THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

032/1 **CHEMISTRY 1**

(For Both School and Private Candidates)

Time: 3 Hours **Thursday, 11th October 2012 p.m.**

Instructions

1. This paper consists of sections A, B and C.

2. Answer **all** questions in this paper.

3. Calculators and cellular phones are **not** allowed in the examination room.

4. Write your **Examination Number** on every page of your answer booklet(s).

5. The following constants may be used.

   Atomic masses:

   H = 1, C = 12, O = 16, N = 14, Na = 23, Mg = 24, Al = 26,

   S = 32, Cl = 35.5, Ca = 40, Mn = 55, Fe = 56, Cu = 64.

   Avogadro's number = 6.02×10^{23}.

   GMV at s.t.p. = 22.4 dm^3.

   1 Faraday = 96,500 coulombs.

   Standard pressure = 760 mm Hg.

   Standard temperature = 273 K.

   1 litre = 1 dm^3 = 1000 cm^3.

SECTION A (20 Marks)

Answer **all** questions in this section.

1. For each of the items (i) – (x), choose the correct answer from the given alternatives and write its letter beside the item number in the answer booklet provided.

(i) Which one of the following sets of laboratory apparatus are used for measure volume?

A Crucible, U-tube and volumetric flask
B Test tubes, beakers and glass jar
C Thistle funnel, separating funnel and beaker
D Burette, pipette and measuring cylinder
E Conical flask, test tube and measuring cylinder.

(ii) The empirical formula of certain compound in CH_3. Its molar mass is 30 g. What will be its molecular formular?

A CH_4 B C_2H_4 C C_2H_6
D C_2H_8 D C_4H_{12}

(iii) In order to produce the greatest amount of hydrogen in a short time, one gram of magnesium ribbon should react with

A 10 cm^3 of 0.5 M sulphuric acid
B 40 cm^3 of 0.5 M acetic acid solution
C 40 cm^3 of 0.5 M sulphuric acid solution
D 20 cm^3 of 1 M sulphuric acid solution
E 20 cm^3 of 1 M acetic acid solution.

(iv) Fractional distillation process of a mixture of water and ethanol is possible because

A water and ethanol have the same boiling point
B water has lower boiling point than ethanol
C ethanol has lower boiling point than water
D water and ethanol form partially immiscible liquid solution
E water and ethanol are immiscible liquids.

(v) Which of the following substances represent a group of acidic oxides?

A Carbon dioxide, carbon monoxide and sulphur dioxide
B Sulphur trioxide, nitrogen dioxide and nnitrogen monoxide
C Carbon dioxide, sulphur dioxide and dinitrogen oxide
D Sulphur trioxide, carbon dioxide and nitrogen dioxide
E Carbon monoxide, nitrogen oxide and sulphur dioxide.

(vi) What will the molarity of a solution which contains 26.5 g of anhydrous sodium carbonate in 5 dm^3 of solution?

A 0.05 M B 0.25 M C 5.30 M
B 0.025 M E 0.50 M

(vii) The Brownian movement is taken to be the evidence of the:

A theory of association of water molecules
B theory of ionization of electrolytes
C theory of colloidal suspensions
D kinetic theory of behavior of substances
E Brownian theory.

(viii) One off the isotopes of an element X has an atomic number Z and a mass number A. What is the number of neutrons contained in the nucleus of the element X?

A Z B A C A + Z
D A – Z E Z – A

(ix) C_2H_4Cl can be represented in different structures which are called

A homologous series B isomers
C structural formulae D identical structures
E condensed structures.

(x) _____ is the general term used to explain a mixture of different metals.

A Alloy B Allotrope C Amphoteric
D Amorphous E Isotope.

2. Match the items in **List A** with the responses in **List B** by writing the letter of the correct response beside the item number in the answer booklet provided.

List A	**List B**
(i) Its hydride is the only alkaline gas. (ii) Possesses 11 electrons. (iii) Most electronegative element. (iv) Extracted by Frasch process. (v) A noble gas. (vi) Exists in oxidation state of +3 in haematite. (vii) Least reactive metal in the reactivity series of metals. (viii) A non metal which is a good conductor of heat and electricity. (ix) Vital for all living things (x) Its oxide is yellow when hot and white when cold.	A Sodium B Aluminum C Iron D Gold E Oxygen F Flourine G Sulphur H Argon J Ozone I Iodine K Mercury L Chlorine M Magnesium N Calcium O Nitrogen P Carbon Q Lithium R Potassium S Hydrogen T Zinc

SECTION B (54 Marks)

Answer **all** questions in section.

3. (a) With the help of chemical equation, what will be observed when ammonia reacts with
   (i) Hydrogen chloride.
   (ii) Copper (II) oxide.

   (b) It is not advisable to sleep inside a house which is not well ventilated with a burning wooden charcoal. Give a reason for that and write the chemical equation to represent your answer.

4. Study the following part of the periodic table and then answer the questions that follow.
Note: The letters used are not scientific symbols for the elements concerned.

Group

I							O
	II	III	IV	V	VI	VII	
						N	
	K				Q		P
L							

   (a) Identify and write down the electronic configuration for the elements K, N, P and L.

   (b) What type of bond will exist in a compound formed when Q combines with L? Write the chemical formula for the compound formed and list two chemical properties for the compound formed.

5. (a) A solution of sodium hydroxide was electrolysed using platinum electrodes. Write the reactions which took place at the electrodes and give a reason why the solution becomes alkaline.

   (b) Electric current was passed through a solution of sodium hydroxide using platinum electrodes. Draw a labelled electrolytic cell for this electrolysis. Indicate the directions of the movement of ions.

6. (a) Give the name of the process of making coke from coal. Write one characteristic which make coke a better fuel than coal.

   (b) (i) State the difference between physical strength and chemical strength of metals.
   (ii) Giving example, explain why preparation of metallic oxides by direct method is not intensively used.

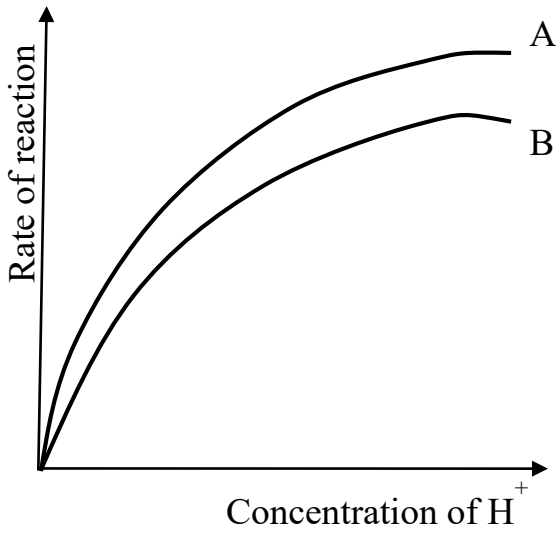
7. (a) (i) People suffering from heart burn usually use wood ashes for relief. Mention characteristic which makes the ashes to be used for heart burn relief.
   (ii) Give four compounds found in laboratories which show the same characteristics as ashes.

   (b) How many molecules are there in 11.2 litres of carbon dioxide at STP?

8. (a) (i) Name the products formed when nitrates of potassium and zinc decompose by heat.
(ii) Suggest why the nitrates of zinc and potassium behave differently on heating.

(b) Mention two uses of sodium nitrate.

9. Two experiments were carried out using the same mass of magnesium ribbon and the same volume of acids of the same concentration. The acids were 1M hydrochloric acid and 1M ethanoic acid. The results were as shown in the following figure:



(a) If the experiments were conducted within the same time, is there a difference in volumes of hydrogen gas collected at the same room temperature and pressure? Give reasons for your answer.

(b) When same mass, volume and concentration of powdered magnesium and ethanoic acid are allowed to react, new graph is formed. Giving reason (s), suggest the position of that graph whether will be above, between or below graphs A and B.

10. (a) (i) Name three gases which should not be produced in order to prevent the destruction of ozone layer.
(ii) List and explain three effects of ozone layer depletion.

(b) Lack of safe water for domestic and industrial uses is a serious problem in most of Tanzanian towns. The major cause of this problem is pollution in the water sources. Slate three methods that could make water from a pond or a well be safe for drinking.

11. (a) The chemical properties of concentrated sulphuric acid can be grouped into oxidizing property and dehydrating property. In which property should sulphuric acid be grouped when it reacts with copper metal? Give reason and write the equation of the reaction.

(b) The preparation of chlorine gas can be represented by the following equation:
$MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$. Calculate the number of moles of HCl which are needed to react with 20 g of MnO_2 and list two main chemical properties of chlorine gas.

SECTION C (26 Marks)

Answer **all** questions in this section.

12. Consider a four carbon hydrocarbon (C_4H_n), where n is an integer. Give the name of homologous series, molecular formula and structural formula for different isomers of the compound formed by each homologous. In each case indicate the causes of isomerism.

13. Describe four common stages for the extraction of metals. Does the extraction of gold follow all four stages? Give reasons.