

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) Consider the following reagents, then state which reagents are used in the preparation of oxygen gas in the laboratory?
1. H_2O_2 2. H_2O 3. MnO_4 4. MnO_2
(A) 1 and 2 (B) 3 and 4 (C) 1 and 3 (D) 1 and 4 (E) 2 and 4
 - (ii) Which among the following it is a chemical property of water?
(A) It is a very good solvent (B) It is neither acidic nor basic
(C) It has higher surface tension (D) It can exist in three states of matter
(E) It expands when it freezes
 - (iii) What is the maximum number of electrons in the innermost shell of atoms?
(A) 3 (B) 1 (C) 4 (D) 2 (E) 8
 - (iv) What feature is essential for a good fuel?
(A) High speed of continuous energy supply (B) High energy value supplied
(C) Low carbon dioxide production (D) High carbon dioxide production
(E) High content of non-combustible material
 - (v) A careless student secretly tried to mix up different chemicals just out of curiosity. The worst that would happen was to:
(A) Damage the school properties (B) Annoy the teacher
(C) Test the chemicals (D) To measure volume of chemicals
(E) Produce poisonous gas or explosion
 - (vi) Which of the following are the components needed to start fire?
(A) Match box, fire wood and kerosene (B) Match box, fire wood and oxygen
(C) Oxygen, fuel and fire wood (D) Oxygen, heat and match box
(E) Oxygen, fuel and heat

- (vii) Why is nitrogen formed first during the fractional distillation of air?
- (A) It has got high boiling point (B) It has got low density
(C) It has got low melting point (D) It has got high density
(E) It has got low boiling point

- (viii) Which of the following sets of nuclide notation represents isotopes?
- (A) $^{18}_8X$, $^{16}_7X$, $^{19}_{10}X$ (B) $^{18}_9X$, $^{18}_9X$, $^{18}_{10}X$
(C) $^{16}_8X$, $^{18}_8X$, $^{19}_9X$ (D) $^{16}_8X$, $^{17}_8X$, $^{18}_8X$
(E) $^{16}_8X$, $^{17}_8Y$, $^{18}_6Z$

- (ix) What will be the combining power of element 'V' in the compound V_2X ?
- (A) 4 (B) 2 (C) 6 (D) 1 (E) 3

- (x) Which of the following chemical species have the same number of electrons?
- (A) K^+ , Ca^{2+} , Cl^- and Ar (B) Cl, Be, Al^{3+} and O^{2-}
(C) O^{2-} , Ca^{2+} , H and Mg^{2+} (D) Na^+ , Mg^{2+} , Be^{2+} and Li
(E) F, Cl, Br and I

2. Match descriptions in **LIST A** with their corresponding terminologies in **LIST B** by writing the letter of the correct response beside the item number.

LIST A	LIST B
(i) Positively charged particles in the nucleus of an atom	A. Atom
(ii) Negatively charged particles rotating around the nucleus of an atom	B. Nucleons
(iii) Neutral charged particles in the nucleus of an atom	C. Neutrons
(iv) Protons and neutrons in the nucleus of an atom	D. Shell
(v) A path in which electrons are orbiting the nucleus of an atom	E. Protons
	F. Nucleus
	G. Electrons

SECTION B (70 Marks)

Answer all questions in this section.

3. Briefly explain any five (5) importance of science laboratories to secondary school students. **(10 marks)**
4. (a) State three (3) precautions that should be taken when giving First aid to a victim. **(03 marks)**
(b) Concentrated nitric acid is one among the very important liquid chemicals in chemistry laboratory. The stock solution of the acid is stored in dark brown bottles away from direct sunlight and high temperature.
(i) Draw and name the warning sign that the bottle should be labeled. **(02 marks)**
(ii) Why the chemical is stored in dark brown bottles? Explain. **(01 mark)**
(iii) State two (2) precautions that must be taken when using the chemical. **(02 marks)**
(c) Why a sand bath and a magnetic heater (magnetic hot plate) are not the preferred heat sources in the laboratory despite of not producing soot? Give two (2) reasons. **(02 marks)**
5. (a) Water and sodium chloride are both compounds. Give four (4) reasons to support this fact. **(04 marks)**
(b) Explain how a burning candle shows both physical change and chemical change. **(02 marks)**
(c) Stumai went in the laboratory and found five bottles with different mixtures. The bottles were labeled **P, Q, R, and S** which contained ethanol and water, iodine and sand, cooking oil and water, water and salt respectively. State the method that she should use to separate the mixtures on each bottle. **(04 marks)**

6. (a) A pink coloured substance was heated to form a blue substance. When water was added, it changed back to pink. State whether a physical or chemical change was observed during the whole process, give reason(s) for your choice. **(03 marks)**
- (b) Petrol oil, methane gas and plastic buckets were stored in three buildings; **A, B** and **C** respectively. The three buildings caught fire and the fire began to spread inside the buildings.
- (i) State the class of fire fueled by the burning material inside each building. **(03 marks)**
- (ii) Why it is dangerous to use water to extinguish fire from buildings **A** and **B**? Explain. **(02 marks)**
- (iii) Why is it not advisable to use carbon dioxide extinguisher to extinguish fire from building **C**? Explain. **(02 marks)**
7. Hydrogen peroxide breaks down slowly to form water and oxygen. The reaction can be speeded up by the influence of the catalyst.
- (a) Name the suitable catalyst that can be used to speed up the reaction. **(02 marks)**
- (b) How does the catalyst speed up the rate of the reaction? Explain. **(02 marks)**
- (c) Write down the word equation for the reaction that involve breaking down of hydrogen peroxide in presence of a suitable catalyst. **(02 marks)**
- (d) Explain any four (4) uses of the gaseous product obtained by breaking down of hydrogen peroxide in presence of a suitable catalyst. **(04 marks)**
8. (a) The most common method of preparation of hydrogen gas in the laboratory is by the actions of dilute acids on metals. Why sodium metal is not used for the same purpose? Explain. **(03 marks)**
- (b) Water can be purified domestically by three methods which are; boiling, use of purifiers and the use of commercial filters. State one precaution that should be taken when using each method. **(03 marks)**
- (c) Water obtained from various sources is unfit for domestic, industrial and other uses since it is highly contaminated. Why treatment and purification of such water is important? Give four (4) reasons. **(04 marks)**
9. (a) State four (4) advantages of Moseley periodic table over Mendeleev's periodic table. **(04 marks)**
- (b) You are given elements **H, I, J, K, L** and **M** with atomic numbers **1, 10, 13, 14, 16** and **20** respectively. Identify the elements with the following properties;
- (i) most electronegative
- (ii) highly stable
- (iii) Alkaline earth metal
- (iv) form water when burn in oxygen. **(02 marks)**
- (c) Write the chemical formula of the sulphate of aluminium and determine the oxidation state of sulphur from the chemical formula. **(04 marks)**

SECTION C (15 Marks)
Answer question number ten (10)

10. Study the portion of the periodic table given below and answer the questions that follow.

<i>Group</i>	I	II	III	IV	V	VI	VII	VIII/0
<i>Period 2</i>	Li	Be	B	C	N	O	F	Ne
<i>Period 3</i>	Na	Mg	Al	Si	P	S	Cl	Ar

- (a) How the ionization energy of elements vary from Be to Mg? Explain. **(04 marks)**
- (b) How the electronegativity of elements vary from Na to Cl? Explain. **(04 marks)**
- (c) Explain in terms of electronic configuration, why Li and Na elements have similar chemical properties. **(02 marks)**
- (d) Name the type of bond that may be formed between hydrogen and fluorine and the type of bond formed between hydrogen and chlorine. **(02 marks)**
- (e) State any three (3) differences between the types of bonds formed in (d) above. **(03 marks)**