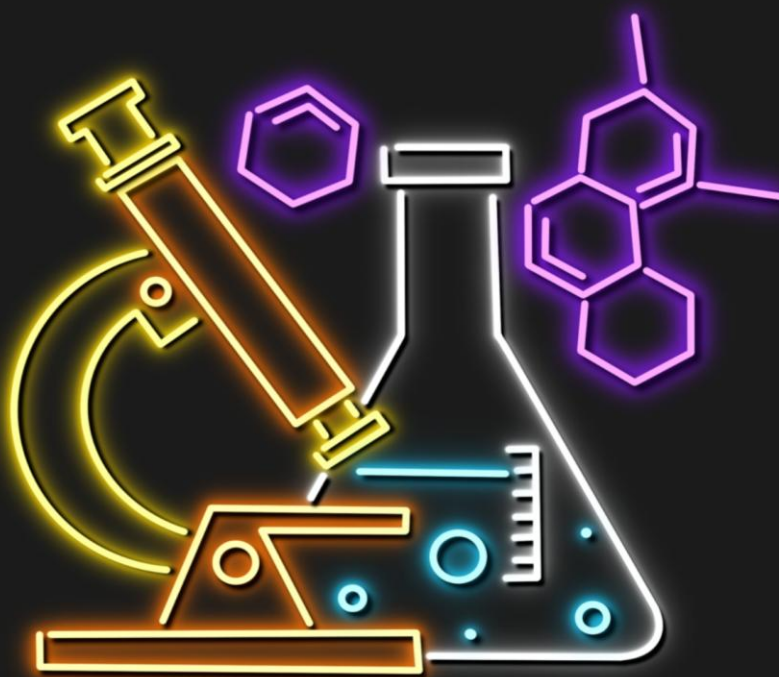


# INTERSECONDARY SCHOOLS EXAMINATION SERIES (ISESE)

## CHEMISTRY FORM TWO



"10 PAPERS WITH THEIR  
MARKING SCHEMES"

U.B.N COOPERATION

ROBERT MSAKI

- **KITINI HIKI KINA MITIHANI 10 ILIYOANDALIWA KWA AJILI YA KUMJENGA MWANAFUNZI NA KUMPA UWEZO WA KUZOEWA MITIHANI MIGUMU.**
- **MITIHANI HII INAPATIKANA PIA KWA MFUMO WA WORD (AMBAPO UTAWEZA KUEDIT)**
- **KUPATA MAJIBU (MARKING SCHEMES) ZA HII MITIHANI UTACHANGIA SHILINGI ELFU KUMI (10,000/=) AMBAYO ITATUMIKA KAMA GHARAMA ZA UENDESHAJI**
- **MAWASILIANO (0624254757) WHATSAPP TUU.**

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**PRESIDENT'S OFFICE**  
**REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT**  
**JOIN THE REVOLUTION PROGRAM**  
**FORM TWO SERIES No. 01**  
**CHEMISTRY**

**Time:2:30Hours**

**Year 2024**

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**Instructions**

1. This paper consist of section A, B and C with a total of **ten ( 10)** questions
2. Answer all questions in the space provided
3. Section A and C carry **fifteen (15)** Marks each and section B carries **seventy (70)** Marks
4. All communication devices and any unauthorized materials are **NOT** allowed in the examination room
5. All answers must be in blue or black ink **EXCEPT** diagrams which must be in pencil

<b>FOR EXAMINERS USE ONLY</b>		
<b>QUESTION NUMBER</b>	<b>SCORE</b>	<b>EXAMINER'S INITIALS</b>
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
<b>TOTAL</b>		
<b>CHECKER'S INITIALS</b>		

## SECTION A (15 MARKS)

Answer ALL questions in this section

1. For each of the items (i) – (x) choose the correct answer from among given alternatives and write it on the space provided
  - i. Identify the skill not acquired during chemistry study.....
    - A. Careful and thorough observations
    - B. Accurate recording of what has been observed
    - C. Drawing conclusions from observations
    - D. Thorough observations and map reading skill
  - ii. Access to safety equipment should never be blocked by any object because \_\_\_\_\_
    - A. It's a just simple law
    - B. There must be spaces for people to move around in the laboratory
    - C. The equipment is used in every day
    - D. Its important to reach safety equipment quickly in case of an accident
  - iii. The following apparatus is used to keep test tubes in the laboratory
    - A. Test tube rack
    - B. Beaker
    - C. Tongs
    - D. Test tube holder
  - iv. Factors in an experiment that can be manipulated to get desired results are called
    - A. Controlled variables
    - B. Manipulated variables
    - C. Dependent variables
    - D. Independent variables
  - v. Which of the following is an example of a chemical change
    - A. Melting butter
    - B. Breaking glass
    - C. Mixing milk and water
    - D. Burning leaves
  - vi. When a small amount of common salt is dissolved in water, the mixture so formed is
    - A. Homogeneous
    - B. Immiscible
    - C. Heterogenous
    - D. Suspension
  - vii. Which term describes a rapid chemical reaction that releases energy in form of light and heat?
    - A. Ignition
    - B. Reactivity
    - C. Combustion
    - D. Heating
  - viii. Are those people who study chemistry practically in the pastare called \_\_\_\_\_
    - A. Chemists
    - B. Alchemist D.Scientist
    - C. Al-chemistry
  - ix. Is the systematic study of nature:-
    - A. Science
    - B. Technology
    - C. Chemistry
    - D. Contamination

x. Syrups are examples of

A. Solution

B. Suspensions

C. Homogeneous mixtures

D. Filtrate

i.	ii.	iii.	iv.	v.	vi.	vii.	viii.	ix.	x.

2. Match the item in **list A** with the corresponding responses in **list B** by writing the letter of the correct response besides the item number

<b>LIST A</b>	<b>LIST B</b>
i. Removal of Hydrogen from a substance	A. Oxidation
ii. Removal of oxygen from a substance	B. Reduction
iii. Substance which remove hydrogen from a substance	C. Catalyst
iv. Substance which remove oxygen from a substance	D. Reducing agent
v. Alter the rate of chemical reaction	E. Oxidizing agent
	F. Decomposition
	G. Oxygen

<b>LIST A</b>	i.	ii.	iii.	iv.	v.
<b>LIST B</b>					

### SECTION B (70 MARKS)

Answer **ALL** questions in this section

3. (a) Why decomposition of Hydrogen peroxide method is mostly preferred in the preparation of oxygen gas?

\_\_\_\_\_

(b) Briefly explain why oxygen gas is collected by downward displacement of water?

\_\_\_\_\_

(c) Briefly explain chemical properties of oxygen gas?

i. \_\_\_\_\_

ii. \_\_\_\_\_

iii. \_\_\_\_\_

iv. \_\_\_\_\_

4. (a) Your teacher may advise you on things you should never do in the laboratory. For each of the rules below, write what might happen if you never followed the instructions?

i. Never enter in the laboratory without permission

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ii. Never quarrel or fight in the laboratory

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iii. Never throw any solid into the sink or waterways

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iv. Replace the cover after using the chemicals

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v. Never use laboratory apparatus for drinking or storing food

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- (b) Draw the warning symbol you would expect to see on

i. A can of petrol

ii. A bottle of concentrated sulphuric acid

5. a) Mkwawi a form one student at Lake Tanganyika secondary school accidentally mixed sulphur and iron fillings

(i) Suggest an appropriate method of separation you would advise him to use to separate the mixture

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(ii) Give a reason for the choice of your answer

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(iii) Describe how he would use the method named above to separate the sulphur and iron fillings

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(b)(i) Name two substances that sublime when heated

---

(ii) Why water is not a suitable solvent in paper chromatography?

---

c) Bleeding is the lost of blood and other fluids from the body when the skin breaks. As a student identify procedures when dealing with the a victim of a small cut or wound.

- i) \_\_\_\_\_
- ii) \_\_\_\_\_
- iii) \_\_\_\_\_
- iv) \_\_\_\_\_
- v) \_\_\_\_\_
- vi) \_\_\_\_\_

6. (a) Effective use of four senses of observation is important before a chemist can make conclusion. With four (4) points, show how the senses are used as tools of observation during experimentation by giving one example for each.

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b) Is chemistry related to your environment? Explain.

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7. a) Why a flame produced by a candle **is not** suitable for a cooking? Give two reasons

i) \_\_\_\_\_

ii) \_\_\_\_\_

b) Give four differences between a flame produced when the air holes of a Bunsen burner are open and the one produced when the air holes are closed

Flame produced when air holes are open	Flame produced when air holes are closed
i)	
ii)	
iii)	
iv)	

8. a) Identify each of the following statements as an observation or a hypothesis

i) A silver tray turns a dull gray color when left uncovered \_\_\_\_\_

ii) North of the equator, it is warmer in summer than in winter \_\_\_\_\_

iii) Ice cubes float in water because they are less dense \_\_\_\_\_

b) Outline four significance of scientific producers in daily life

i) \_\_\_\_\_

ii) \_\_\_\_\_

iii) \_\_\_\_\_

iv) \_\_\_\_\_

v) \_\_\_\_\_

9. Robert Msaki placed a large crystal of Potassium permanganate (VII) in the bottom of a beaker of cold water and left it for several hours

(i) Explain what he must have observed after five minutes. Explain

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(ii) Describe what he likely observed after several hours. Explain

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



(iii) Name the two processes which have taken place.

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(iv) From that experiment give two conclusions about matter

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

10. (a) Draw a well labeled diagram of a small laboratory heat source consisting of a vertical metal tube connected to a gas source

(b) Describe how you will light a device drawn above

i) \_\_\_\_\_

ii) \_\_\_\_\_

iii) \_\_\_\_\_

iv) \_\_\_\_\_

(c) Burning back of the device drawn above is corrected as follows

i) \_\_\_\_\_

ii) \_\_\_\_\_

iii) \_\_\_\_\_

**PRESIDENT'S OFFICE**  
**REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT**  
**JOIN THE REVOLUTION PROGRAM**  
**FORM TWO SERIES No. 02**  
**CHEMISTRY**

**Time 2:30Hrs**

**Year: 2024**

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**Instructions**

1. This paper consists of section A, B and C with a total **often(10)** questions
2. Answer all questions in the space provided
3. Section A and C carry **fifteen (15)** Marks each and section B carries **seventy (70)** Marks
4. All communication devices and any unauthorized materials are **NOT** allowed in the examination room
5. All answers must be in blue or black ink **EXCEPT** diagrams which must be in pencil

## SECTION A (15 MARKS)

1. For each of the items (i) – (x) choose the correct answer from among given alternatives and write it on the space provided

i) A form one student saw the “flammable” sign on a box and made the following possible interpretations. Which one is the most correct?

- a) The box contained firewood
- b) The box contained papers
- c) the box had radioactive materials
- d) The box contained spirit used in lamps.

ii) \_\_\_\_\_ Speed up the decomposition of  $H_2O_2$  during preparation of oxygen in the laboratory

- a)  $NaOH$
- b)  $CaCO_3$
- c)  $MnO_2$
- d)  $O_2$

iii) The following are the apparatus used during preparation of hydrogen in the laboratory by decomposition of hydrogen peroxide

- a) Beaker and thistle funnel
- b) Round bottomed flask and trough
- c) Beehive shelf and delivery tube
- d) Gas jar and calorimeter

iv) A student who gets burnt accidentally in the chemistry laboratory would be given one of the following first aid.

- a) Antibiotic solution
- b) Nitric acid
- c) Petroleum jelly
- d) Potassium permanganate

- v) A large percent of air is composed of
- a) Noble gases
  - b) Nitrogen
  - c) Carbondioxide
  - d) Oxygen
- vi) The boiling point of pure water at sea level is 100°C and that of ethanol is 78°C. the mixture of ethanol and water can be separated by
- a) Filtration
  - b) Fractional distillation process
  - c) Layer separation process
  - d) Sublimation process
- vii) Which group among the following elements are metals?
- a) Calcium, magnesium and sodium
  - b) Calcium, hydrogen and nitrogen
  - c) Calcium, carbon and magnesium
  - d) Oxygen ,potassium and sodium
- viii) In the Bunsen burner a sooty flame is most likely to be formed when the
- a) Air holes are fully closed
  - b) Air holes are opened
  - c) Flame is noisy
  - d) Flame is smaller and hotter
- ix) Oxygen reacts with non metals to produce
- a) Acidic oxides
  - b) Basic oxides
  - c) Amphoteric oxides
  - d) Oxy hydrogen flaame

x) In industry oxygen produced in large scale by using

- a) Fractional distillation of liquefied air
- b) Decomposition of hydrogen peroxide
- c) Decomposition of potassium chlorate
- d) Electrolysis of water

2. Match the item in **LIST A** with the corresponding responses in **LIST B** by writing the letter of the correct response besides the item number

<b>LIST A</b>	<b>LIST B</b>
i) Inflating weather balloons	A. It is denser than air
ii) Manufacturing of ammonia	B. It is highly flammable
iii) Manufacturing of margarine	C. It is lighter than air
iv) Production of oxy-hydrogen flame	D. It is an oxidizing agent
v) Collected by downward displacement of water	E. It is reducing agent
	F. It readily combines with other elements
	G. It burns with blue flame
	H. It is less denser than air

### **SECTION B (70 MARKS)**

Answer **ALL** questions in this section

3. Assume most students in your class fail to perform a certain chemistry experiments assigned by the teacher

- a) Identify a problem that you can investigate.
- b) Formulate the hypothesis
- c) List down a dependent variable, an independent variable and controlled variable in your investigation.

4. (a) Explain how measurement of volume differs when using cylinder and burette?

b) It is recommended that a laboratory apparatus should be properly washed or wiped after use. Explain the significance for this when;

- i) Measuring volume of liquids
- ii) Measuring mass of the substance

5. The flames that produced by Bunsen burner are luminous flame and non-luminous

- a) Which between these flames is hotter than other? Why
- b) Which flame can be easily seen? Why
- c) Outline four (4) the similarities between luminous flame and non-luminous flame.

6. (a) If you were stranded in a desert with no water how could you collect a supply of drinkable water? You only have a spade plastic sheet, few heavy stones and plastic cup.

(b) Nasra thought her filtering experiment was too slow. She stirred inside the funnel a glass rod. However, she found that the residue was getting into the evaporating basin. Suggest what she has done.

(c) Your friend dropped some salt on the ground accidentally. The salt mixed up with dust and sand. You are required to advise your friend on what to do at home so as to get back his salt as clean as possible. In your advice you may use the following:

Kerosene burner, aluminum pot, clean piece of cloth, powdered charcoal, large tin and a sand bath.

7. (a) One of the major problems in the world today is the spread of AIDS/HIV. Chemicals are working to develop to keep new drugs that will combat AIDS/HIV.

- i) Make a list of other problems that we face in the world today
- ii) Can you suggest anything that chemistry might be able to do to solve them?
- b) When water and Kerosene are mixed in the same container, which one will form the upper layer? Give reason.

8 (a) What is the reading on the thermometer when it is placed in.

- i) Tap water                      (ii) Water from the fridge                      (iii) Heated water

(b) For what ranges of temperature can the thermometer give reading?

9. (a) Robert and Msaki were doing an experiment in which water was to be heated in a beaker. Robert kept the beaker near the wick in the yellow part of the candle flame. Msaki kept the beaker in the outermost part of the flame. Whose water will get heated in a shorter time?

(b) After use, the non-luminous flame should be put off or adjusted luminous flame. Explain.

### SECTION C (15 Marks)

Answer question **number 10** in this section

10. Complete the table below.

Type of fire extinguishers	Chemical composition of agents	Suitable for	Not suitable for
Air pressurized water (APW)			
Dr chemical (DC)			
Carbon dioxide			
Halon			
Foam			



**PRESIDENT'S OFFICE**  
**REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT**  
**FORM TWO SERIES NO.3**  
**CHEMISTRY**

**Time:2:30Hours**

**Year: 2024**

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**Instructions**

1. This paper consist of section A, B and C with a total **often(10)**questions
2. Answer all questions in the space provided
3. Section A and C carry **fifteen (15)** Marks each and section B carries **seventy (70)** Marks
4. All communication devices and any unauthorized materials are **NOT** allowed in the examination room
5. All answers must be in blue or black ink **EXCEPT** diagrams which must be in pencil

<b>FOR EXAMINERS USE ONLY</b>		
<b>QUESTION NUMBER</b>	<b>SCORE</b>	<b>EXAMINER'S INITIALS</b>
1		
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9		
10		
<b>TOTAL</b>		
<b>CHECKER'S INITIALS</b>		

## SECTION A (15 MARKS)

Answer ALL questions

1. Write down the letter of the most correct responses for each of the following questions.
- If a Bunsen flame produces most soot which is the correct conclusion.
    - The air hole is closed
    - The burner gas jet is big ( )
    - The air hole fully opened
    - The gas supply is poor
  - The common method used in industrial production of hydrogen gas is called
    - Electrode
    - Fractional distillation of liquefied air ( )
    - Electrolysis of water
    - Steam reforming
  - Juma applied the knowledge of scientific procedures in solving his daily problems. One of the stages of scientific procedure is experimentation. In scientific procedures experiments used to test which from the choices given?
    - Data
    - Problems ( )
    - Hypothesis
    - Observation
  - The lightest and most abundant element in the universe is
    - Oxygen
    - Hydrogen ( )
    - Nitrogen
    - Water
  - Which of the following sets of apparatus suitable for measuring volume of solution s
    - Burette, pipette, and beaker
    - Burette, pipette, and conical flask
    - Measuring cylinder, burette and pipette ( )
    - Burette, flat bottomed flask and pipette
  - Flammable chemicals are the ones which can
    - Catch fire easily
    - Explode easily
    - Poison you ( )
    - Burn skin
  - \_\_\_\_\_ are conditions or factors that can change in an experiment
    - Hypothesis
    - Variables ( )
    - Problems
    - Conclusion
  - A branch of chemistry which deals with studies and uses of instruments and methods which used to separate, identify, and quantify, chemical species in matter?
    - Inorganic chemistry
    - Analytical chemistry ( )
    - Instrumental chemistry
    - biochemistry
  - Which branch of chemistry deals with the studies of carbon and its compound?
    - In organic chemistry
    - Organic chemistry ( )
    - Biochemistry
    - Analytical chemistry
    - e)
  - Why is loose or floppy clothing not allowed in the laboratory?

- a) It will help move fast
- b) It will get wet when water splashes
- c) It may catch fire or cause one to fall ( )
- d) It causes poor ventilation in the body

2.

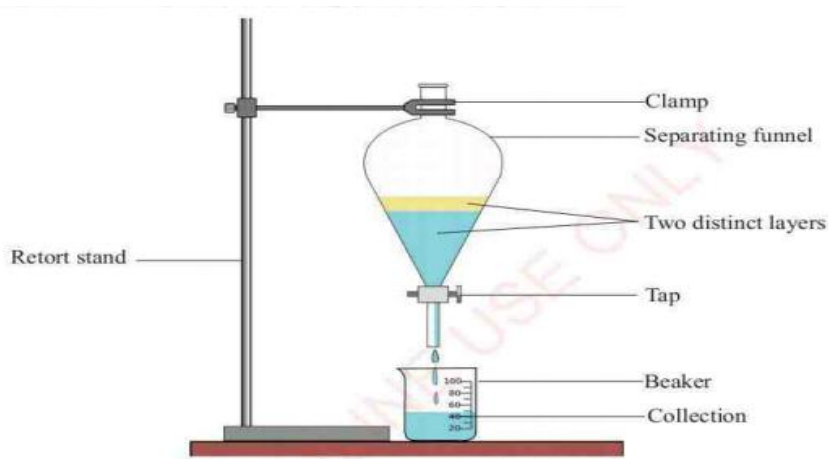
LIST A	LIST B
i) A process of separating a mixture of sodium chloride and ammonium chloride. ii) A method used to separate kerosene and water iii) A method by which salt and water can be separated iv) A method used to get solvent from a solution mixture v) A method by which coloured substances are separated and identified	A. sublimation B. Boiling C. Chromatography D. Distillation E. Evaporation F. Filtration G. Layer separation H. Decantation

### SECTION B (70 Marks)

Answer ALL questions

3) What are considered to be the main distinctions between a chemical compound and a mixture? (5 points) Explain why the liquid obtained by mixing sodium chloride with water is not regarded as a chemical compound.

4) A form two student from UBN secondary school prepares experimental set up **A** as follows. Then they pour water into a beaker followed by addition of kerosene to obtain a mixture **X**. Then they pour the mixture **X** in an experimental set up **A**. Apply the knowledge you obtain from chemistry lessons answer the questions that follow



- (a) Identify the experimental set up **A**
- (b) Identify the mixture **X**
- (c) What is the aim of the demonstrated Experiment
- (d) Which liquid you drain first? Give reason

5) (a) Explain why there is an increase in weight when iron get rust.

(b) Mention ways in which the burning magnesium in air and rusting of iron differ  
(4points)

6) (a) A form two student from your school reads a statement from a certain book that, “if the clothes worn by your friend catch fire, cover them with a fire blanket” Why a fire Blanket is to be used in that case?

(b) Explain the Effect of rust in your environment.

(c) You are given the components of air in the table bellow. Answer the question

<b>GAS</b>	<b>APPROXIMATE PERCENTAGE(%)</b>
Nitrogen	78
Oxygen	21
Noble gas	0.94
Carbon dioxide	0.03
Water vapour	0.4

What does percentage indicate?

7) With the aid of well labelled diagram explain how Bunsen burner work

8) (a) Once Mr Msaki open a container which contain hot soup in the room, people in different parts of the room notice the smell of the soup. You as a form two student explain by using kinetic theory of matter how this happens.

(b) Water vapour is a matter? Explain your answer

(c) Why does the wax of the candle melt after few seconds when the candle is ignited?

Explain











9) There are various types of solutions. The solute and solvent can be in any state of Matter. The table bellow show mixture of different solutes and solvents in different state to form solutions. Fill the table by giving common examples

<b>solute</b>	<b>solvent</b>	<b>Examples</b>
solid	gas	
solid	liquid	
solid	solid	
liquid	Gas	
liquid	liquid	
liquid	solid	
gas	gas	
gas	liquid	
gas	solid	

**SECTION C (15 MARKS)**

**Answer question no.10**

10) use tick and cross to fill the table

Fire extinguishers					
Classes of fires					
 <b>A</b>					
 <b>B</b>					
 <b>C</b>					
 <b>D</b>					
 <b>E</b>					

**THE UNITED REPUBLIC OF TANZANIA  
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT  
JOIN THE REVOLUTION PROGRAM  
FORM TWO SERIES No. 04  
CHEMISTRY**

**TIME 2:30 HRS**

**Year 2024**

**INSTRUCTIONS**

- This paper consists of section **A, B** and **C** with total number of **ten (10)** 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 (15 MARKS)**

**Answer all questions in this section**

1. Items (i) – (x) contains of multiple choice questions, choose the letter of the most correct response and write it against the number in the box provided

i) The most probable valency of an element whose atomic number is 12 is

- |      |      |
|------|------|
| a) 0 | b) 1 |
| c) 2 | d) 3 |

ii) A salt which on exposure to air becomes with a liquid is

- |                 |                 |
|-----------------|-----------------|
| a) Efflorescent | b) Deliquescent |
| b) Hygroscopic  | d) Hydrolytic   |

iii) A black powder, when heated alone, gave oxygen and a yellow residue. When heated with concentrated hydrochloric acid, chlorine gas was evolved. The black powder was

- |                    |                      |
|--------------------|----------------------|
| a) Powder charcoal | b) Lead oxide        |
| c) Cupric oxide    | d) Manganese dioxide |

- iv) Before using a burette, it should be prepared by washing it with
- a) Dilute bench acid, then water
  - b) Cold water only
  - c) Hot, then cold water
  - d) Water, then the solution to be used
- v) A hen's egg shell contains calcium
- a) Sulphate
  - b) Carbonate
  - c) Chloride
  - d) Nitrate
- vi) The most abundant metal in the earth's crust is
- a) Iron
  - b) Aluminium
  - c) Calcium
  - d) Sodium
- vii) The kinetic theory of gas attempts to explain the behavior of gas on the basis of the
- a) Ionization of their molecules
  - b) Brownian movement
  - c) Laws of Boyle, Charles, Gay lussac and Avogadro
  - d) Movement of their molecules
- viii) In a class room experiment, air was passed over heated copper turnings in order to obtain some relatively pure nitrogen. Which impurities would you expect to be present in the relatively pure nitrogen gas which was collected over water?
- a) Argon, water vapor and helium
  - b) Helium, carbon dioxide and carbon monoxide
  - c) Oxygen, hydrogen and rare gases
  - d) Rare gases, water vapor and carbon dioxide
- ix) A sodium atom and a sodium ion have the same
- a) Electronic configuration
  - b) Number of electrons
  - c) Chemical properties
  - d) Number of protons
- x) An element x is found in period 4 and group II of the periodic Table. If X undergoes the reaction  $x \longrightarrow X^{2+} + 2e^{-}$ , the electronic configuration of  $X^{2+}$  ions is
- a) 2:8:4
  - b) 2:8:8
  - c) 2:8:2
  - d) 2:8:6

2. Match the following items from **list A** with corresponding responses from **list B** by writing the letter beside the item number in your answer sheet

<b>List A</b>	<b>List B</b>
i. Biomass	A. Carbon monoxide and hydrogen gas
ii. Water gas	B. Carbon monoxide and oxygen
iii. Producer gas	C. Methane
iv. Natural gas	D. Organic matter in living organisms
v. Biogas	E. Energy in matter due to its position or state

### **SECTION B (70 MARKS)**

#### **Answer all questions**

3. (a) In form four class the teacher explained on the "classification of fuels" but one of the student did not understand. You are now asked to clarify this for him. Use vivid examples in giving your clarification.

(b) Emelda was ordered to the market by his mother to buy charcoal, the mother emphasized her to choose good charcoal. As a form two student who attended the class of fuels and energy. Explain to Emelda four things to consider when choosing a good charcoal.

4. (a) Mr. Msaki was doing experiment concerning flame test of different chemical substances in the chemistry laboratory, unfortunately coat caught fire. Briefly explain which fire extinguishing items you will use to help him to extinguish fire from his laboratory coat

(b) Juma accidentally fallen in the class and was found that he was unconscious.

Two students helped him to recover from the condition

- i. What process was done by the two students?
- ii. What is the name given to two students who helped Juma?
- iii. What are the three qualities of the students who gave the help to Juma?
- iv. Briefly explain three reasons of giving the process identified in (i) above



5. (a) Experimentation and observation are among important steps during scientific procedures. Briefly explain how each of two can be done
- (b) Wakamengo is an expert on the study of composition, structure and properties of matter.
- Who is Wakamengo?
  - The knowledge that gained by Wakamengo can assist him in many careers. Name any four careers.
  - The choice done by Wakamengo is best, briefly explain three reasons that can be used to verify the usefulness of his choice.
6. (a) Briefly explain why
- The use of charcoal is harmful to the environment.
  - Charcoal is still being used by majority of Tanzania for domestic purpose
- b) A mass of 20 20.0g of petrol was burnt in air. The heat produced was used to heat 2.5 litres of water. Given that the heat volume of petrol is 43,640 kJ/kg, by how much could the temperature of water be changed? (The specific heat capacity of water =  $4.18\text{kJ}^{\circ}\text{K}^{-1}$ , Density of water =  $1000\text{ kg/m}^3$ .)
7. (a) Why is petrol not recommended to be a fuel in school laboratories? Briefly
- (b) Which three heat sources can be used to boil some water in the laboratory instead of Bunsen burner?
- (c) Arrange the following steps for lighting the Bunsen burner in a correct sequence using letter A to F
- Open the air holes to get the required flame.
  - Turn on the gas fully to ensure that plenty of gas is entering the burner
  - Connect the Bunsen burner to the gas main supply
  - Adjust the gas tap until the supply of gas is enough for a time
  - Light the gas at the top of barrel with a lighted matchstick
  - Close the air hole

8. (a) Giving a reason, state whether rust will form or not in each of the following situations (I) – (VI)

- I. Iron bar is dipped into boiling water
- II. Painted iron bar is dipped into un-boiled water
- III. Iron bar dipped in un-boiled water
- IV. Oiled iron bar is left outside the room over nights
- V. Aluminium wire is dipped in un-boiled water
- VI. A dry iron is wrapped with cotton wool

(b) Briefly explain any four methods of preventing rusting

9. (a) Write chemical formula of the two compounds from which oxygen gas can be prepared by decomposition.

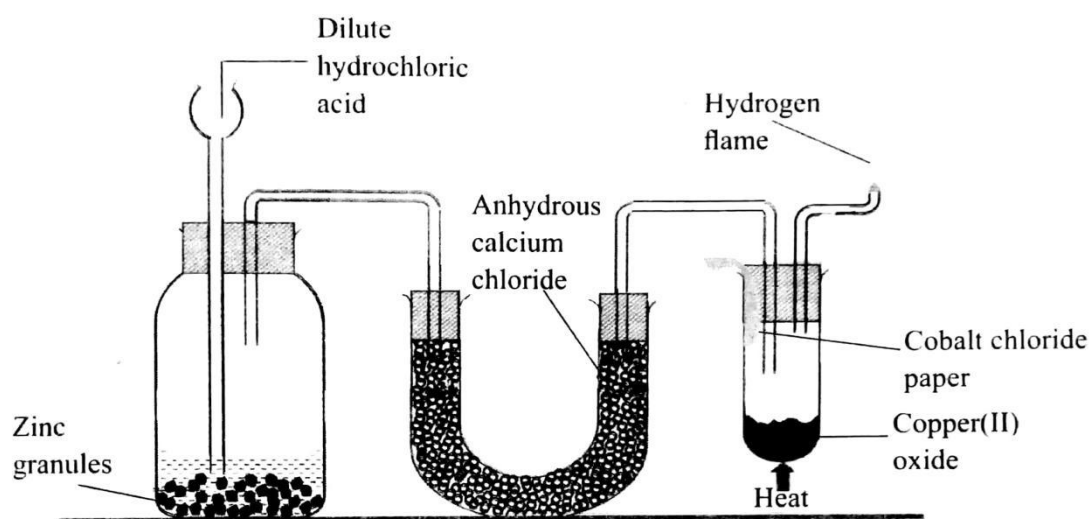
(b) What are three physical properties of oxygen gas?

(c) Why is it important to have abundant oxygen gas on earth? Give five reasons.

### SECTION C (15 MARKS)

Answer question **number 10**

10. Kabwaza is a form two student at Mbagala secondary school, He conducted an experiment to investigate the chemical properties of hydrogen gas as shown in the setup below



- i) What is the aim of the experiment
- ii) What happens to copper (II) oxide during the experiment?
- iii) Write well balanced chemical equation between copper(II) oxide and hydrogen gas
- iv) What happens to cobalt (II) chloride paper?
- v) Why cobalt (II) chloride used?
- vi) What other substance can serve the same purpose as cobalt (II) chloride paper?
- vii) Which function does calcium chloride perform?

**THE UNITED REPUBLIC OF TANZANIA**  
**JOIN THE REVOLUTION PROGRAM**  
**FORM TWO CHEMISTRY SERIES No. 05**

NAME \_\_\_\_\_ TIME 2:30 HRS

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**INSTRUCTIONS**

- This paper consists of section **A**, **B** and **C** with total number of **ten (10)** 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 (15 MARKS)

### Answer all questions in this section

1. Choose the correct answer among the given alternatives and write its letter in your exercise book.

i) One of the following apparatus is used to measure a fixed volume of liquids

- a) Pipette  
b) Burette  
c) Measuring cylinder  
d) Beaker

ii) Coloured substances can be separated through the process called

- a) Filtration  
b) Chromatography  
c) Distillation  
d) Sublimation

iii) Which of the following equations is a neutralization reaction?

- a)  $\text{Zn} + \text{Cl}_2 \longrightarrow \text{ZnCl}_2$   
b)  $\text{Fe} + \text{S} \longrightarrow \text{FeS}$   
c)  $\text{H}^+ + \text{OH} \longrightarrow \text{H}_2\text{O}$   
d)  $\text{CaCO}_3 \longrightarrow \text{CaO} + \text{CO}_2$

iv) Moving across a period in the periodic table

- a) Electronegativity decrease  
b) Electronegativity increase  
c) Metallic property increase  
d) Electropositivity increase

v) A solution of pH 1.5 is best described as

- a) Weak acid  
b) Strong base  
c) Weak base  
d) Strong acid

vi) A sample of chlorine gas was found to contain 75% of the isotope  $^{37}\text{Cl}_{17}$  and 25% of isotope  $^{35}\text{Cl}_{17}$ . Which of the expressions below is used to calculate the relative atomic mass of chlorine?

- a)  $\frac{(35 \times 75) + (37 \times 25)}{100}$   
b)  $\frac{(35 \times 25) + (37 \times 75)}{100}$   
c)  $\frac{(75 \times 25) + (37 \times 35)}{100}$   
d)  $\frac{35+37}{2}$

vii) Which of the following group of substances represents flammable liquids?

- a) Petrol, pesticides, hydrogen  
b) Petrol, sulphuric acid, methylated spirit  
c) Methylated spirit, petrol, kerosene  
d) Kerosene, diesel, hot water

viii) Element M of group I element combines with element X of Group VI, the formula of the compound is

- a)  $X_2M_6$
- b)  $MX_2$
- c)  $MN_6$
- d)  $M_2X$

xi) Acid changes colour of litmus paper from

- a) Blue to yellow
- b) Red to blue
- c) Red to pink
- c) Blue to red

x) The untreated water and treated water differ in that

- a) Untreated water contains dirt while the treated water contains dissolved chemicals
- b) Treated water forms lather with soap while the untreated forms scum
- c) Untreated water is safe for swimming while the treated can corrode the skin
- d) Treated water is safe for swimming while the untreated can be harmful to the health

2. Match the portable fire extinguishers in **LIST A** against their corresponding colour codes (ratings) in **LIST B** by writing the letter of the correct response beside the item number

LIST A	LIST B
(i) Air pressurized water (APW) extinguisher	A. Green
(ii) Carbon dioxide extinguisher	B. Blue
(iii) Wet chemical extinguisher	C. Cream
(iv) Dry chemical extinguisher	D. Red
(v) Foam extinguisher	E. Black
	F. Yellow
	G. Grey
	H. white

## SECTION B (70 MARKS)

### Answer all questions

3. (a) Filtration and centrifugation methods can both be used in the laboratory to separate the mixture forming suspension. In what context the two methods differ in functioning? Explain
- (b) Jolin planned to conduct an experiment so as to verify the effect of temperature on the behavior of water. She boiled  $300\text{cm}^3$  of water in a beaker using Bunsen burner flame and she recorded the temperature of water after every ten (10) seconds. On her experiment, she observed two processes, first was the formation of small amount of water vapour at  $40^\circ\text{C}$  and last process was the formation of large amount of water vapour at  $100^\circ\text{C}$
- (i) State the names of two processes observed during the experiment
- (ii) Give any three (3) difference between the two processes observed during the experiment
4. (a) Give reason for each of the following
- (i) Controlled variables are important when designing an experiment
- (ii) Experimentation is nothing without hypothesis
- (b) Mwajuma conducted an experiment at 10:00 a.m and Lucy conducted the same experiment at 04:00 p.m. the results of the experiment conducted by Lucy were quite different from that of Mwajuma, such that the results can't be used to verify the same phenomena. What might be the causes of the difference in their experimental results? Explain any two (2) causes
- (c) (i) When you visit a chemistry laboratory, you will find that some of the laboratory apparatus are made of clay or porcelain material. Give any four (4) reasons for this.
- (ii) Any building is suitable for being used as a chemistry laboratory, provide that it is tall and white inside. Refute this statement with four (4) points

5. (a) Why zinc is the most preferred metal during laboratory preparation of hydrogen gas by the action of dilute acids with metals? Explain
- (b) Why it is important to pass the prepared hydrogen gas through silver nitrate solution, then in lead nitrate solution and finally in potassium hydroxide solution before passing the gas over a drying agent like calcium chloride? Explain
- (c) Hydrogen gas is a very promising energy source, yet its uses as a major source of energy are very limited. Explain this in terms of its storage, safety and production.
6. (a) How the presence of impurities like common salt affects the boiling point of water? Explain
- (b) Though distilled water is pure water, people prefer potable water over distilled water for drinking. Justify this statement with two (2) reasons
- (c) Acidulated water is taken in Hoffmann voltameter to carry out the electrolysis process. If a piece of litmus paper is dipped in both of the compartments of Hoffmann voltameter, what change will be observed in the colour of the litmus during the electrolysis process? Explain
7. (a) Which postulate of Dalton's Atomic Theory is considered to be correct even today? Explain
- (b) The postulates of Dalton's Atomic Theory are said to be primitive. Give four (4) reasons to support this statement
8. (a) You are given a gas jar containing gas w. The gas shows positive test with nitrogen monoxide gas and pyrogallol solution, as it forms brownish fumes of nitrogen dioxide gas when it comes into contact with nitrogen monoxide gas and turns alkaline pyrogallol solution from colourless to brown.
- (i) Identify gas w
- (ii) Explain the other test other than the tests mentioned in above, that can be used to identify gas w in the laboratory
- (iii) State any two (2) uses of gas w in our daily life



(b) Madam Angel placed a grey solid substance on a deflagrating spoon, ignited it and then lowered the spoon into a gas jar full of oxygen gas. The solid burnt with a brilliant (bright) white flame and the product of combustion was white powdered material. Finally, the product of combustion was dissolved in a beaker containing water so as to form an aqueous solution.

- (i) What is the name of the grey solid substance?
- (ii) Give the name of the white powdered product formed
- (iii) Write the word equation for the reaction between the grey substance and oxygen gas
- (iv) What could happen if both blue and red litmus papers might have been dipped in a beaker containing an aqueous solution of white powdered material? Explain

9. (a) Give reason(s) for each of the following

- (i) The amount of methane and sulphur always affects the quality of natural gas
- (ii) Wind is said to be the promising future source of energy

(b) A mass of 30 g of petrol was burnt in air. The heat produced was used to heat 3.0 litres of water up to 373K. Determine the initial temperature of water in degrees Celsius. Given that

- The heat value of fuel was 43,640 kJ/kg
- Specific heat capacity of water,  $C_w = 4.18 \text{ kJ kg}^{-1} \text{ K}^{-1}$
- Density of water,  $\rho_w = 1 \text{ g/cm}^3$
- Density of petrol,  $\rho_p = 0.85 \text{ kg/dm}^3$

**SECTION C (15 MARKS)**

**Answer question number 10**

10. A Librarian of U.B.N. Schools found that there is a poor light supply in the library room, as a result the quality of the room was low. He decided to find the causes of the problem by observing the main electrical switch. Unfortunately, the fire erupted and spread in the room whereas a large number of books and magazines burnt due to fire.

- (a) State the class of fire that caused the burning of large number of books and magazines. Give reasons for your choice
- (b) What type of a portable fire extinguisher should have been used to extinguish the fire so as to save some books and magazines? Give reasons for your choice.
- (c) What type of a portable fire extinguisher should have been not used to extinguish the fire? Give reason.
- (d) Before extinguishing the fire using an appropriate fire extinguisher, what action should have been taken first? Explain

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**FORM TWO CHEMISTRY SERIES No. 06**

NAME \_\_\_\_\_

TIME 2:30 HRS

**INSTRUCTIONS**

- This paper consists of section **A, B** and **C** with total number of **ten (10)** 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 name** 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

QUESTION NUMBER	TICK(√)	SCORE	EXAMINER'S INITIAL
1			
2			
3			
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**SECTION A (15 MARKS)**

**Answer all questions in this section**

1. For each of the following items (i) –(x), choose the most correct answer from the given alternatives and write its letter beside the item number in the answer table provided below

i) Identify the products formed during the preparation of oxygen gas when hydrogen peroxide is decomposed by manganese iv oxide

- a) Water and oxygen                      b) Hydrogen and water  
c) Sulphur dioxide and oxygen      d) Hydrogen and oxygen

ii) Who coined the term atom?

- a) Democritus                                b) Dalton  
c) Rutherford                                d) J.J Thompson

iii) The process by which water is converted into vapour or steam is called

- a) Condensation                            b) Transpiration  
c) Precipitation                            d) Evaporation

iv) In simple distillation process the apparatus used to cool vapour is known as

- a) Desicator                                b) Kip's apparatus  
c) Liebig condenser                      d) conical flask

v) How do the chemists refer to a mixture of milk and water?

- a) Suspension                              b) Immiscible solution  
c) Miscible solution                      d) Emulsion

vi) The water obtained during fractional distillation is called

- a) Filtrate                                    b) Analyte  
c) Water content                          d) Distillate

vii) Which of the warning sign relate directly with Mercury?

- a) Toxic                                        b) Corrosive  
c) Irritant                                    d) Radioactive



**SECTION B (70 MARKS)**

**Answer all questions in this section**

3. (a) State one uses of each of the items (i) – (v) in administering First Aid

S/N	Items	uses
(i)	Soap	
(ii)	Bandage	
(iii)	Sterile gauze	
(iv)	Iodine tincture	
(v)	Petroleum jelly	

(b) Give one function of each of the following apparatus in the chemistry laboratory

- (i) Spatula      (ii) Gas jar      (iii) Lie-big condenser  
(iv) "Mortar" and pestle      (v) Wire gauze

4. (a) By giving one reason, explain the following facts:

(i) During laboratory preparation of oxygen gas, little manganese dioxide is added to hydrogen peroxide.

(ii) Fish can obtain oxygen for respiration although they spend their lives in water

(iii) Oxygen gas can be used for welding activities although they it does not burn

(b) Which property enables the use of hydrogen gas in.

- (i) Filling weather balloons  
(ii) Production of ox-hydrogen flame?

(c) Give two domestic uses of oxygen gas

5. (a) Give three chemical test for water and show the results obtained in each

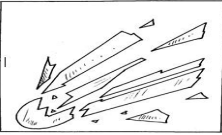


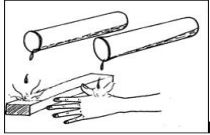

- (b) (i) Differentiate water treatment from water purification  
(ii) Why should drinking water be treated and purified? Give two reasons  
(iii) How can drinking water be treated or purified?

6. (a) Differentiate hypothesis from analysis

(b) Effective use of four sense of observation is important before a chemist can make conclusion. With four points, show how the senses are used as tools of observation during experimentation by giving one example for each.

7. What precaution will you take in handling chemicals having the warning signs shown in the table?

Give two precautions in each sign.

S/N	Sign	Relevant precaution
(a)		(i) ..... ..... (ii) ..... .....
(b)		(i) ..... ..... (ii) ..... .....
(c)		(i) ..... ..... (ii) ..... .....
(d)		(i) ..... ..... (ii) ..... .....
(e)		(i) ..... ..... (ii) ..... .....

8. Briefly explain the five classes of fires based on the nature of the burning materials and the extinguisher required. Give one example for each class.

9. A certain gaseous compound contains 30.4% of nitrogen and 69.6% of oxygen by mass. If the molar mass of the compound is 92, calculate its molecular formula.

**SECTION C (15 MARKS)**

**Answer question number 10**

10. Briefly explain five characteristics to be considered when looking for good fuel

**THE PRESIDENT'S OFFICE  
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT  
FORM TWO CHEMISTRY  
SERIES No. 07**

NAME \_\_\_\_\_ TIME 2:30 HRS

**INSTRUCTIONS**

- This paper consists of section **A, B** and **C** with total number of **ten (10)** 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

QUESTION NUMBER	TICK(√)	SCORE	EXAMINER'S INITIAL
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## SECTION A (15 MARKS)

Answer all questions in this section

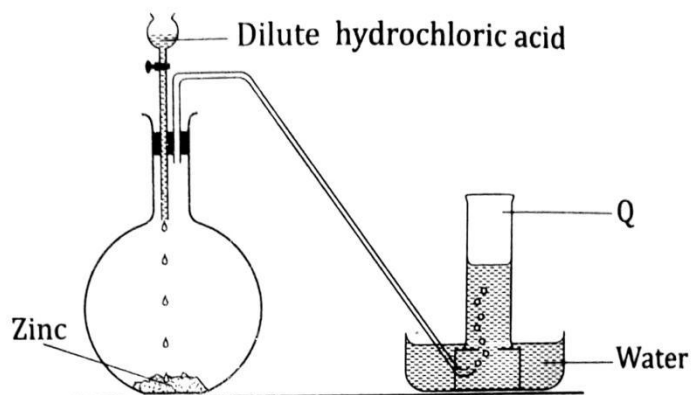
1. Choose the correct answer from the given alternatives and write its letter
- i) When substance A and B react to produce a new substance C, the reactants A and B is said to:
- a) Undergo chemical change
  - b) Form a solution C
  - c) Undergo a physical change
  - d) Form a mixture
- ii) According to Dalton's atomic theory, the smallest particle which can undergo chemical change is:
- a) An electron
  - b) A molecule
  - c) An atom
  - d) A proton
- iii) Element Q of atomic number 12 is found in
- a) Group I and period 2
  - b) Group II and period 2
  - c) Group II and period 3
  - d) Group IV and period 4
- iv) When hydrogen chloride molecule is formed covalently, how many electrons are shared between hydrogen and chlorine atoms?
- a) 1 electrons
  - b) 2 electron
  - c) 3 electron
  - d) 4 electron
- v) Which of the following sets of symbols could represents isotopes of a single elements
- a)  ${}^{16}_8X$ ,  ${}^{17}_8X$ ,  ${}^{18}_8X$
  - b)  ${}^{16}_8Z$ ,  ${}^{17}_8Z$ ,  ${}^{16}_9Z$
  - c)  ${}^{16}_7W$ ,  ${}^{16}_8W$ ,  ${}^{16}_9W$
  - d)  ${}^{16}_7W$ ,  ${}^{17}_8W$ ,  ${}^{18}_9W$
- vi) The method of separating a mixture of two liquids by using their differences in boiling points is know as
- a) Distillation
  - b) Filtration
  - c) Evaporation
  - d) Fractional distillation

- vii) Soot is most likely to be found in a Bunsen burner flame when
- The air hole is fully opened and the gas supply fully on
  - The gas supply is turned as low as possible
  - The air hole is closed so that air cannot enter and mix with the gas
  - A test tube is held in flame
- viii) If the following substances were heated carefully on an open dish, which one would most likely increase in weight?
- Copper powder
  - Anhydrous sodium carbonate
  - Potassium permanganate crystals
  - Blue copper (II) Sulphate crystals
- ix) Which soil sample is likely to contain the greatest amount of nitrogen?
- Clay
  - Humus
  - Sand
  - Loam
- x) The most effective metal coating for prevention of iron rust is
- Lead
  - Tin
  - Zinc
  - Copper

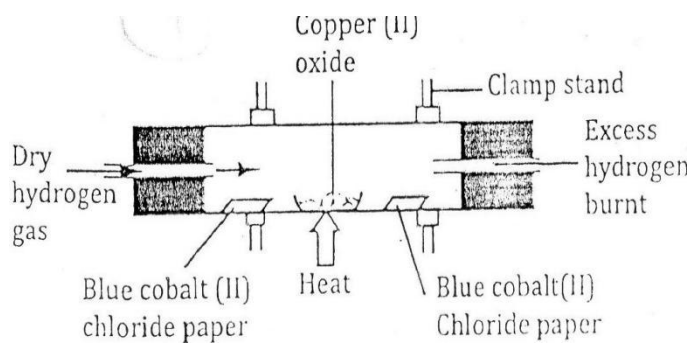
2. Match the mixtures in list a with the methods of separation in list b by writing the letter of the correct response below the corresponding item number in the answer sheet provided.

List A	List B
I. Ammonium chloride in sand	A. Decantation
II. Muddy water	B. Chromatography
III. Oil in sunflower	C. Evaporation
IV. Sodium chloride in water	D. Fractional distillation
V. Spirit in water	E. Layer separation
	F. sublimation

3. The following figure shows a set-up used to prepare gas Q

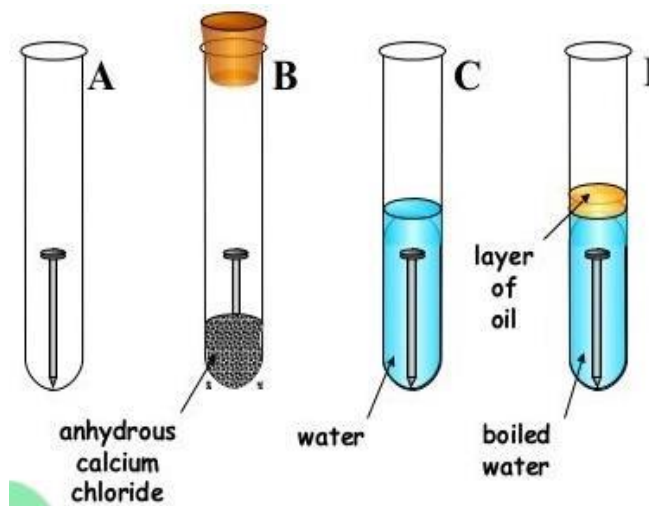


- Identify gas Q
  - Identify other two chemical substances that could be used in the laboratory to prepare gas Q if zinc is not present
  - State two physical properties of gas Q
  - State two chemical properties of gas Q
4. a) Study the experiment diagram below and answer the questions that follow



- What happens to the copper (II) oxide during the experiment?
  - What happens to two pieces of cobalt paper?
  - Write a word equation for the reaction
- b) Mention four chemical properties of hydrogen gas

5. a) Using the idea of particles explain why
- It is easy to pour a liquid
  - A gas will completely fill any container
- b) When you open a freezer you may find ice inside on the walls. How does this ice form?
- c) What would happen to a well stoppered bottle full of water left in a deep freezer over night?? Why does this happen?
6. a) Which part of the flame is coolest of all? Why
- b) Name four heat sources that can be used in the laboratory
- c) Why the outer zone of the flame is hotter than other parts of the flame?
- d) Why warning signs are so important?
7. You are provided with the diagram below, study it carefully and then answer the questions that follow



- a) State short and clear description what will be observed in each test tube A-D after 2 or 3 days
- Why the water in the test tube D boiled then covered with oil
  - What is the function of calcium chloride in test tube B
  - What conclusion can you draw from your experiment?
  - Give two similarities between combustion and rusting
  - Give two differences between combustion and rusting

8. a) How can you answer when someone ask your about energy value of a fuels.

b) Calculate the heat obtained by burning ethanol. Using the information given

Temperature of cold water =  $25^{\circ}\text{C}$

Temperature of warm water =  $45^{\circ}\text{C}$

Mass of lamp at the beginning = 40.50g

Mass of the lamp at the end = 40.00g

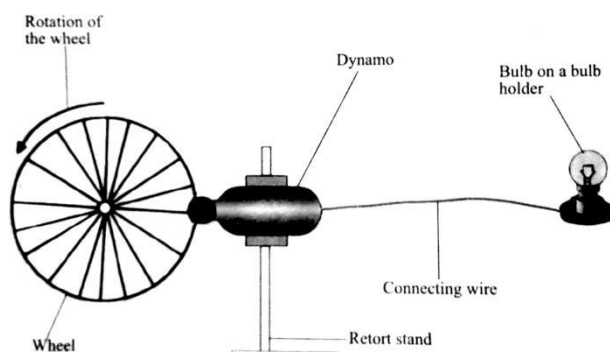
Volume of water = 100cm

Specific heat capacity of water is  $4.2\text{J mol}^{-1}\text{ }^{\circ}\text{C}^{-1}$

c) The figure below shows the demonstration of the conservation of kinetic energy to electrical energy

i) What form of energy does the rotating wheel possess?

ii) Describe the energy transformations that takes place from the rotating wheel to the lit bulb



9. The figure below is part of the periodic table where the transition metals are not included. The numbers in the table are the atomic numbers of some of the elements

→ **GROUPS**

↓ **PERIODS**

1						2
	4		6		8	
11	12					17

- a) i) For each number, write the symbol of the corresponding element  
ii) Considering the elements with atomic number 12 and 17, which is a metal and which is non-metal?  
iii) Write one equation which represents a reaction between the element with atomic number 1 and the element with atomic number 17.
- b) i) What are the types of oxides formed by elements with atomic numbers 11 and 12?  
ii) Write a balanced chemical equation between the oxides of the element with the atomic number 11 and aqueous solution of the compound formed in (a) (iii)  
iii) Write the symbol of an inert gas element represented by the given atomic number

SECTION.B (15 MARKKS)

**Answer question number 10**

10. (a) Give reason(s) for each of the following  
i) The amount of methane and sulphur always affects the quality of natural gas  
ii) Wind is said to be the promising future source of energy
- (b) A mass of 30g of petrol was burnt in air. The heat produced was used to heat 3.0 litres of water up to 373K. Determine the initial temperature of water in degree celcius. Given that
- The heat value of fuel was 43,640 kJ/kg
  - Specific heat capacity of water,  $C_w = 4.18 \text{ kJkg}^{-1}\text{K}^{-1}$
  - Density of water,  $\rho_w = 1\text{g/cm}^3$
  - Density of petrol,  $\rho_p = 0.85\text{kg/dm}^3$

**PRESIDENTS OFFICE  
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT  
FORM TWO CHEMISTRY EXAMINATION  
SERIES NO.8**

**TIME: 2:30 HRS**

**YEAR 2024**

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- This paper consists of sections A, B and C
- Answer all questions in both sections
- All writings should be in blue or black ink except diagrams which you must use a pencil
- A clean work is highly recommended

SECTION A (15 MARKS)

Answer **all questions** from this section

1. For each of the items (i)-(x); choose the correct answer from among the given alternatives

and write its letter in the box provided

(i) A team of researchers is investigating ways to improve the efficiency of solar panels. They are exploring different materials and their chemical properties to enhance the conversion of sunlight into electricity. What aspect of chemistry is central to their research?

- a) Studying geological Formations.
- b) Exploring astronomical phenomena
- c) Analyzing chemical reactions.
- d) Investigating historical artefacts.

(ii) In a pharmaceutical research laboratory, scientists are working on developing a new medication to treat a common illness. They need to analyze the chemical properties of different compounds to ensure the effectiveness and safety of the potential drug. Which aspect of studying chemistry is most directly relevant to this situation?

- a) Understanding how matter undergoes chemical change.
- b) Making various medical products
- c) Understanding the use of chemicals in agriculture
- d) Helping to enter into various careers.

(iii) You accidentally break a glass beaker during an experiment. What is the correct procedure for handling broken glassware?

- a) Use your hands to pick up the larger glass pieces
- b) Sweep the broken glass into the regular trash bin.
- c) Use a dustpan and broom to carefully collect the broken glass, placing it in a designated glass disposal container.
- d) Ignore the broken glass and continue with your experiment

(iv) A chemistry student is performing a lab activity that involves sterilizing a loop before inoculating bacteria onto a culture medium. The student reaches for the Bunsen burner. What role does the Bunsen burner play in this situation?

- a) To cool down the wire loop
- b) To sterilize the wire loop by burning off any microorganisms
- c) To provide a comfortable atmosphere for the bacteria.
- d) To illuminate the work area.



(v) An environmental scientist & studying the impact of air pollution on plant growth. Different plants are exposed to varying levels of pollutants over a period, and measurements are taken to assess their growth rates. What is the scientific procedure involved in this study?

- a) Observation and data collection.
- b) Filtration
- c) Hypothesis testing
- d) Distillation.

(vi) If water does not easily form lather with soap, it is because of the presence of.

- a) Calcium and magnesium salts
- b) Calcium Sulphate
- c) Sodium and calcium salts
- d) Ammonium and Magnesium salts.

(vii) Separation of a mixture by fractional distillation is possible. If the mixture constituents differ in their

- a) Boiling point
- b) Melting Point
- c) Vaporizing points
- d) Freezing points

(viii) A student who gets burnt burnt's accidentally in the chemist laboratory would be given one of the following as first aid.

- a) Antibiotic solution
- b) Nitric acid
- c) Petroleum jelly
- d) Potassium permanganate.

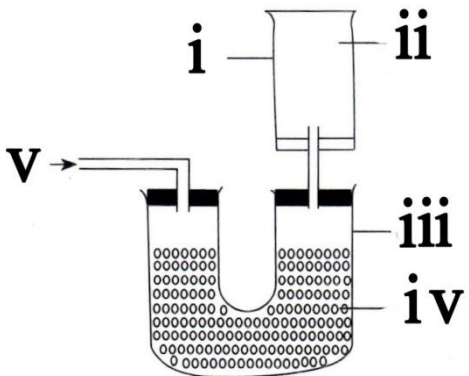
(ix) The boiling point of pure water at sea level is  $100^{\circ}\text{C}$  and that of ethanol is  $78^{\circ}\text{C}$ . The mixture of ethanol and water can be separated by

- a) Filtration process
- b) Fractional distillation process
- c) Layer separation process
- d) Sublimation process.

(x) Which group among the following elements are metals?

- a) Calcium, magnesium and sodium
- b) Calcium, hydrogen and nitrogen
- c) Calcium, Carbon and magnesium.
- d) Oxygen, potassium and sodium.

2. Match the parts of diagram which shows the collection of dry hydrogen gas using anhydrous calcium chloride in list A with its corresponding response in list B

LIST. A	LIST.B
	<p>A. Gas jar            B. Dry hydrogen            C. Mixture of hydrogen and air            D. Anhydrous calcium chloride            E. U-tube            F. Wet hydrogen gas            G. Inverted gas tube</p>

SECTION.B (70 MARKS)

Answer **all questions** from this section

3.(a) When do hypothesis rejected or accepted?

(b) Mention the major problem that we normally account in our normal life and you think they can be solved by following scientific procedure.

(c) What should be done when carrying out experiment and you find that results do not agree with the hypothesis?

(d) Why laboratory rules are so important?

4.(a) An environmentalist is advocating for sustainable energy solution in a community. How does the classification of Fuels based on their states influence the discussion about adopting renewable energy sources? Provide examples of renewable fuels from each state and their potential applications in daily life.

(b) A commuter relies on public transportation to get to work every day. Explain how the Combustion of fossil fuels in buses and trains contributes to the energy needed for transportation in urban areas. Highlight the specific role of fuels in powering engines and facilitating daily commutes.

5. (a) John a form one student at Buguza Secondary School accidentally mixed sulphur and Iron fillings.

- i) Suggest an appropriate method of separation you would advise him to use to separate the mixture.
- ii) Give a reason for the choice of your answer.
- iii) Describe how he would use the method named above to separate the Sulphur and Iron fillings.

(b) Name two substances that sublime when heated.

(c) Why water is not a suitable solvent in paper chromatograph?

6.(a) If you were stranded In a desert with no water how could you collect a supply of drinkable water? You only have a spade, plastic sheet, few heavy stones and plastic cup.

(b) Marra thought her filtering experiment was too slow. She stirred inside the funnel with a glass rod. However, she found that the residue was getting into the evaporating basin. Suggest what she has done.

(c) Your friend dropped some salt on the ground accidentally. The salt got mixed up with dust and sand. Your required to advice your friend on what to do at home so as to get back his salt as clean as possible. In your advice you may use the followings: Kerosene burner, aluminium pot, clean piece of cloth, powdered charcoal, large tin and a sand bath.

7. Some beakers, syringes and measuring cylinders are made of plastic. What are the advantages and disadvantages of plastic containers?

b) Which factor is removed when a wet blanket is put over a small fire?

8. There are three Isotopes of carbon. They have mass number of 12, 14 and 16. The average atomic mass of carbon 12.0107

- a) What does this say about the relative abundance of the Isotopes?
- b) If the three Isotopes listed In the question above all had the same relative abundance, What would the average atomic mass be?

9. A quantity of Epsom salts, magnesium sulphate heptahydrate,  $MgSO_4 \cdot 7H_2O$ , Is heated until all the water is driven off. The sample loses 11.8g in the process. What was the mass of original sample?

SECTION.C (15 MARKS)

Answer **question number 10**

10. You're an aspiring chef, experimenting with different oils for cooking techniques. Some oils remain liquid at room temperature, while others solidify quickly. This variation in melting and boiling points influences their suitability for different cooking methods. Can you explain the differences in melting and boiling point between group IV elements (like carbon in vegetable oil) and group I group or group VII elements (like sodium in salt and chlorine in some cooking sprays)?

**PRESIDENTS OFFICE  
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT  
FORM TWO CHEMISTRY EXAMINATION  
SERIES NO.9**

**TIME: 2:30 HRS**

**YEAR 2024**

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- This paper consists of sections A, B and C
- Answer all questions in both sections
- All writings should be in blue or black ink except diagrams which you must use a pencil
- A clean work is highly recommended

## SECTION A (15 MARKS)

Answer **all questions** from this section

1. For each of the items (i)-(x); choose the correct answer from among the given alternatives and write its letter in the box provided

(i) At a water treatment plant, technicians are using chemical processes to purify drinking water. They add specific chemicals to remove contaminants and ensure the water is safe for consumption. What is the fundamental purpose of those chemical processes in water treatment.

- a) Enhancing water colour for artistic purposes
- b) Purifying water for safe consumption decorative water
- c) Creating decorative water features
- d) Generating electricity from water

(ii) You are about to use a Bunsen burner to heat a substance in a test tube What is the correct procedure for lighting the Bunsen burner?

- a) Turn on the gas, then light the match and hold it over the burner
- b) Light the match first, then turn on the gas and carefully ignite the burner
- c) Use an open flame to check if the burner is already on.
- d) Skip lightning the Bunsen burner and proceed with the experiment.

(iii) In a University laboratory, students are carrying out an experiment, involving the identification of metal ions by flame test. They are using a Bunsen burner as part of the experimental setup. What is the specific role of the Bunsen burner in the flame test experiment?

- a) To create a pleasant aroma in the lab
- b) To identify metal ions by their characteristic flame colours.
- c) To generate electricity for the experiment.
- d) To cool down the metal ions.

(iv) A pharmaceutical Company is developing a new drug and is testing its effectiveness in inhibiting the growth of bacteria. They conduct multiple trials using varying concentrations of the drug. What is the scientific procedure involved in assessing the drug's effectiveness?

- a) Filtration
- b) Titration
- c) Experimentation and data analysis
- d) Chromatography.

(v) A student is conducting a science experiment to investigate the behaviour of different substances when heated. What aspect of matter is crucial for understanding why some substances undergo a change in state when heated, while others do not?

- a) The colour of the substances
- b) The texture of the containers.
- c) The melting and boiling point of the substances.
- d) The size of the heat source.

(vi) Imagine you're driving a car powered by an internal combustion engine. What fundamental chemical reaction is taking place within the engine to propel the car forward?

- a) Respiration
- b) Condensation
- c) Combustion
- d) Dissolution

(vii) The choice of the source of heat depends on the

- a) Colour of the flame.
- b) quantity of heat produced
- c) Substance to be burned or boiled
- d) Type and shape of flame.

(viii) An important property of Oxygen which distinguishes it from other gases is that it:

- a) Burns and supports combustion.
- b) Burns but does not support combustion
- c) Neither burns nor supports combustion.
- d) Supports Combustion but does not burn.

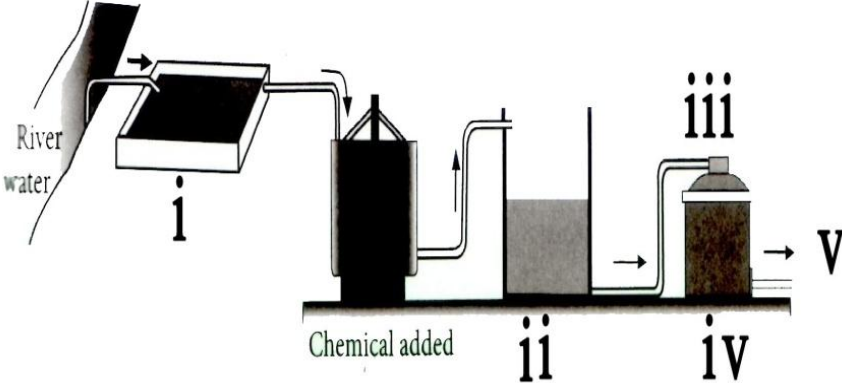
(ix) The process of Chlorination in water treatment aims at

- a) Forming suspension
- b) Killing micro organisms
- c) Making Syrup.
- d) Removing bad colour.

(x) One of the following is not correct about take coke being a better fuel than coal as it.

- a) Does not produce Carbon dioxide gas
- b) Does not produce poisonous gas
- c) Has a higher heat Content
- d) Is clean and smokeless.

2. The diagram below shows the stages in urban water treatment. Match the unlabelled stage in list A with their corresponding response from list B

LIST.A	LIST.B
 <p>The diagram illustrates the stages of urban water treatment. It starts with 'River water' entering a tank labeled 'i'. The water then flows to a tank labeled 'ii' where 'Chemical added' is introduced. From there, it goes to a tank labeled 'iii', then to a tank labeled 'iv', and finally to a tank labeled 'v' which is the final output.</p>	<ul style="list-style-type: none"> <li>A. Sand filter</li> <li>B. Chlorination</li> <li>C. Sedimentation</li> <li>D. Filtration</li> <li>E. Aeration</li> <li>F. Treatment and storage of water</li> <li>G. Coarse gravel</li> </ul>

SECTION.B (70 MARKS)

Answer **all questions** from in this section

3.(a) Why do we store the covered bottles of Oxygen gas mouth up rather than down?

(b) Why must the end of the thistle funnel be below the surface of the solution in the flat bottomed flask?

4.(a) A farmer installs a biogas digester on their farm to manage agricultural waste. Explain the chemical process involved in the production of biogas from Organic matter in the digester. How does this application benefit the farmer in terms of waste management and energy production?



(b) A dairy farm implements a biogas digester to manage cow manure. Illustrate how the use of biogas from cow manure contributes to environmental conservation by addressing methane emissions, nutrient management and the production of renewable energy for on farm use.

5. Glory was investigating the purification of water by observing pond water, She collected sample of pond water in a container and left it on her bedroom window overnight. The next morning she noticed that water as having a lot of clearer and that there was a layer of sludge on the bottom of the container.

- a) What stage in the purification of water does this represent?
- b) Which chemical is used to make this stage faster?
- c) The water now looks as clear as top water and Glory is tempted to drink it shouldn't she drink this water?

6. (a) What is the relationship between an atom and an element?

(b) A neutral atom of an element has 2 electrons in the first shell, 8 electrons in the second shell and 8 electrons in the third shell, Briefly explain what this information tell us.

7.(a) Most of the Societies in Tanzania are using fire wood and charcoal as a source of fuel for domestic uses because it is very cheap and readily available, but it has a negative effect in the environment. Assess the effects of such fuel in the environment.

(b) Distinguish between Renewable and non- renewable sources of energy

(c) Give at least three importance of biogas.

8. A chef accidentally mixes two liquids in the kitchen. One is cooking oil and the other is Vinegar. Classify the resulting mixture and explain its properties.

9. In a Chemistry Laboratory, a chemical Spill ignites, resulting in a small fire. Identify the correct fire extinguisher and describe why it is suitable for Chemical fires.

#### SECTION.C (15 MARKS)

Answer question number ten **(10)**

10. What is the mass percentage of hydrogen and Oxygen in water?

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**PRESIDENTS OFFICE  
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT  
FORM TWO CHEMISTRY EXAMINATION  
SERIES NO.10**

**TIME: 2:30 HRS**

**YEAR 2024**

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- This paper consists of sections A, B and C
- Answer all questions in both sections
- All writings should be in blue or black ink except diagrams which you must use a pencil
- A clean work is highly recommended

SECTION A (15 MARKS)

Answer **all questions** from this section

1. For each of the items (i)-(x); choose the correct answer from among the given alternatives and write its letter in the box provided

(i) In the field of medicine, understanding the principles of Chemistry is Crucial for developing and prescribing effective drugs, which option below best defined the term "Chemistry", in the context of drug development and pharmaceuticals?

- A. Study of non-living things.
- B. Study of physical properties of matter.
- C. Study of drugs
- D. Study of Composition and decomposition of matter.

(ii) Consider the following scenarios related to physiological processes in the human body. Based on your knowledge of chemical reaction Chemical reaction, which of the following illustrates a chemical reaction taking place in our body?

- A. Falling sick
- B. Digestion
- C. Respiration
- D. Salivating

(iii) Separation of mixture by fractional distillation is possible if the mixture constituents differ in their:

- A. Boiling points
- B. Melting Points
- C. Vapourizing points
- D. Freezing points.

(iv) When element T at group I combines with element x of Group VI, the formula of the Compound formed is

- A.  $T_2X$
- B.  $X_2T$
- C.  $TX_2$
- D.  $XT_4$

(v) How many protons, neutrons and electrons are there in an atom presented by the symbol  ${}_{19}^{39}k$ ?

	Protons	Neutrons	Electrons
A.	39	19	20
B.	19	39	20
C.	20	19	20
D.	19	20	19

(vi) Saturated solution is one which

- A. Contains more solute undissolved at a given temperature.
- B. Will take no more of solute at a given temperature.
- C. Contains a little solute at a given temperature.
- D. Has a large amount of solvent at a given temperature.

(vii) A student who gets burnt accidentally in the chemistry laboratory would be given one of the following as first aid.

- A. Antibiotic Solution.
- B. Nitric acid
- C. Petroleum Jelly
- D. Potassium permanganate.

(viii) The percentage by mass of nitrogen in  $(\text{NH}_4)_2\text{CO}_3$  is.

- A. 28.0
- B. 29.1
- C. 37.5
- D. 96.0

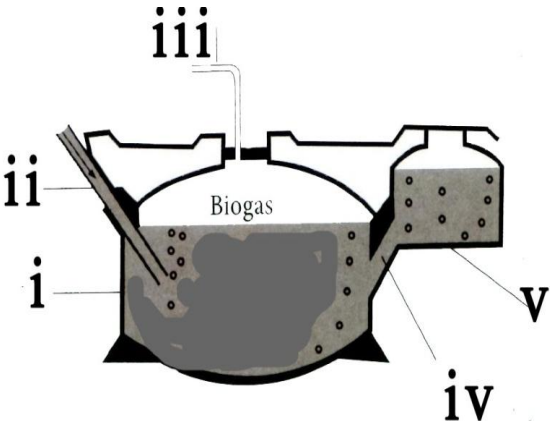
(ix) In a water treatment plant, ozone ( $\text{O}_3$ ) is used to disinfect water. This ozone is produced by passing an electric current through pure Oxygen obtained from

- A. Decomposing hydrogen peroxide with manganese dioxide
- B. Heating potassium chlorate and collecting the evolved gas
- C. Electrolyzing water using sodium hydroxide as the electrolyte
- D. Separating air into its components using fractional distillation

(x) In your city, there is growing concern about air pollution caused by vehicle emissions. Which fuel would be the most environmental friendly alternative to produce air pollution while still providing efficient transportation.

- A. Gasoline
- B. Diesel
- C. Biodiesel
- D. Hydrogen

2. The figure below shows the biogas digester ,Match the unlabelled parts in list A with their corresponding answer in list B

LIST.A	LIST.B
 <p>The diagram shows a cross-section of a biogas digester. It consists of a main spherical digester tank (i) with an inlet pipe (ii) on the left side. At the top, there is a gas outlet (iii). To the right, there is a removable tank (iv) and an overflow tank (v). The word 'Biogas' is written inside the main tank.</p>	<p>A. Overflow tank            B. Out let            C. Seal            D. Biogas collection            E. Inlet pipe            F. Inlet            G. Digester tank            H. Removable tank</p>

### SECTION.B (70 MARKS)

Answer **all questions** in this section

3. Hydrogen peroxide can be dangerous chemical. A bottle of hydrogen peroxide was left standing on a sunny window sill. The bottle had a screw top suddenly one day the bottle exploded

- Why did the bottle exploded?
- How would you suggest that hydrogen peroxide is stored safely

4. Imagine yourself standing before your classmates, tasked with delivering a captivating morning speech about "classification of fuels based on their efficiency". Here's how you can utilize the concepts of

- Phyrometric effect of burning and
- Heat value to build an engaging and informative presentation

5.(a) Explain why hydrogen is included in reactivity series of metals

(b) Explain why hydrogen gas should be prepared in small amount

(c)Why when using the thistle Funnel without the tap, the tube of the thistle Funnel is dipped to the solution.

6.(a) Give three example of what can happen to drops of water after it falls as rain on the ground.

(b) List five ways water is stored as it passes through water cycle.

(c) Water is the only substance found on the earth naturally in three states. Name the three form of water

7.(a) In a Chemistry Laboratory, a student conducted an experiment by burning sulphur in the presence of oxygen. What changes in the physical state and colour did the student observe during the reaction of sulphur with oxygen? Explain the significance of these changes in terms of chemical reactions.

(b) In an industrial setting, a manufacturing plant uses hydrogen peroxide to produce oxygen for various applications. Discuss the advantages and disadvantages of using hydrogen peroxide compared to other methods for oxygen generation.

8. A certain Soil requires 80 kg of nitrogen (N) per hectare so as to fulfil plant requirements of N. Calculate (in kg) the quantity of ammonia sulphate ((NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub>) Fertilizer required to meet this demand.

9.(a) A sample of chlorine gas contains 75% of isotope  $^{35}_{17}\text{Cl}$  and 25% of the other isotope which is  $^{37}_{17}\text{Cl}$ . What is the relative atomic mass of chlorine?

(b) The average atomic mass of copper is 63.55. If the only two isotopes of copper has masses of 62.94 and 64.93. What are the percentages of each?

#### SECTION.C (15 MARKS)

Answer **question number ten** (10)

10.(a) Madam Vaileth is a Civics teacher at Pandamoyo Secondary School, she passed near the school laboratory and saw many laboratory apparatus made of glasses and wondered why those apparatii made of glasses. If she will come and ask you, what would you answer Madam Vaileth. Give four reasons.

(b) Form one student went into the laboratory and found bottles each labelled with the one of the following warning signs.

- i) Flammable
- ii) Corrosive
- iii) Irritant or Harmful
- iv) Toxic

Explain how will he/she handle bottles with those warning signs.

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