mass of Y is 46. Determine the:

(i) Empirical formula of Y (3mks)

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(ii) Molecular formula of Y

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b) When Y was heated with excess concentrated sulphuric acid, a colourless gas Z, which turned bromine water colourless was evolved.

Identify

(i) Y (1mk)

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(ii) Z (1mk)

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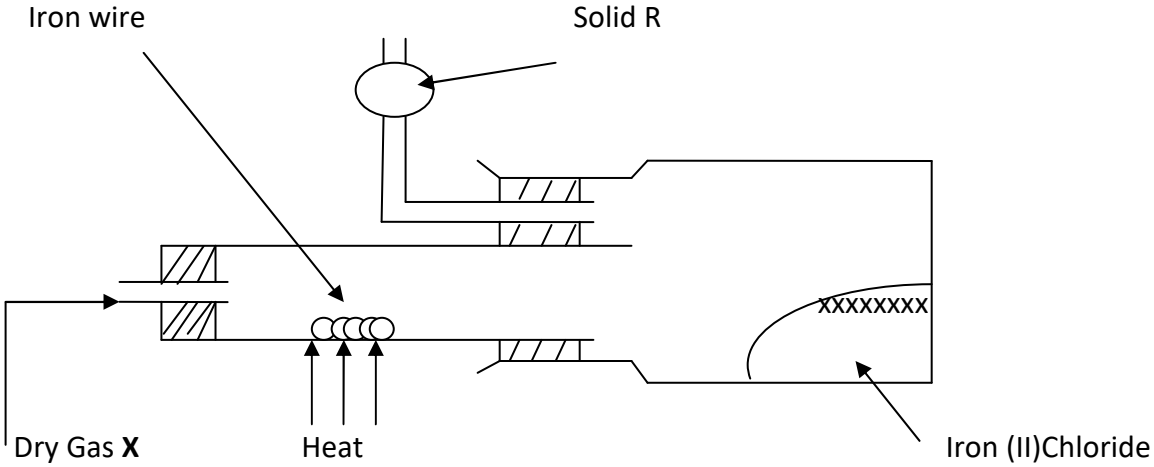
8. Anhydrous iron(III) chloride was prepared using the set up of the apparatus in the figure below:



a) Identify: -

(i) X …… (½mk)

(ii) R…… (1mk)

b) Write equation for the reaction leading to the formation of Iron(III)chloride (1½mks)

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(ii) Name the method of salt preparation exhibited in the above experiment (½mk)

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c) (i) State what would be observed if Iron(III) chloride is exposed to air (1mk)

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(iii) Give a reason for your answer in (c)(i) above (½mk)

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9.a) The atomic numbers of carbon and oxygen are 6 and 8 respectively. Draw a diagram to show the electronic structure of : - (½mk)

(i) Carbon

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(ii) Oxygen atom

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b) (i) Using dot and cross to represent outermost electrons; show how carbon and oxygen atoms may bond together to form a compound (3mks)

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(ii) Would the compound formed in (b)(i) above conduct electricity or not . Give reason for your answer?

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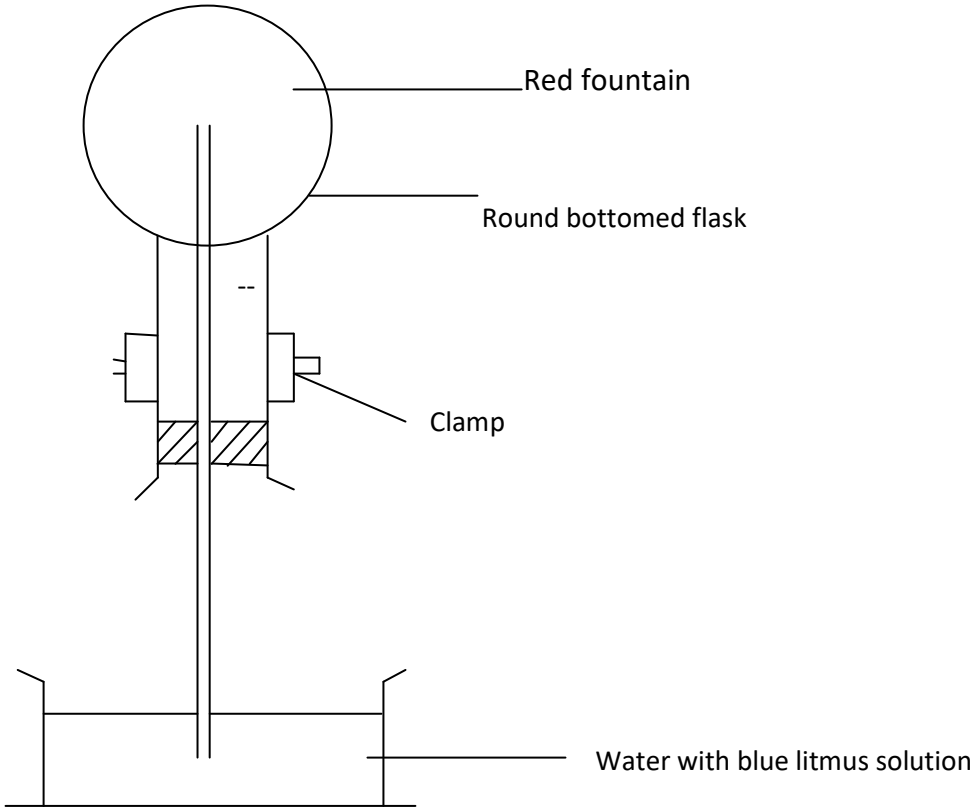
10. Below is a diagram of a fountain produced when around bottomed flask filled with hydrogen chloride gas is inverted over water in a water trough as shown.



(i) Explain how the red fountain forms (3mks)

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(ii) Show the effect of atmospheric pressure using arrows appropriately (1mk)

……

(iii) Name two other gases that may be used to produce the fountain as shown (1mk)

……

……

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SECTION B (*attempt any two questions from this section*)

11.a) Describe how a dry sample of ammonia can be prepared in the laboratory. Use a diagram to illustrate. (6mks)

b) Name a reagent that can be used to test for ammonia and state what would be observed if ammonia is tested with the reagent. (2mks)

c) (i) Draw a labeled diagram of the set up of the apparatus that can be used to show that ammonia can burn in oxygen.

(ii) Write an equation for the combustion of ammonia in oxygen. (1½mks)

d) Dry ammonia was passed over heated copper(II) oxide

(i) State what was observed (1mk)

(ii) Write an equation for the reaction (1½mks)

12. In the extraction of cast iron using a blast furnace, haematite ore which contains some impurities, is first roasted in air. It is then mixed with some other substances and finally introduced into the blast furnace. Cast iron can be obtained from haematite iron ore.

a) Name the major impurity in the iron ore and formula of haematite (1mk)

b) During the extraction of iron, limestone and coke are added into the blast furnace. Explain the role of:-

(i) Coke (5mks)

(ii) Lime stone (4mks)

(Use equations to illustrate your answers)

c) Write equation for the reaction leading to the formation of iron(II) sulphate (2mks)

d) Iron (II)sulphate was heated strongly (1½mks)

(i) State what was observed (1½mks)

(ii) Write equation for the reaction (1½mks)

13.a) Define the term enthalpy of neutralization (1mk)

b) Describe an experiment you would carryout to determine the enthalpy of neutralization of sodium hydroxide solution by hydrochloric acid. (8mks)

c) 50cm^3 of 1M sodium hydroxide solution were placed in a plastic beaker and 5cm^3 portions of hydrochloric acid were added from the burette. The mixture was stirred after each addition and maximum temperature measured was recorded.

The results are shown below: - initial average temperature of both solutions T_1 was 26.50^oC. Specimen results.

Volume of HCL added/cm^3	5	10	15	20	25	30	35	40	45	50
Highest temperature, T_2/^oC	29.1	30.1	31.1	32.1	33.1	34.1	34.4	33.8	33.3	32.8
Temperature rise ($T_2 - T_1$)^oC										

Questions

a) Plot a graph of temperature rise against volume of hydrochloric acid added.

b) (i) Determine the volume of hydrochloric acid needed to reach end point
(iii) Calculate the morality of the hydrochloric acid

c) Calculate the enthalpy of neutralization of the hydrochloric acid.

14.a) (i) Differentiate between an amphoteric oxide and basic oxide (2mks)

(ii) Give an example in each case above (1mk)

Study the flow chart below and answer the questions that follow

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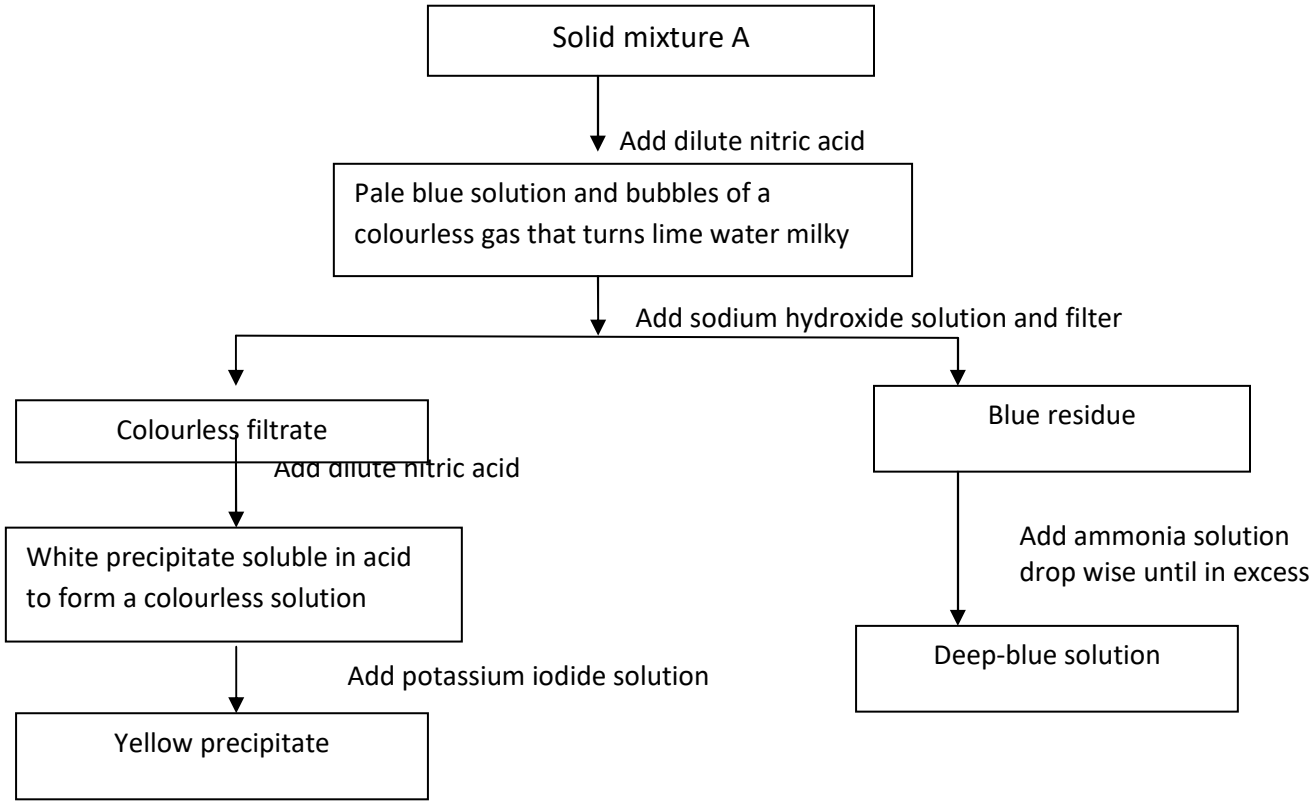

b) Identify

(i) The common anion in the solid mixture A (½mk)

(ii) Cation in the filtrate (½mk)

(iii) Cation in the residue (½mk)

c) Write the ionic equation leading to the formation of the: -

(i) Blue residue (1½mks)

(ii) Yellow precipitate (1½mks)

d) Identify the ion responsible for the deep blue solution (½mk)

e) Describe how a pure dry sample of copper(II)sulphate crystals can be prepared in the laboratory starting from copper(II)oxide (7mks)

END