THE CATHOLIC DIOCESE OF SAME
KINDOROKO GIRLS' SECONDARY SCHOOL
FORM FOUR SECOND PRE–MOCK EXAMINATIONS

032/1 **CHEMISTRY 1**

(For Both Private and School Candidates)

Time: 3:00 Hours **Year: 2025**

Instructions

1. This paper consists of section A, B and C with a total of **eleven (11)** questions.
2. Answer all questions from section A and B and only **two (2)** questions from section C.
3. Section A carries **sixteen 16** Marks, section B carries **fifty four (54)** Marks and section C carries **thirty (30)** Marks.
4. All writing must in **blue** or **black** pen except for diagrams which must be in pencil.
5. Non programmable calculators may be used
6. Cellular phones and any unauthorized material are **not** allowed in the examination room
7. Write your **Name in Full** on every page on your answer booklet(s).
8. The following constants may be used
   Atomic masses: H = 1, C = 12, N = 14, O = 16, Na = 23, Mg = 24, Al = 27, S=32,
   Cl = 35.5, K = 39, 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 mmHg
   Standard temperature = 273 K.
   1 Litre = $1dm^3 = 1000\ cm^3$.

SECTION A (16 Marks)

Answer **all** questions from this section

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

(i) Which substance can be reduced when heated with coke?

A Aluminium Oxide B Magnesium Oxide
C Sodium oxide D Iron (III) Oxide
E Potassium oxide

(ii) Which of the following is agricultural chemical product made by application of chemistry?

A Yeast B Drugs
C Pesticides D Cement
E Clothes

(iii) A substance which absorbs water from the atmosphere and become solution is called:

A Efflorescence B Hygroscopic
C Deliquescent D Volatile
E Flammable

(iv) Which of the following is not the component of First Aid Kit?

A Knife B Razor blade
C Goggles D A pair of scissors
E Gloves

(v) What is the maximum number of electrons carried by N energy level of an atom?

A 2 B 8
C 18 D 32
E 10

(vi) Consider the reaction $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$ + Heat. In order to maximize the production of ammonia gas, pressure and temperature should be:

A Decreased and increased B Increased and decreased
C Increased and no change D Decreased and decreased
E No change and decreased

(vii) In preparation of oxygen using aqueous hydrogen peroxide and manganese dioxide the gas is collected by upward delivery because:

A Less denser that water B Less denser than air
C Denser than water D Denser than air
E Slightly soluble in water and denser than air

(viii) Which of the following is the natural acid?

A Nitric acid B Phosphoric acid
C Citric acid D Sulphuric acid
E Chloric acid

(ix) Which of the following statements is not true about the blast furnace during extraction of Iron?

A The reaction in the blast furnace keeps the iron molten
B Limestone is reacted with impurities to form slag
C Coke is added to reduce Iron oxide to Iron metal
D Coke combines with some impurities in the Ore
E Hot air is added to form carbon dioxide

(x) Which of the following carbonates id least stable to heat?

A Calcium carbonate
B Zinc carbonate
C Lead (II) carbonates
D Copper (II) carbonate
E Iron (II) carbonate

2. Match the items in **LIST A** with the correct response in **LIST B** by writing the letter of the correct response beside the item number.

LIST A		**LIST B**	
(i)	The speed at which a reaction occurs	A	Activation energy (Ea)
(ii)	Forward and reverse reactions occur at equal rates	B	Catalyst
(iii)	Energy absorbed for released during a chemical reaction	C	Chemical Equilibrium
(iv)	Minimum energy required for the reaction to occur	D	Collision theory
(v)	Factor that can influence the rate of a reaction such as temperature concentration presence of catalyst	E	Endothermic reaction
		F	Enthalpy change
(vi)	Favored by rise of temperature	G	Exothermic reaction
		H	Reactants
		I	Products

SECTION C (54 Marks)

Answer **all** questions from this section

3. (a) Describe briefly how would you separate
   (i) Pure Iron fillings contaminated with oil
   (ii) Sodium chloride crystals contaminated with glass particle
   (iii) Pure oxygen from atmosphere air
   (iv) Pure water contaminated with hydrate copper (II) Sulphate
   (v) Pure Iron powder contaminated with magnesium powder
   (vi) Blood cells from blood plasma

   (b) Identify three (3) properties of which you would prove that Iron (II) sulphide is the compound formed by heating Iron filling and Sulphur and differ from the original mixture.

4. (a) A chemical manufacturing facility uses water in various industry processes. Elaborate on the significance of implementing water treatment and purification system within industrial settings considering both environmental impact and the quality of water used in production

   (b) During the coagulation stage of water treatment. What is the primary purpose of adding chemicals like alum (Aluminium Sulphate)?

5. An experiment was conducted to find out the relationship between solubility of potassium nitrate salt in water against temperature. The results were recorded as shown in the table

Mass of salt (g)	10	30	50	65	87	113
Mass of water (g)	100	100	100	100	100	100
Temperature (°C)	0	20	30	40	50	60

With reference to the experiment,

(a) Provide the statement of the problem
(b) Give the hypothesis
(c) Identify:
  (i) The dependent variable
  (ii) The independent variable
  (iii) The controlled variable
(d) Make an interpretation of the data given
(e) Make an inference and conclusion

6. (a) Explain the application of changes of state matter. Provide four (4) points.
(b) $25cm^3$ of 0.1M HCl was enough to dissolve completely 3.35g of hydrated sodium carbonate (Na_2CO_3. XH_2O) which is dissolved in 250mls of distilled water where by only $25cm^3$ need for reaction. Determine number of water crystallization in hydrated sodium carbonate.

7. (a) State Le-Chatelier's principle
(b) What is equilibrium reaction?
(c) In the industrial preparation of sulphur trioxide equilibrium is established between sulphur dioxide and oxygen gas as follows:

$$2SO_{2(g)} + O_{2(g)} \longrightarrow 2SO_3 \quad \Delta H = -94.9KJ/mol$$

  (i) How would you adjust temperature and pressure to maximize the proportion of product at equilibrium?
  (ii) Why is it unfavorable to work with very high temperature and very low temperature in contact process?
  (iii) What catalyst is used to speed up the rate of formation of Sulphur trioxide?

8. (a) State five (5) characteristics of homologous series.
(b) Draw the open structure formula of 2,2 – dichlorohexane
(c) Write the chemical equation for the:
  (i) Combustion of CH_3CH_2OH
  (ii) Conversion of $CH_2 = CH_2$ to CH_3CH_2OH

SECTION C (30 Marks)

Answer only **two (2)** questions from this section

9. Fertilizers contain some important nutrients which can improve growth of plants. With five (5) points, explain the methods of fertilizer application.

10. Chlorine gas can be prepared in the laboratory by the oxidation of concentrated hydrochloric acid using oxidizing agents such as potassium permanganate. The gas produced is passed in two different conical flasks. The first flask contains water and the second contains concentrated sulphuric acid. Use this information to answer the questions below:
    (a) Draw the net labeled diagram for preparation of chlorine gas and write a molecular equation for this reaction.
    (b) Explain the following statements:
        (i) Chlorine gas is collected by upward displacement of air
        (ii) The role of manganese (iv) oxide in preparation of chlorine gas
        (iii) The reaction is done in a fume number
        (iv) Write the balanced equation when manganese (iv) oxide reacts with concentrated hydrochloric acid under heat.
    (c) Explain any four (4) uses of chlorine gas

11. Environment supports lives of all living organisms. Its pollution has led to some major cartographic effects. Describe water pollution by analyzing its causes, effects and protective measures to be taken. Provide three (3) points in each case.