

THE UNITED REPUBLIC OF TANZANIA
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
FORM FOUR SERIES No. 06
CHEMISTRY 1

TIME 3 HRS

YEAR; 2024

INSTRUCTIONS

- This paper consists of section **A, B** and **C** with total number of **eleven (11)** questions.
- Answer all questions in the space provided
- All writing must be in **black** or **blue** pen except for diagrams which must be in **pencil**.
- Write your **examination number** at the top right corner of every page
- The following atomic masses may be used; H = 1, O = 16, S = 32, Cl = 35.5, Na = 23, C = 12, Ag = 108, N = 14

SECTION A (16 Marks)

Answer **all** questions from this section

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

(i) Mr. Mbuga wanted to transfer some chemicals from the Winchester bottles to smaller bottles for his student to do an experiment. The smaller bottle are called _____

- A. Sroring bottle
- B. Reagent bottles
- C. Winchester bottles
- D. Beakers
- E. Chemical bottles

(ii) Scientist, engineers, doctors and geologist apply a method in solving scientific problem. This method is called _____

- A. Project work
- B. Data recording
- C. Data collection
- D. scientific procedures
- E. Experimentation

(iii) Msaki boiled some tea, but he didn't have a sieve. The alternative method he could use to separate the tea levels from the liquid tea is _____

- A. Layer separation
- B. Decantation
- C. Evaporation
- D. Fractional distillation
- E. All of the above

(iv) Kitchen tools made steel are enabled in order to _____

- A. Make them shiny
- B. Make them look expensive
- C. Make them easy to see
- D. Make them look cheap
- E. All of the above

(v) A very hot flame from welding machines is produced by burning two gases namely

- A. Krypton and neon
- B. Nitrogen and neon
- C. Ethylene and oxygen
- D. Neon and hydrogen
- E. Oxygen and hydrogen

(vi) The collision theory state that a chemical reaction can only take place when particle _____

- A. Collide
- B. Bond
- C. Break up
- D. Are in gaseous form
- E. All of the above

vii) An acid liquid when treated with copper, gave a colorless gas which turned brown. When treated with marble chips, it save carbon dioxide. The acid liquid was;

- A. Concentrated nitric acid
- B. Dilute nitric acid
- C. Dilute suphuric acid
- D. Concentrated sulphuric acid

E. Dilute hydrochloric acid

viii) _____ Are a family of organic compounds which have some or all of the hydrogen atoms in the hydrocarbons replaced with halogen atoms. These compounds are source of chlorine and bromine atoms which contribute to the depletion of the ozone layer.

- A. Alkenes
- B. Halides
- C. Esters
- D. Halons
- E. Halogens

ix) Half a gram of hydrogen gas is exploited in air to produce water. The mass of water formed is

- A. 1.8g
- B. 0.75g
- C. 4.0g
- D. 18g
- E. 4.2g

x) In the electrolysis, the equivalent weight of an element is the mass of the element liberated by _____

- A. 1 Coulomb of electricity
- B. 96500Coulomb of electricity
- C. 2Coulombs of electricity
- D. Electricity process
- E. 9650 Coulombs of electricity

2. Match the items in list A with their corresponding answer in list. B

LIST A	LIST B
i) $\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3 - \text{C} - \text{CH}_2 - \text{CH}_3 \\ \\ \text{CH}_3 \end{array}$	A. Propane
ii) $\text{CH}_3 - \text{CH}_2 - \text{CH}_3$	B. 2-ethylbutane
iii) $\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{CH}_3 \\ \\ \text{C}_2\text{H}_5 \end{array}$	C. 3-methylpentane
iv) $\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3 - (\text{CH}_2)_3 - \text{C} - \text{CH}_3 \\ \\ \text{CH}_3 \end{array}$	D. 2,2-dimethylbutane
v) $\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3 - \text{CH} - \text{C} - \text{CH}_3 \\ \quad \\ \text{CH}_3 \quad \text{H} \end{array}$	E. 2,3-dimethylbutane
vi) $\text{CHCl} - \text{CHCl} - \text{CHCl}_2$	F. 2,2-dimethylhexane
	G. 2,2,2-trimethylbutane
	H. 1,1,2,3-tetrachloropropane
	I. 1,2,3,3-tetrachloropropane

SECTION B (54 Marks)

Answer **all** questions in this section

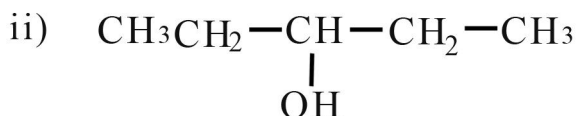
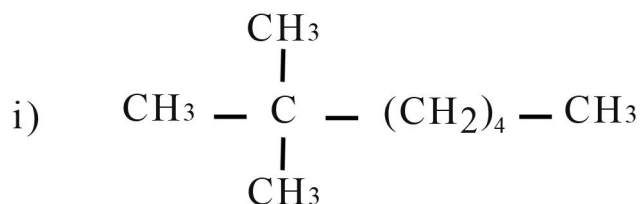
3. (a) A solution of hydrated sodium carbonate was titrated with 1.68m³ nitric acid solution. 30cm³ of the solution. Required 28.75cm³ of the nitric acid for a complete reaction. If the solution was prepared by dissolving 12.056g of the carbonate to make 600cm³ of solution, determine the molecules of the water of crystallization in the hydrated sodium carbonate.

b) To what volume must 300 cm³ of 0.60m sodium hydroxide solution be diluted to give a solution with a concentration of 0.005M?

4.(a) Using balanced chemical equation show how;

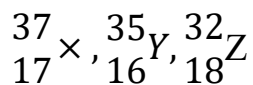
- i) Methane undergoes complete chlorination in the presence of sunlight
- ii) Ethane undergoes addition hydrogen chloride
- iii) Ethanol reacts with sulphuric acid at 180°C

(b) Give the systematic (IUPAC) names of the following compounds;



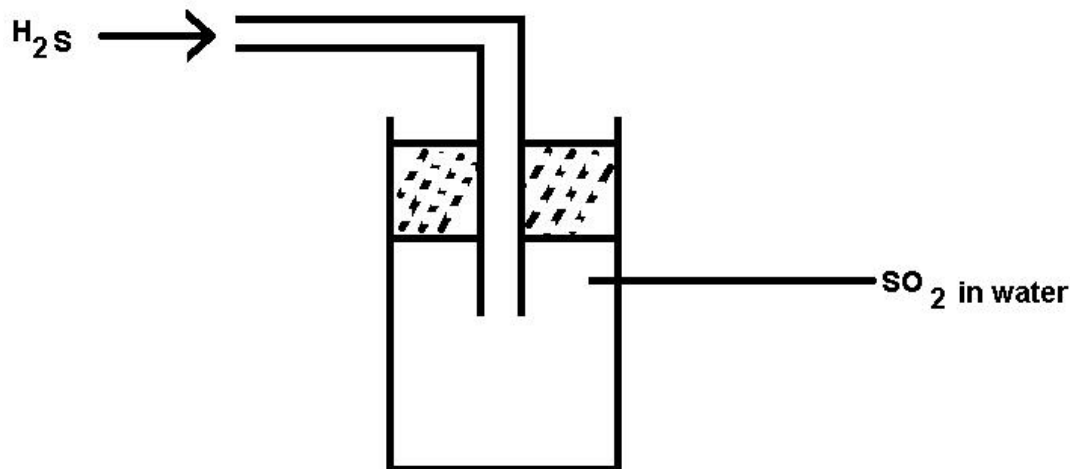
5.(a) Explain why graphite can be used as an electrode as well as lubricant but diamond can not

(b) You are provided with a list of four atoms whose mass and atomic numbers have been indicated



- (i) What is the number of the protons in x?
- (ii) What is the number of the neutron in Y?

6. The set-up shown below was used to investigate a certain property of SO_2 gas. Study it and answer the questions that follow.



- What observation is made in the gas jar?
- Write down an equation for the reaction that takes place in the jar?
- What property of SO_2 was being investigated?

7. (a) Ammonia is manufactured in the Haber process by reacting hydrogen and nitrogen accordingly to the following equation.



A volume of 1120 liters of ammonia gas was collected at S.T.P. Calculate the volume of hydrogen gas used. (Molar gas volume at S.T.P.= 22.4dm^3)

(b) 4.5 of an oxide of iron was completely reduced by heating it in carbon. If 3.15g of iron was produced, determine the empirical formula of the oxide.

8. In an experiment to purify impure silver metal, a strip of impure silver of mass 3.45g was used as the anode. The cathode was made up a strip of pure silver of mass 6.45g. after the electrolysis the cathode was found to weight 9.66g

(a) Calculate the number of the coulomb of electrolysis passed

(b) What is the % purity of the impure silver?

SECTION C (30 Marks)

Answer **any two** questions in this section

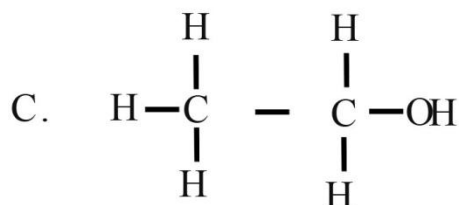
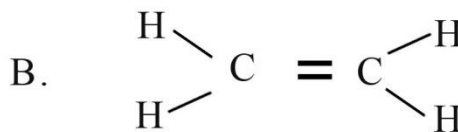
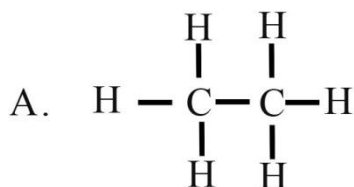
9. (a) Group the following plants nutrients into macronutrients and micronutrients.

S,Zn, Mo,N,Cl,P,Co,K,Ca.

(b)A certain sol requires 40kg of nitrogen per hectare in order to meet the plants nitrogen requirement. Calculate the quantity in Kg per hectare of ammonium sulphate fertilizer that must be applied on the piece of land.

10.(a) Write the structural formula of all possible isomers of hydrocarbons whose molecular formula is C_4H_{10} and give their IUPAC names.

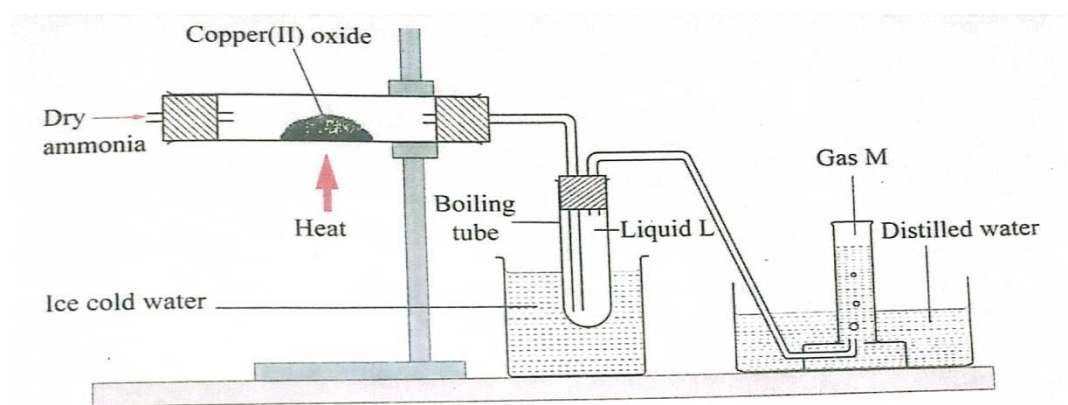
(b) The following are the some organic compound



- (i) Give the IUPAC names of each of the compound
- (ii) Describe a chemical test can be used to distinguish compound A from B

(c) Write the open structure of glucose

11. The figure below shows a set up that can be used to prepare a certain gas in the laboratory



- (i) Identify M
- (ii) Write an equation to show the formation of the gas M
- (iii) Explain why the gas is not collected over water.
- (iv) Describe the chemical test that can be used to confirm the presence of gas M.
- (v) With the aid of chemical equation, explain what would happen when a dry samples of gas M is passed over heated copper (II) oxide.

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