

HOLYDAYS WORK 2024-2025**Instructions:**

1. Attempt All questions from section A
2. Attempt at least 3 questions section B
2. Attempt at least 1 question section C
3. The periodic table is not allowed

Section A: Attempt all questions/55 Marks

Q1. Complete and write balanced chemical equations for the following soluble salt preparations by means of chemical formular: **/4marks**

- a. Magnesium + sulfuric acid →
- b. Calcium carbonate + hydrochloric acid →

Q2. Answer by “True” or “False” for each of the following statements: **/4marks**

- a) Particles in solid have irregular arrangement.
- b) In gases, there are very weak forces between particles.
- c) Particles move more in solids than in liquids.
- d) Burning wood is a chemical change.

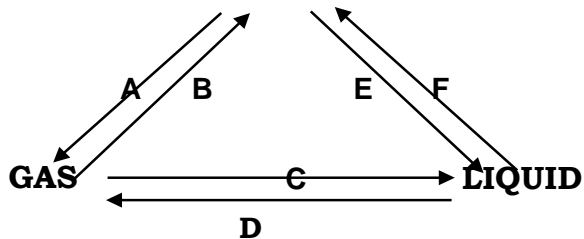
Q3. Match the correct description to the separation technique. **/4marks**

Separation technique	Description
1. Evaporation	A. ...is used to separate small amounts of two or more <u>solids</u> which are soluble in the same solvent.
2. Filtration	B. ...is used to separate a <u>soluble solid</u> from the liquid to obtain the <u>solute</u> .
3. Chromatography	C. ...is used to separate a <u>soluble solid</u> and a <u>liquid</u> to obtain the <u>solvent (liquid)</u> .
4. Distillation	D. ... is used to separate an <u>insoluble solid</u> from a <u>liquid</u> .

Q4. 2.746g of a compound gave an analysis 1.94g of Ag, 0.268g of Sulphur and the rest is for of Oxygen. Find out the E.F of compound. (Ag=108, S=32, O=16). **/ 4marks**

Q5. The diagram below shows the triangle of changes of states of matter.

SOLID



- a) Name the changes of states labelled by letter **A, B, C, D, E** and **F**. /3marks
 b) Name any 2 substances that can undergo change of state labelled **E**. / 1 mark

Q6. Given the following elements and their atomic numbers as:

A= 3, B= 9, C= 12, D= 16, E= 18 and **F= 20**. Find out which of these elements is: /4marks

- A halogen
- Noble gas
- Alkali metal
- Alkaline earth metal

Q7. The electron structure of an element **Y** is **2.8.7**

- Write the formula of the most common ion of **Y**. /1mark
- To which group and period of the periodic table does **Y** belong? /1mark
- Element **Y** reacts with an element **A** of atomic number **11**.
 - Write the formula of the compound formed between **A** and **Y**. /1mark
 - Name the chemical bond from the compound formed in (i) above. /1mark

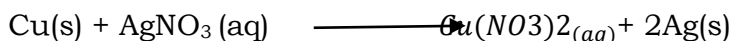
Q8. Match each of the following allotropes with its correct use. / 4marks

Allotropes	Use
a) Graphite	i. Reducing agent in the extraction of metals like iron and zinc from their oxides
b) Diamond	ii. Household fuel for cooking
c) Wood charcoal	iii. Used as electrode in dry cells and during electrolysis
d) Coke	iv. Making of drilling bits and cutting glass and metals

Q9. An organic compound contains 31.9% of carbon, 6.8% of hydrogen, 18.51% of nitrogen and the remaining is for oxygen. If the relative molecule mass of compound is 75. Calculate the molecular formula. (C=12, H=1, N=14, O=16) /5marks

Q10. a) What is the limiting reagent? /1mark

b) Copper reacts with silver nitrate as;



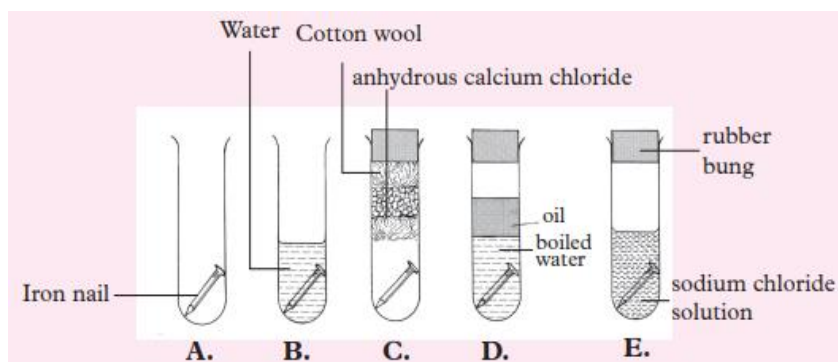
If 0.5mole of copper is added to 1.5mole of silver nitrate.

- Identify the limiting reagent/1mark
- Calculate the mass of $\text{Cu(NO}_3)_2(\text{aq})$ produced.

(Cu=63.3, Ag=108, N=14, O=16, S=32) /2marks

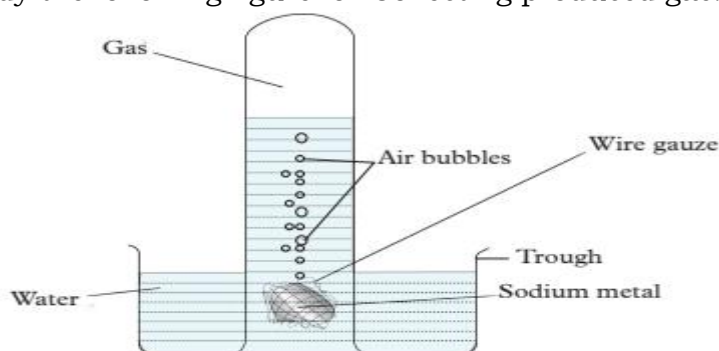
iii) Calculate the mole left and mass left of the excess. /2marks

Q11. The diagram below shows an experiment to determine conditions under which iron rusts.



- State the reason for using boiled water in tube D. /1mark
- State the purpose of the layer of oil in tube D. /1mark
- What is the effect of anhydrous calcium chloride in tube C? /1mark
- State what happens to the nails in tube A. /2marks
- From this experiment, state two conditions necessary for rusting to take place /2marks

Q12. Study the following figure for Collecting produced gas.



- What observations are made when sodium metal is dropped in water? / 1 mark
- Write the equation for the reaction between sodium metal and water. / 2 marks
- What happens to the burning splint inserted in a test tube containing the gas collected? / 1 mark
- Suggest the properties of the gas collected. / 2 marks
(C=12, O=16, AN=6.022X10²³)

Section B: Attempt at least 3 questions/30marks

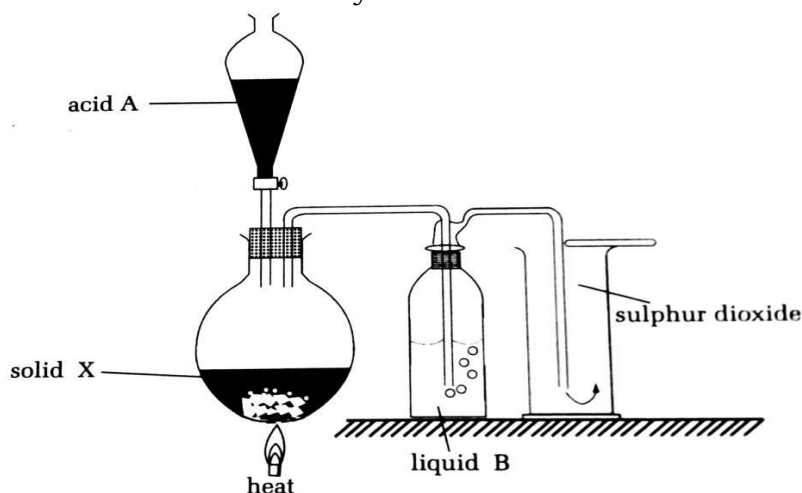
Q13. Part of the periodic table indicating the positions of some elements shown below. The letters are not the usual chemical symbols for the elements.

	I	II	III	IV	V	VI	VII	VIII
1								

2	W		X			Z		
3								Y
4	E						F	

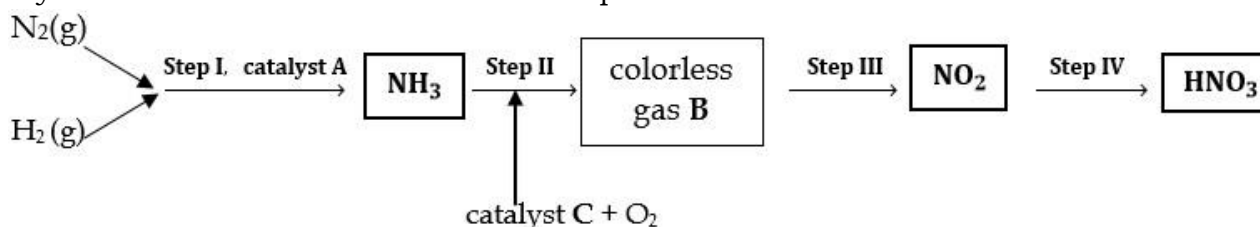
- Write the formula of the oxide of W. **(1 mark)**
 - The oxide of W dissolved in water. State whether the resultant solution is neutral, acidic or alkaline. Explain your answer. **(2 marks)**
- Write the formula of the compound formed when X reacts with Z. **(1 mark)**
- How many electrons are on outermost shell of Z^{2-} ions? **(1 mark)**
- State the type of bonding present in the compound formed between E and F. **(1 mark)**
- Identify the noble gas in the table. **(1 mark)**
- State two physical properties of element W. **(2 marks)**
- Give the letter of the element with the highest melting point. **(1 mark)**

Q14. Study the diagram below representing the preparation and collection of Sulphur dioxide in the laboratory.



- Identify **X**, **A** and **B** /**3marks**
- Write the equation for the reaction in the flask. /**1mark**
 - What is the purpose of liquid **B**? /**1mark**
- Describe what is observed when sulphur dioxide is passed into an acidified aqueous solution of potassium dichromate. /**2marks**
- State a physical property of Sulphur dioxide that related to its method of collection. /**1mark**
- Explain any two dangers associated with industrial production of Sulphur dioxide. /**2marks**

Q15. Study the flow chart below and answer the questions that follow.



- Name catalysts A, C and colorless gas B. /**3 marks**

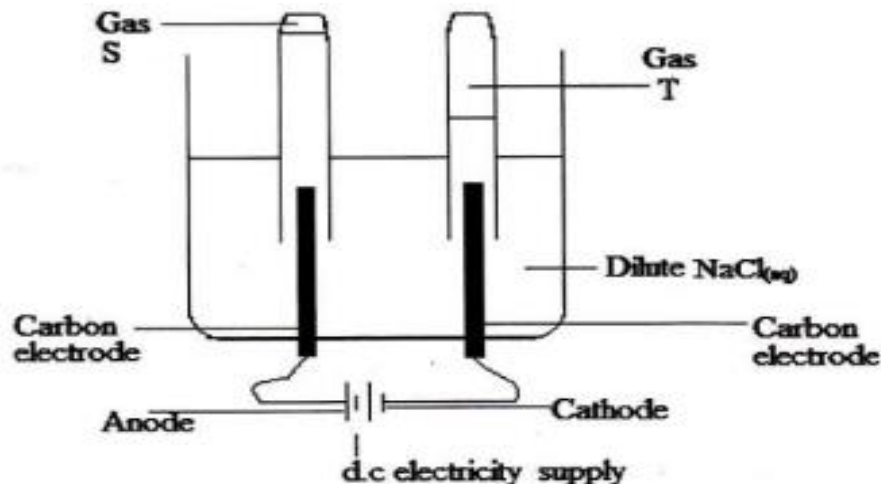
b) Write the chemical equations for the reaction: / **4 marks**

Step I, Step II, Step III and Step IV

c) What do you observe when concentrated nitric acid added to heated mixture of iron (II) sulphate acidified and sulphuric acid. / **2 marks**

d) Name the process used for obtaining N_2 (g) from the step I. / **1 mark**

Q16. The diagram below represents electrolysis of aqueous sodium chloride solution ($NaCl$), prepared using distilled water.



a) Answer by “**YES**” or “**NO**” for each of the following statements

i) **The Anode** is the positive electrode at which reduction reaction takes place / **1 mark**

ii) **The Cathode** is the negative electrode at which oxidation reaction takes place. / **1 mark**

b) Name the gas **S** and gas **T**. / **2 marks**

c) Write the symbols of all ions present in the solution of sodium chloride ($NaCl$) / **2 marks**

d) Write the equation that take place at anode electrode and cathode electrode. / **2marks**

e) If the volume of gas produced at anode electrode equals 3.5 cm^3 . What will be the volume of gas produced at cathode electrode? / **2marks**

Q17. Briefly, describe and explain the gas law:

a. Charle’s law. / **2marks**

b. Gay Lussac law. / **2marks**

c. Bayle’s law. / **2marks**

d. The relative densities of oxygen gas and of carbon dioxide are 16 and 32 respectively. If 25 cm^3 of carbon dioxide gas diffuses out in 75 seconds. What is the volume of oxygen gas will diffuse out in 96 seconds under similar conditions? / **4Marks**

Q18) 25.00 cm^3 portions of a sodium hydroxide solution were titrated with a standardized solution of 0.75 mol/dm^3 sulphuric acid solution using phenolphthalein indicator. If the average titrated was 17.70 cm^3 of sulphuric acid.

a) Write the balanced equation between sodium hydroxide and sulphuric acid. / **2marks**

b) Calculate the number of mole of sulphuric acid solution/ **2marks**

c) Calculate the number of mole of sodium hydroxide solution/ **2marks**

d) Calculate the molar concentration of the sodium hydroxide/ **2marks**

e) Calculate the mass concentration of the sodium hydroxide/ **2marks**

Section C: Attempt at least 1 question/15marks

Q19. A student performed an experiment to establish how effective manganese dioxide was as catalyst in the decomposition of hydrogen peroxide. Pouring dropwise 50mL of 1M hydrogen peroxide on 5g of manganese dioxide, the volume of oxygen gas has been recorded at different intervals of time. The results obtained are given below:

Time(s)	0	30	40	50	60	70	80	90
Volume of oxygen gas in (cm ³)	0	45.06	85.02	120.12	145.32	180.04	180.04	180.04

- Plot the graph volume of oxygen (On Y –axis) against time (On X-axis). **(4 marks)**
- At which time the reaction ended? **(1 mark)**
- What volume of oxygen produced at 45seconds? **(1 mark)**
- Write a balanced chemical equation of decomposition of hydrogen peroxide in the presence of manganese dioxide as catalyst. **(2 marks)**
- In this experiment, manganese dioxide used as catalyst.
 - Define the term: **The catalyst. (1 mark)**
 - Explain the effect of catalyst on the rate of reaction. **(2 marks)**
- List and explain other two factors that may affect the rate of reaction. **(2 marks)**
- How can you confirm that the gas which is being produced, it is oxygen gas ? **/2marks**

Q20. What chemical tests can you do to distinguish the following pairs (reagents, observations).

- Sulphate ions and sulphite ions. **(3marks)**
- Zinc (II) ions and copper (II) ions. **(3marks)**
- Sulphur dioxide gas and methane gas. **(3marks)**
- Carbon dioxide gas and hydrogen chloride gas. **(3marks)**
- Iron (III) ions and iron (II) ions. **(3marks)**

GOOD LUCK! !!!!