
BABATI DISTRICT COUNCIL
SARAME SECONDARY SCHOOL
CHEMISTRY OPENING TEST, JULY 2025
FORM THREE

INSTRUCTIONS

1. This paper consists of sections A, B and C with a total of eleven (11) questions.
2. Answer all questions in sections A and B and two (2) questions from section C.
3. 3. Sections A carries sixteen (16), marks, section B fifty-four (54) marks and section C thirty (30) marks.
4. Non-programmable calculators may be used.
5. Communication devices and any unauthorized materials are not allowed in the examination room
6. Write your name on every page of your answer sheets
7. The following constants may be used:
1 mole of any gas at S.T.P = 22.4dm^3
Avogadro's constant = 6.022×10^{23}

Atomic Masses: H = 1, N= 14, O = 16, Cl=35.5, Ca = 40 C=12 S=32, S=32

SECTION A (16 Marks)

Answer **all** questions in this section.

- (i) Which of the following is agricultural chemical product made by application of chemistry? (A) yeast (B) pesticides (C) drugs (D) cement
- (ii) Which state of matter is involved when drying wet clothes?
- (A) Liquid to solid (B) gas to liquid (C) liquid to gas (D) gas to solid
- (iii) Why is water a universal solvent?
- (A) It is neither acidic nor basic
(B) It dissolves many substances than any other liquid known.
(C) It occurs naturally in all three states of matter
(D) It is denser than air.
- (iv) A galvanized iron is the one which is coated with (A) Tin (B) Silver (C) Copper (D) Zinc
- (v) One among the following substances can sublime on heating (A) water (B) iodine (C) sulphur (D) carbon
- (vi) These are some of the branches of chemistry (A) Biology, Physics and Chemistry (B) Genetics, thermodynamics and chemical kinetics (C) Biochemistry, physical chemistry and organic chemistry (D) None of the above.
- (vii) Which of these combinations will result into fire? (A) oxygen, water and heat (B) oxygen, dry wood and heat (C) nitrogen, air and oxygen (D) water, oxygen and air.
- (viii) The largest percentage of gases in 20cm³ of air is (A) Oxygen (B) hydrogen (C) water vapour (D) nitrogen.
- (ix) To investigate the solubility of sodium chloride, a technician dissolved different amount of sodium chloride in a specific volume of water while altering the temperature of water. What does temperature represent in this experiment?
- (A) dependent variable (B) independent variable (C) Controlled variable (D) Intermediate variable
- (x) How can you prevent a hoe from getting rust?
- (A) By exposing them to air.

- (B) By painting and oiling them.
- (C) By keeping them in moisture.
- (D) By leaving them in the garden after use.

2. Match the items in **List A** against the correct items in List B and write the responses in your answer sheet.

LIST A	LIST B
(i) Boiling	(A) The ions responsible for hardness in water.
(ii) Magnesium sulphate	(B) Removes only temporary hardness of water
(iii) Washing soda	(C) Urban water treatment
(iv) Calcium hydrogencarbonate	(D) Strengthens teeth and bone in animals.
(v) Hard water	(E) Substance responsible for permanent hard water (F) Get into water when rain containing carbonic acid reacts with rocks made up of calcium carbonate.
(vi) Mg^{2+} and Ca^{2+}	(G) Removes both permanent and temporary hardness of water. (H) Combines to give calcium carbide (I) Used to wash clothes to make them clean.

SECTION B (54 Marks)

Answer **all** questions in this section.

- 3.(a) Explain the importance of safety goggles, gloves, and protective masks as safety equipment in a chemistry laboratory.
- (b) State the uses of the following apparatuses or equipment:
- (i) Reagent bottle
- (ii) Filter funnel

- (iii) Pipette
- (iv) Mortar and pestle
- (v) Bunsen burner
- (vi) electronic balance

4.(a) A compound X of molecular mass 42 contains 85.7% carbon and the rest is hydrogen.

(i) calculate the empirical formula of X

(ii) Determine the molecular formula of X.

(b) Besides noble gases, other atoms tend to combine to form molecules or compounds.

(i) Why atoms combine?

(ii) Give three ways in which atoms complete valence shell in order to achieve stability like noble gases.

5. Explain the following facts:

(i) A student was stung by a bee and sodium hydrogencarbonate was applied to relieve the pain.

(ii) When diluting concentrated acid, it is recommended acid should be added to water and not vice versa.

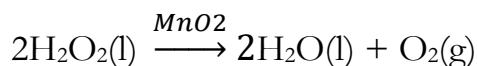
(iii) The laboratory should have large space.

6. In the laboratory preparation of oxygen, Wayne allowed hydrogen peroxide to drop into 0.5g of manganese (IV) oxide.

(a) (i) Why manganese (IV) oxide was used in this experiment?

(ii) What was the mass of manganese (IV) after the reaction completed?

(b) If the chemical equation for this reaction was:



Calculate the number of molecules of oxygen gas produced at STP by decomposing 0.546moles of hydrogen peroxide.

7. (a) State the collision theory.

(b) Explain how the following factors affect the rate of chemical reaction:

(i) temperature

(ii) concentration of reactants

(iii) Surface area of the reactants

(c) Differentiate between the reversible reaction and irreversible reaction.

8. (a) Differentiate the following pairs:

(i) Efflorescent salt and hygroscopic salt

(ii) Strong acid and weak acid

(iii) Dibasic acid and monobasic acid

(b) Complete and balance the following chemical equations:

(i) $\text{KOH} + \text{H}_2\text{SO}_4 \rightarrow$

(ii) $\text{Na}_2\text{CO}_3 + \text{HCl} \rightarrow$

SECTION C (30 Marks)

Answer **two (2)** questions in this section.

9. (a) Define the following terms

(i) standard solution

(ii) indicator

(iii) end-point

(b) 24cm^3 of a solution of 0.1mol/dm^3 KOH were exactly neutralized by 30cm^3 of solution of sulphuric acid, calculate the concentration of the acid in:

(i) mol/dm^3

(ii) g/dm^3

10. Study the part of Periodic Table below and answer the questions that follow. The letters are not the actual symbols of elements and in answering the questions use the letters provided.

I		VIII					
	II	III	IV	V	VI	VII	
Z				M			Y
		R				X	
W							

- (a) Write the chemical formula of the:
 - (i) Oxide of W
 - (ii) Sulphate of R
- (b) Between R and X which one has (i) large atomic size
(ii) high electronegativity
- (c) Explain the trend in metallic character (electropositivity) with reference to element Z and W.
- (d) Differentiate between compound formed when R combines with X and that which is formed when M combines with X. (Give only three points)

11. Giving one example of the method in each, explain the importance of separating mixture.