PERAMIHO GIRLS' SECONDARY SCHOOL
FORM TWO MONTHLY TEST
032 **CHEMISTRY**
TIME: 2:30 HOURS **AUGUST, 2023**

INSTRUCTIONS

1. This paper consists of **ten (10)** questions in sections **A, B** and **C.**
2. Answer **all** questions in **all** sections.

SECTION A (15 Marks)

Answer all questions in this section.

1. Items **(i) – (x)** consists of multiple choices questions, choose the answer of the most correct response among the given alternatives and write its letter beside the item number.

(i) An element with atomic number 10 is likely to have chemical properties which are similar to the properties of an element whose atomic number is:
(A) 9 **(B)** 16 **(C)** 20 **(D)** 22 **(E)** 18

(ii) **A** and **B** are atoms of elements in the same period of the Periodic Table. **A** is in group II and **B** is in group III. Which of the following statement is not true?

(A) B has more proton than **A** in its nucleus
(B) The atomic number of **B** is unit greater than that of **A**
(C) A has one electron less than **B** in its valence shell
(D) A and **B** have same number of shells
(E) A contains one more electron than **B** in its valence shell

(iii) Bromine ion, Br^- differs from bromine atom because bromine ion has:
(A) more protons **(B)** less protons
(C) more electrons **(D)** less electrons
(E) more neutrons

(iv) Elements loose or gain electrons to form:
(A) Isotopes **(B)** Radicals
(C) Molecules **(D)** Ions
(E) Iso-electronic series

(v) Water can be obtained from a solution of common salt by:
(A) Evaporation **(B)** Simple distillation
(C) Filtration **(D)** Condensation
(E) Fractional distillation

(vi) The property of metal to be drawn into wires is called:
(A) Conductivity **(B)** Malleability
(C) Ductility **(D)** Decorating
(E) Expansion

(vii) One of the isotope 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

(viii) 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

(ix) Which of the following is the electronic configuration of an element '**Y**' found in period 3 and group II of the periodic table? **(A)** 2:8 **(B)** 2:8:2 **(C)** 2:6 **(D)** 2:8:8:2 **(E)** 2:8:4

(x) Which of the following sets of elements is arranged in order of increasing electronegativity?
- **(A)** Chlorine, bromine, iodine, fluorine
- **(B)** Bromine, chlorine, fluorine, iodine
- **(C)** Iodine, bromine, chlorine, fluorine
- **(D)** Chlorine, iodine, chlorine, fluorine
- **(E)** Fluorine, bromine, iodine, chlorine

2. Match the uses of the first aid kit items in a **LIST A** with their respective items in **LIST B** by writing the letter of the correct responses besides the items number.

LIST A	**LIST B**
(i) Covering wounds to protect them from dirty and germs. (ii) Cleaning wounds to kill germs and bacteria. (iii) Preventing skin from loss of moisture through evaporation (iv) Treating fungal infection of the skin (v) Washing hands, wounds and equipment.	**A.** Anti-septic **B.** Detergents **C.** Gloves **D.** Heavy cloth **E.** Gentian violet **F.** Iodine tincture **G.** Petroleum jelly **H.** Sterile gauze **I.** Saline **J.** Whistle

SECTION B (70 Marks)

Answer all questions in this section.

3. (a) Form one students were conducting an experiment in the laboratory. After finishing the experiment, they requested the laboratory technician to leave the laboratory. What are the laboratory rules they were supposed to follow before leaving the laboratory ? Give three (3) points. **(03 marks)**

(b) A student accidentally broke a beaker containing copper(II) sulphate crystals. She decided to separate the blue crystals from the small pieces of glass by first dissolving the mixture in distilled water. What were the next two steps? Explain. **(04 marks)**

(c) Explain three (3) factors that affect the problem being investigated during scientific study. **(03 marks)**

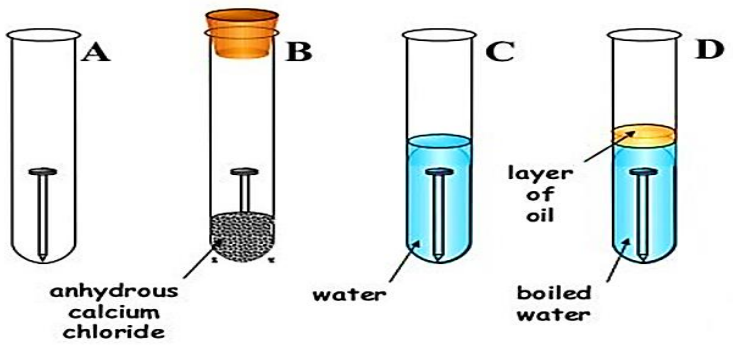
4. (a) Indicate whether a physical or chemical change is involved in the following processes:
(i) Dissolving of sodium metal in water
(ii) Dissolving of sodium chloride in water
(iii) Heating of magnesium metal in air
(iv) The addition of concentrated sulphuric acid in water. **(02 marks)**

(b) With the help of a labeled diagram explain the working mechanism of a biogas plant. **(06 marks)**

(c) Outline any four (4) advantages of a biogas in everyday life. **(02 marks)**

5. **(a)** State any two (2) similarities between combustion and rusting. **(01 mark)**

(b) The diagrams below represent four experiments conducted so as to verify a certain phenomenon. The experiments were carried out in four test tubes whereas one iron nail was soaked in each test tube separately. The results were recorded after three days. Study the diagrams carefully and answer the questions that follow.



(i) What was the aim of the experiment? Explain. **(01 mark)**

(ii) What will be observed in each test tube **A – D** after three days? Explain. **(04 marks)**

(iii) Why boiled water was used in test tube **D**? Explain. **(01 mark)**

(iv) Why the boiled water in test tube **D** was covered with oil? Explain. **(01 mark)**

(v) State the function of anhydrous calcium chloride in test tube **B**. **(01 mark)**

(vi) What conclusion can you draw from the experiment? Explain. **(01 mark)**

6. **(a)** MnO_2 and H_2O_2 are the chemical substances that are used to prepare gas **Q** in the laboratory when they are allowed to react each other.

(i) Give the name of each of the chemical substances mentioned above. **(02 marks)**

(ii) Which chemical substance remains unchanged at the end of the reaction? Give reason. **(01 mark)**

(iii) Write the word equation for the laboratory preparation of gas **Q.** **(01 mark)**

(iv) State the chemical test of gas **Q.** **(01 mark)**

(v) State two (2) uses of gas **Q** in relation to its properties. **(02 marks)**

(b) Draw a well diagram for the laboratory preparation of gas **Q** prepared in (a) above. **(03 marks)**

7. **(a)** The Thomson's model of an atom faced a lot of criticisms from different scientists since it failed to prove many experimental facts.

(i) How Ernest Rutherford challenged Thomson's model of an atom? Explain. **(01 mark)**

(ii) State any three (3) postulates/findings of Rutherford's Atomic Model. **(03 marks)**

(b) Give the meaning of relative atomic mass (R.A.M) of an element and state its mathematical expression. **(02 marks)**

(c) Hydrogen exists naturally into three isotopes which are; *Protium* (^1_1H), *Deuterium* (^2_1H) and *Tritium* (^3_1H). The percentage abundance of Protium is 98.9 %. Determine the relative atomic mass of hydrogen, if the percentage abundance of Deuterium is ten times that of Tritium. **(04 marks)**

8. **(a)** Why is zinc used as a coat for iron and not vice versa? Explain. **(03 marks)**

(b) Your friend's clothes have caught fire. In order to extinguish the fire you have decided to cover her with a damp blanket. State the function of the damp blanket. **(02 marks)**

(c) Give reason for each of the following:

(i) The flame produced by a spirit lamp is not good for heating purposes in the laboratory

(ii) Anhydrous Copper(II) sulphate becomes coloured when exposed in an open environment for a long time.

(iii) Distilled water is not suitable for drinking

(iv) Covalent compounds are not good conductor of electricity.

(v) Group eight (VIII) elements cannot form compounds. **(05 marks)**

9. **(a)** Unlike empirical formula, molecular formula is the actual formula of the compound. Justify this statement. **(02 marks)**

(b) Study the following compounds and answer the questions that follow:
$Cu(NO_3)_2$ and $(NH_4)_2CO_3$

(i) Give the IUPAC name of each compound. **(02 marks)**

(ii) Write the formula of the ions present in the compounds and give their names. **(02 marks)**

(iii) Find the oxidation state of Cu and C in the compounds. **(04 marks)**

SECTION C (15 Marks)

Answer question number ten (10)

10. Study clearly the following table and use it to answer the subsequent questions.

Element	A	B	C	D
Atomic number	6		19	
Number of protons				16
Number of neutrons	6	12		
Mass number			39	32
Electronic configuration		2:8:1		

(a) Copy and complete the table above. **(06 marks)**

(b) Identify the elements which are metallic in nature. **(02 marks)**

(c) State the valency of each element in the table above. **(02 marks)**

(d) Write the molecular formula of the compound formed when elements C and D combine. **(02 marks)**

(e) State the nature of the compound formed in **(d)** above whether it is covalent or ionic compound. Give reason for your choice. **(03 marks)**