CHEMISTRY FORM 1 AND 2 QUICK REVISION 2023

1. Complete the table below by classifying each of the substances in the table below as either **strongly acidic**, **weakly acidic**, **strongly basic/alkaline** or **weakly basic/alkaline**. **(7marks)**

Substance	**K**	**L**	**M**	**N**	**O**	**P**	**Q**
pH value	12.5	8.0	7.0	6.5	3.0	1.0	5.5
Classification							

2. **Complete** the following word equations by filling in the **missing** substances. **(5marks)**

(a) Zinc metal + Sulphuric (VI) acid → ? + Hydrogen gas

(b) Calcium carbonate + Hydrochloric acid → ? + ? + Water

(c) Sodium hydroxide + Nitric (V) acid → ? + Water only

(d) Ammonium hydrogen carbonate + ? → Ammonium chloride + Water

(e) ? + Hydrochloric acid → Magnesium chloride + Hydrogen gas

3. **Complete** the following general equations by filling in the **missing** substances. **(5marks)**

REACTION	**PRODUCTS FORMED**		
1. ACID + BASE (METAL HYDROXIDE)	……... + ……		
2. ACID + METAL	…… + ……		
3. ACID + CARBONATE	……..	……..	……..
4. ACID + HYDROGEN CARBONATE	……..	……..	……..
5. ACID + BASE(METAL OXIDE)	……..	……..	……..

4. Apart from **Universal indicator**, list down **any other three** examples of commercial indicators and state their colours in **acidic** and **basic** solutions. **(6marks)**

5. State **one** use of each of the following **acids**. **(3marks)**

(a) Sulphuric (VI) acid **(b)** Tartaric acid **(c)** Nitric (V) acid

6. State **one** use of each of the following **bases**. **(3marks)**

(a) Calcium hydroxide **(b)** Ammonia solution **(c)** Magnesium hydroxide

7. Name **two chemical substances** that can be used to test for presence of water. **(2marks)**

8. State **two differences** between the following:

(a) Mixtures and Compounds **(2marks)**

(b) Acids and Bases **(2marks)**

(c) Chemical changes and physical changes **(2marks)**

9. List down **any two metals** that cannot react with dilute acids to produce hydrogen gas. **(2marks)**

10. Water is **not a good** solvent for chromatography and solvent extraction. Give a reason why water is **not suitable** for use in:

(a) Chromatography **(b)** Solvent extraction. **(2marks)**

11. Describe **briefly** how the **presence** of the following **gases** can be **tested** and **confirmed**.

(a) Carbon (IV) oxide gas **(2marks)**

(b) Hydrogen gas **(2marks)**

12. Give any **two examples** of each of the following: **(8marks)**

(a) Weak acids (b) Strong acids (c) Weak bases (d) Strong bases

13. Name the elements whose chemical symbols are given below **(12marks)**

(a) **Ne** (b) **Si** (c) **Pb** (d) **Mn** (e) **Br** (f) **Mg** (g) **P** (h) **Fe** (i) **Na** (j) **Sn** (k) **Hg** (l) **Ag**

14. Name **all the elements** present in the following compounds. **(9marks)**

(a) Aluminium nitrate **(d)** Iron (II) sulphate **(g)** Potassium hydrogen sulphite

(b) Calcium chlorate **(e)** Ammonium chloride **(h)** Ammonium hydroxide

(c) Magnesium hydroxide **(f)** Lead (II) carbonate **(i)** Sulphur (IV) oxide

15. Paper chromatography was carried out on **FIVE** substances **P, Q, R, S** and **T** using a Chromatography paper. The above substances gave the following results:

- The components in **P** moved **2cm** and **6cm** away from the baseline
- The components in **Q** moved **4cm** and **3cm** away from the baseline
- The component in **R** moved only **6** centimeters from the baseline
- **S** was retained on the baseline while **T** moved **3cm** and **7cm** away from the baseline.

(a) Draw a **well labelled paper chromatogram** to represent the above results **(6marks)**

(b) Select any **two substances** that were containing **similar** components. Give a reason for your selection. **(2marks)**

(c) What can you **conclude** about substance **S**? **(1mark)**

(d) Name **the suitable substances** that could be used as the **solvent** and **absorbent material** for the above chromatography experiment. **(2marks)**

(e) State any **three applications** of chromatography. **(3marks)**

16. State **one application** of each of the following methods of separating mixtures. **(4marks)**

(a) Use of magnet (b) Fractional distillation (c) Evaporation (d) Solvent extraction.

17. State **two advantages** of using Universal indicator over other commercial indicators. **(2marks)**

18. Although, simple acid-base indicators (plant extracts) are **cheaper** than commercial indicators, they are **not very reliable** like the commercial indicators. Give **two disadvantages** of common acid-base indicators over commercial indicators. **(2marks)**

19. State the **effect of impurities** on melting and boiling points of a substance. **(2marks)**

20. In terms of the **kinetic theory**, **compare** the arrangement particles in **solids** and **gases** and hence state the **difference** in their **kinetic energy** and their **intermolecular forces.** **(6marks)**

21. Study the information below and answer the following questions. A mixture contains **three** solids **A, B**, and **C**. The solubility of these solids in different liquids is as shown below:-

Solid	Water	Alcohol	Ether
A	Soluble	Insoluble	Insoluble
B	Insoluble	Soluble	Very soluble
C	Soluble	Soluble	Insoluble

Explain how you will obtain a sample of **C** from the mixture. **(3marks)**

22. Indicators can be classified into two broad groups as **commercial indicators** and **simple acid-base indicators**.

(a) Define the term **indicator.** **(1mark)**
(b) Apart from **universal** indicator and **litmus** paper/solution, name **two other** commercial indicators. **(2marks)**
(c) State **two major advantages** of universal indicator over the other commercial indicators. **(2marks)**

23. Complete the blank spaces with **appropriate word/words** in each of the following statements.
(a) Substances that are acidic contain……**ions**, those that are basic contain ……..**ions** while substances that are neither acidic nor basic are said to be …… **(3marks)**
(b) A ……solution is one in which **no more solute can dissolve** at a given temperature. **(1mark)**
(c) A complete reaction between an **acid** and a **base** to produce salt and water only is called …….. **(1mark)**
(d) The **gas** produced when a **metal** reacts with an acid is called …… while a reaction between acids and **carbonates** produces a gas called …… **(2marks)**
(e) The colour of **hydrated** Copper (II) sulphate crystals is ……but when heated, it loses its water of crystallization and changes to a **white** solid called ……...Copper (II) sulphate. When a few drops of **water** are added to the white solid, the original colour is recovered. This **type** of chemical change is called …… chemical change. **(3marks)**

24. Write word equations for the following reactions **(3marks)**
(a) Reaction of **calcium carbonate** with **dilute hydrochloric** acid
(b) **Zinc metal** reacting with dilute **sulphuric (VI) acid**
(c) **Magnesium metal** reacting with **nitrogen** gas

25. When a certain indicator **K** was added to some lemon juice, the pH of the lemon juice was found to be **6.0**.
(a) Name the:
(i) Acid **present** in lemon juice **(1mark)**
(ii) The **indicator K** that was used. **(1mark)**
(b) By basing on the above **pH** value, what conclusion can be made about the **strength** of the acid present in lemon juice? **(1mark)**

26. Differentiate between **Organic** acids and **mineral** acids **(2marks)**

27. When a certain piece of **Magnesium ribbon** was added to dilute Sulphuric (VI) in a boiling tube, **effervescence** occurred and a colourless gas **Z** was produced.
(a) What is the meaning of the term '**effervescence'**? **(1mark)**
(b) Identify gas **Z** **(1mark)**
(c) Briefly describe how gas **Z** can be **tested** in the laboratory. **(2marks)**
(d) Write a **word equation** for the above reaction between Magnesium and the acid. **(1mark)**

28. A reaction between **dilute hydrochloric acid** and **Calcium carbonate** produces bubbles of a **colourless gas Q**. When gas Q is bubbled into a test tube containing a certain **colourless solution R**, a **white precipitate** was formed.
(a) Identify the:
(i) Colourless **gas Q**. **(ii)** Colourless **solution R.** **(2marks)**
(b) Write a **word equation** for the above reaction. **(1mark)**
(c) Apart from Calcium carbonate, name **another carbonate** that when reacted with hydrochloric acid produces gas **Q**. **(1mark)**

29. **The following observations were made when the following substances were heated.**

Substance		**Observations made**
Hydrated Copper (II) sulphate	HEAT →	Changed to a **white** solid
Iodine solid	HEAT →	Changed to **purple** vapour
Copper (II) nitrate	HEAT →	Formed a **black** solid and a **brown** gas was produced

(a) State **two observations** that will be made when some **drops of water** are added to the **white** solid obtained above when **Hydrated Copper (II) sulphate** was heated. **(2marks)**
(b) Classify the following processes as either **physical** or **chemical** changes. **(2marks)**
(i) Heating and cooling of iodine **(ii)** Heating of hydrated Copper (II) nitrate
(c) Name the **two types** of chemical changes. **(2marks)**
(d) What is the **colour of each** of the following substances? **(3marks)**
(i) Hydrated Copper (II) sulphate **(ii)** Sulphur powder **(iii)** Copper (II) nitrate crystals

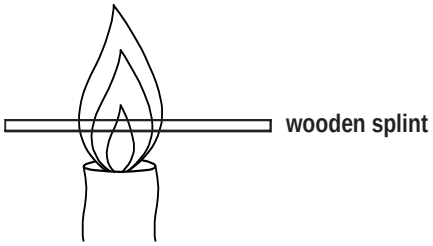
30. Give the **names of the elements** whose chemical symbols are shown below. **(5marks)**

(i) Cl **(ii)** Fe **(iii)** Mg **(iv)** Co **(v)** Mn

31. State **two characteristics** of each of the following processes/changes.
(a) Chemical changes. (b) Physical changes **(4marks)**

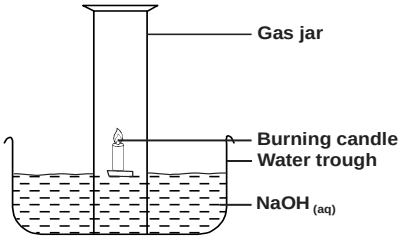
32. List down **any five elements** whose chemical symbols are formed from only the **first letter** of the name of the element. **(5marks)**

33. Study the diagram below then use it to answer the questions that follow.



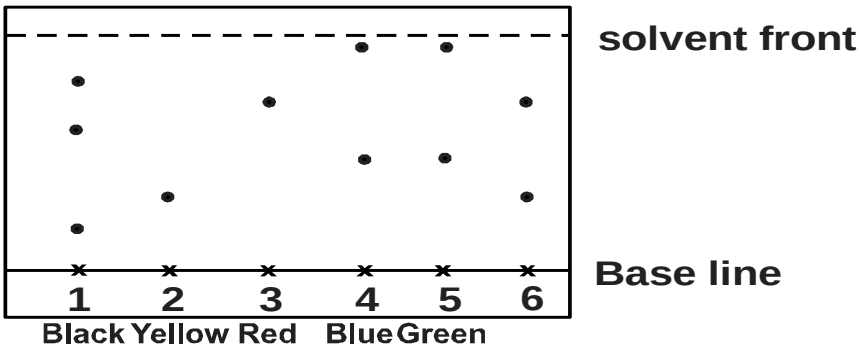
a) Draw the wooden splint at the end of the experiment. If it was slipped then removed. (1mark)
b) Explain the appearance of the wooden splint in (a) above. (2marks)

34. Use the diagram below to answer the questions that follow.



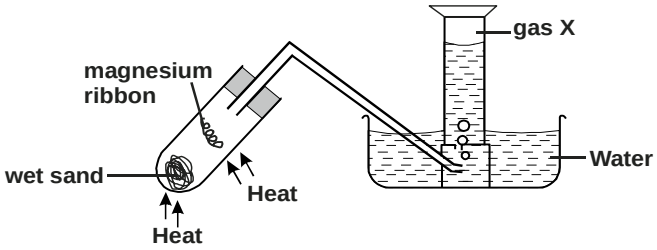
(a) Why is sodium hydroxide solution preferred to water in the above set-up? (1mark)
(b) What modification should be made to the above set-up if percentage of oxygen used in air should be determined (1mark)
(c) Name the main component of air not used in the above set-up. (1mark)

35. A piece of chromatography paper was spotted with coloured inks obtained from pens labelled 1 to 6. The diagram below shows the spots after the chromatogram was developed.



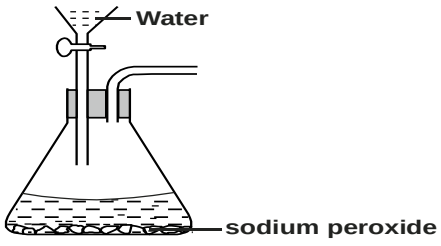
(a) Which two pens contained the same pigment? (1mark)
(b) Which pens contained only one pigment? (1mark)
(c) According to the chromatogram, which pigments are present in the ink of pen number 6. (1mark)

36. Magnesium reacts as shown below.



(a) Identify gas X. (1mark)
(b) Between wet sand and magnesium ribbon, which one should be heated first? Explain. (2marks)
(c) Rusting is a destructive process in which iron is converted to hydrated iron (III) oxide.

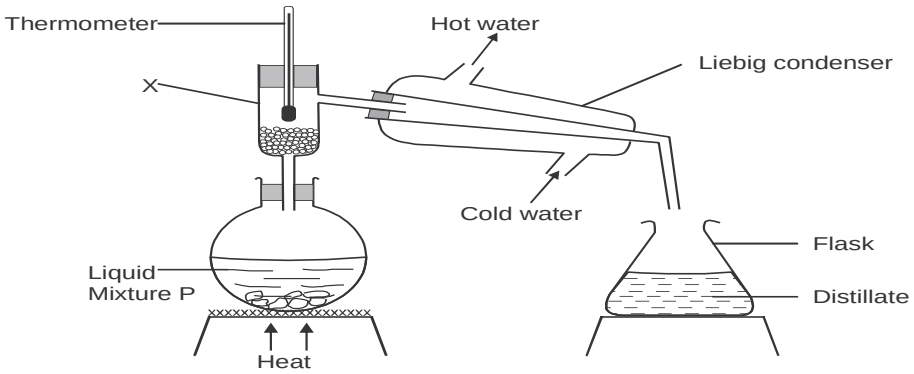
37. The set-up below was used to prepare oxygen gas. Complete the diagram to show how a sample of the gas can be collected. (2marks)



(a) Write a chemical equation for the reaction producing oxygen gas. (1mark)
(b) Name two commonly abused drugs in Kenya. (1mark)

38. Differentiate between prescription drugs and over the counter drugs. (2marks)

39. Study the diagram below and answer the questions that follow. The diagram shows the method used to separate component of mixture P.



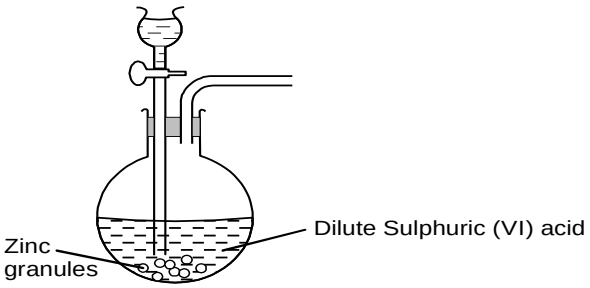
(a) Name X (1mark)

(b) What is the name given to the method used in separation of mixture P? (1mark)

(c) What would happen if the inlet and outlet of water were interchanged? (1mark)

(d) Which physical property is used to separate mixture P? (1mark)

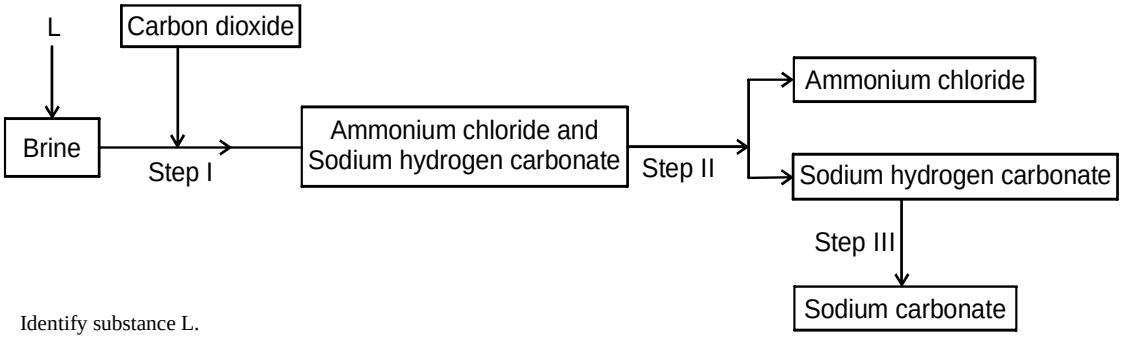
40. The set up below was used to prepare hydrogen gas.



(a) Complete the diagram to show how a dry sample of hydrogen gas can be collected. (2marks)

(b) Write an equation which takes place when hydrogen gas burns in air. (1mark)

41. The simplified flow chart below shows some of the steps in the manufacture of sodium carbonate by the Solvay process.



(a) Identify substance L. (1mark)

(b) Name the process taking place in step II (1mark)

(c) Write an equation for the reaction which takes place in step III. (1mark)

42. Below are PH values of some solutions.

Solution	Z	Y	X	W
PH	6.5	13.5	2.2	7.2

(a) Which solution is likely to be:

(i) acidic rain ..... (1mark)

(ii) Potassium hydroxide ..... (1mark)

(iii) A basic substance V reacted with both solutions Y and X. What is the nature of V. (1mark)

(b) Identify two substances that show these characteristics in question (ii) above. (1mark)

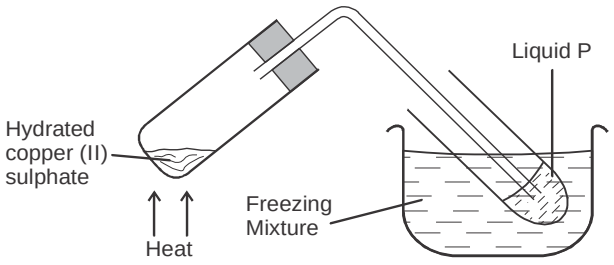
43. Metal S removes oxygen combined with P. Q reacts with an oxide of R and not with an oxide of P. P reacts with cold water but Q does not.

(a) Which is the most reactive metal? (1mark)

(b) Which is the least reactive metal? (1mark)

(c) Arrange the metals in order of reactivity starting with most reactive to the least reactive. (1mark)

44. The diagram below shows a set up used to het hydrated copper (II) sulphate crystals.



(a) State the colour change that occurred in the copper (II) sulphate crystals when heated. (1mark)
(b) Identify liquid P (1mark)
(c) Describe the chemical test that could be used to confirm liquid P. (2marks)

45. The grid below shows part of the periodic table. Study it and answer the questions that follow.

								Q
				S		R	K	
A	J		Y	U		P	L	
W							M	B

(a) Give the name of the elements represented by the shaded region. (1mark)
(b) Identify an element which form ion with +2 charge. (1mark)
(c) Which non-metal is most reactive? (1mark)
(d) Element V is in the second period and group V of the periodic table. Place it on the above grid of the periodic table. (1mark)
(e) State and explain how the atomic radius of U and J compare. (2marks)
(f) Write a chemical equation for the reaction between the oxide of A and water. (1mark)
(g) Explain how the electrical conductivity of A and Y compare. (2marks)

46. Graphite is one of the allotropes of carbon.
(a) Name the other allotrope (1mark)
(b) Explain why graphite is used in the making of pencil leads. (1mark)

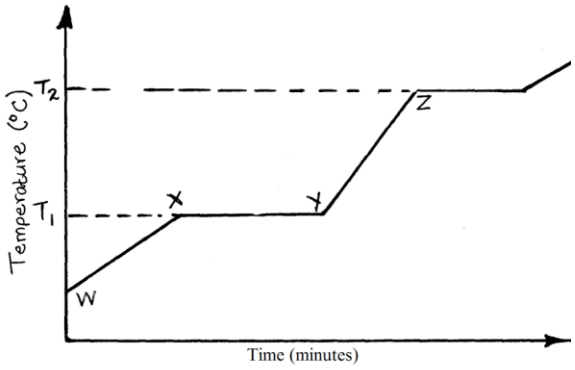
47. State two reasons why most of the laboratory apparatus are transparent. (2marks)

48. State and explain the change in mass when the following are heated in air.

(a) Copper metal (2marks)

(b) Copper (II) nitrate (2marks)

49. The graph below shows the changes which take place when a solid is heated.



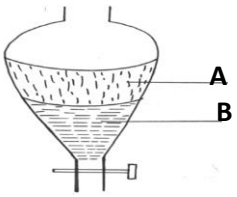
(a) What happens to the molecules between W and X? (1mark)

(b) What is the significance of temperatures T_1 and T_2? (1mark)

(c) Explain why the temperature does not rise between X and Y. (1mark)

(d) Is the substance represented pure or impure? Give a reason. (1mark)

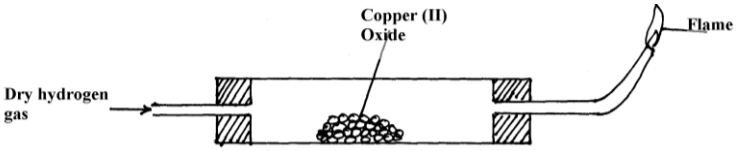
50. A mixture of hexane and water was shaken and left to separate out as shown in the diagram below:-



(a) Identify liquids A and B (2marks)

(b) Apart from density, state **one** other property that makes it possible to separate them using the set-up above? (1mark)

51. The set-up below is used to investigate the properties of hydrogen.



(a) On the diagram, indicate what should be done for the reaction to occur (1mark)

(b) Hydrogen gas is allowed to pass through the tube for some time before it is lit. Explain (1mark)

(c) Write an equation for the reaction that occurs in the combustion tube (1mark)

(d) When the reaction is complete, hydrogen gas is passed through the apparatus until the cool down. Explain (1mark)

(e) What property of hydrogen is being investigated? (1mark)

52. Name the **most suitable methods** that can be used to separate each of the following mixture. (4marks)

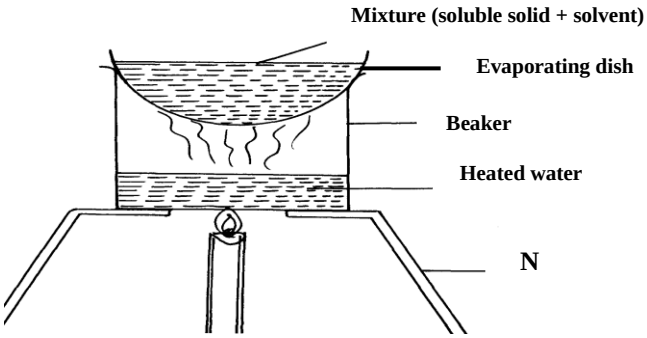
(i) Separating the **components** that make up **air** into individual fractions.

(ii) Obtaining both **pure water** and **salt** from a salt solution.

(iii) A mixture of **Anhydrous Iron (III) chloride** and solid **Sodium chloride**.

(iv) A **heterogeneous** liquid-liquid mixture

53. The **set-up** below was used to obtain a **solute** from a mixture consisting of a **soluble solid** and solvent: -



(a) What is the **name** of the above method of separation? (1mark)

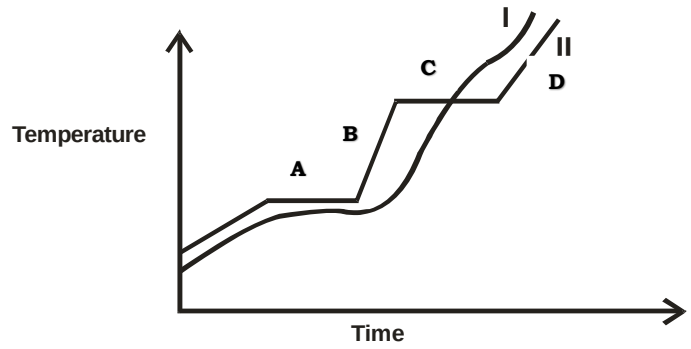
(b) Name the **supportive** apparatus labelled **N** (1mark)

(c) Name **one useful apparatus** that was **missing** in the above set-up and is normally used **together** with apparatus **N**. (1mark)

(d) State the **disadvantage** of the above method of separation over simple distillation method. (1mark)

(e) In the above method, the mixture is **slowly** heated until it is **ready to crystallize**. Explain how one would be able to know if the solution is ready to crystallize. (1mark)

54. The curves **I** and **II** shown below represent the **heating curves** that were obtained when **pure** and **impure** samples of **solid substance X** were heated separately.



(a) Giving a **reason**, identify the **curve** that represents heating of the **impure** solid substance **X**. (2marks)

(b) From the regions marked **A, B, C** and **D**, identify **one region** in which substance **X** is existing in **two different physical states** at the **same time.** (1mark)

(c) State the **effect of impurities** on **melting** and **boiling** points of a substance. (1mark)

(d) Explain what takes place at the following regions of **curve II**.

(i) Region B (1mark)

(ii) Region A (1mark)

55. Study the information below and answer the following questions. A mixture contains **three** solids **A, B**, and **C**. The solubility of the solids in **Water** and **Ethanol** solvents is as shown below:-

Solid	Solubility in Water	Solubility in Ethanol
A	Soluble	Insoluble
B	Insoluble	Insoluble
C	Soluble	Soluble

Explain how you will obtain **solid A** from a mixture containing the three solids **A**, **B** and **C.** (3marks)

56. Indicators can be classified into two broad groups as **commercial indicators** and **simple acid-base indicators**.

(d) Define the term **indicator.** (1mark)

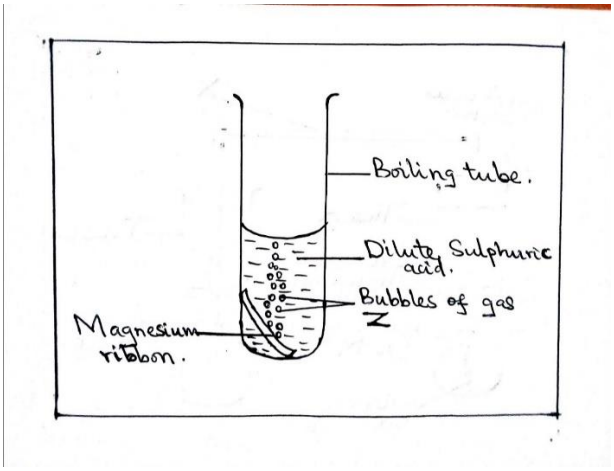
(e) Name **a** commercial indicator that can be used to show the degree of acidity or alkalinity of a substance. (1mark)

57. Complete the blank spaces with **appropriate word/words** in each of the following statements.

(f) A ……solution is one in which **no more solute can dissolve** at a particular temperature. (1mark)

(g) A complete reaction between an **acid** and a **base** to produce **salt** and **water only** is called (1mark)

58. When a piece of **Magnesium ribbon** was added to dilute Sulphuric (VI) in a boiling tube, **bubbles of** a colourless gas **Z** were produced as shown in the diagram below.



(e) Give the **term** used to describe the **process** of production of gas bubbles. (1mark)

(f) Identify gas **Z** (1mark)

(g) Describe a **laboratory test** that can be carried out to confirm the identity of each of gas **Z** produced in the above experiment. (2marks)

(h) Write a **balanced chemical equation** for the **above** reaction between **Magnesium** and Sulphuric acid**.** (1mark)

(i) Name **one metal** that **cannot** react with dilute acids to produce gas **Z**. (1mark)

59. **(a)** What is the **colour of each** of the following substances? (6marks)

(a) Copper (II) oxide

(b) **Sulphur** powder

(c) **Iodine crystals**

(c) **Anhydrous** Cobalt (II) chloride

(d) **Iron** filings

(e) Iodine vapour

(c) Apart from **Anhydrous Cobalt (II) chloride**, name **another chemical substance** that can be used to **test/show** for presence of water. (1mark)

60. Changes in matter can be classified into **three** categories. Classify the following changes as either **temporary physical**, **temporary chemical** or **permanent chemical**. (2marks)

Change/process	Type of change
(a) Heating of Hydrated Copper (II) sulphate	
(b) a piece of wood/paper	
(c) Heating and cooling of **wax**	
(d) Formation of Hydrated Iron (III) oxide from Iron metal.	

61. Some plants have **seeds** that contain **oil**.

(a) Name **one suitable solvent** and the **pieces of apparatus** used to extract the **oil** from the seeds. (2marks)

(b) Name the **method** of obtaining oil from seeds/nuts. (1mark)

62. Complete the table below by **classifying** each of the substances in the table below as either **strongly acidic**, **weakly acidic**, **strongly basic**, **weakly basic** or **neutral**. (**5**marks)

SUBSTANCE	pH VALUE	CLASSIFICATION
Substance **A**	**13.5**	
Substance **B**	**7.0**	
Substance **C**	**6.5**	
Substance **D**	**9.0**	
Substance **E**	**2.0**	

63. Complete the table below by either giving the **appropriate names** of the elements whose chemical symbols or the **appropriate chemical symbol** of the elements. (**5**marks)

Chemical symbol	Name of element
Fe	
Cl	
	Potassium
Mn	
	Silver

64. Name **a base** that is commonly used to manufacture **anti-acid tablets**. (1mark)

65. **Complete** the following general **word equations** by filling in the **missing** substances in the blank spaces provided. (**3**marks)

(i) Acid + **……** ⟶ Salt + Hydrogen gas

(ii) Acid + Base ⟶ **…….** + **…….** Only

(iii) Acid + **……** ⟶ Salt + Water + Carbon (IV) oxide

66. **Complete** the following word equations by filling in the **name of the salt** formed in each case. (2marks)

SUBSTANCE + ACID	NAME OF SALT FORMED
Zinc **metal** + **Hydrochloric** acid	
Magnesium **carbonate** + **Nitric** acid	
Calcium **metal** + **Ethanoic** acid	
Ammonium **carbonate** + **Hydrochloric** acid	

67. Name an **appropriate apparatus** that performs the following functions: (2marks)

(a) Adding **controlled amounts** of liquids into reaction vessels.

(b) **Heating** solid substances that require **strong heat**.

68. Differentiate between a **Molecule** and a **Compound.** (2marks)

69. Name **all the elements** present in the following compounds.

(d) Potassium hydrogen sulph**ite**. (1mark)

(e) Calcium chlor**ate** (1mark)

(f) Magnesium **hydroxide** (1mark)

(g) Ammonium sulphate (1mark)

70. Paper chromatography was carried out on **FIVE** substances **P, Q, R, S** and **T** using a Chromatography paper. The above substances gave the following results:

- The components in **P** moved **2cm** and **5cm** away from the baseline
- The components in **Q** moved **4cm** and **3cm** away from the baseline
- The component in **R** moved only **5centimeters** from the baseline
- **S** was **retained** on the baseline.
- The components of **T** moved **3cm** and **6cm** away from the baseline.

(a) Using **a ruler** for measuring the **actual distances** travelled, Draw a **well labelled paper chromatogram** to represent the above results (5marks)

(b) Select **two substances** that were containing **similar** components. Give a **reason** for your selection. (2marks)

Substances……..

Reason……..

(c) What can you **conclude** about substance **S**? (1mark)

……

(d) Name **one suitable substance** that could be used as the **solvent** for the above chromatography experiment. (1mark)

……

(e) Which **substance** was containing the **most soluble/least dense** component? (1mark)

……

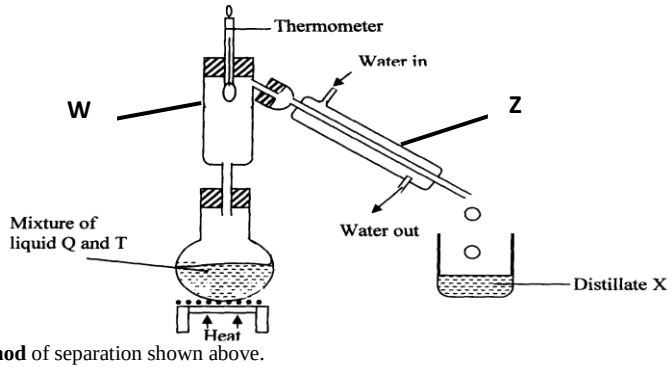
(f) State **one application** of the above method of separation. (1mark)

……

(g) Give a **reason** why water is **not suitable** solvent for Chromatography (1mark)

……

71. The setup below was used by **Form 1** students in Sunshine High School to separate two **miscible** liquids **Q** and **T.** (Boling point of **liquid Q = 95°C**, Boling point of **liquid T = 75°C**)



(a) Identify the **method** of separation shown above. (1mark)
(b) Identify **the mistake** that was made when setting up **apparatus Z**. (1mark)
(c) Name the **piece** of apparatus **labeled W**. (1mark)
(d) Which of the two liquids **Q** and **T** was likely to be **distillate X?** (1mark)
(e) Give a **reason** for your answer in **(d)** above. (1mark)
(f) State **one industrial application** of the above method of separation. (1mark)

72. Use the information given below to answer the questions that follow:

Solution	**G**	**H**	**I**	**J**	**K**
pH values	1.5	6.5	13.0	7.0	8.5

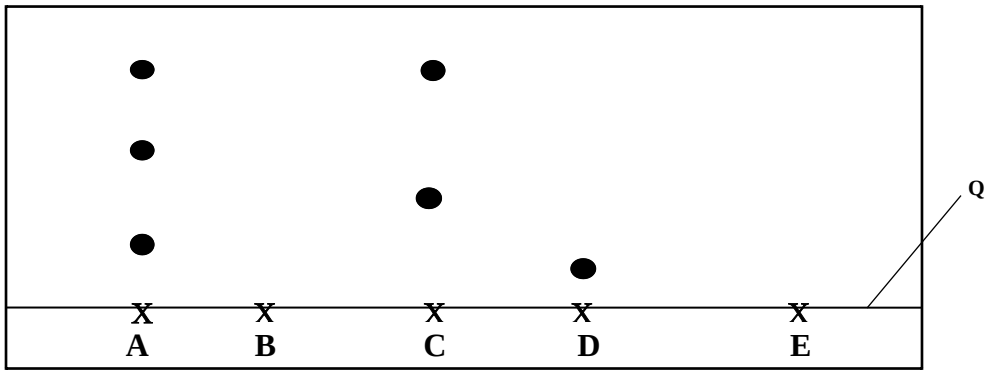
(a) Identify the indicator **E** that was used to determine the **pH** values of the above solutions. (1mark)
(b) Which of the above **solutions** is likely to be: (4marks)

Hydrochloric acidic — Sodium hydroxide solution
Sodium chloride solution — Lactic acid

73. Complete the table below **appropriately**. (3marks)

English name of Element	**Latin name of Element**	**Chemical Symbol**
Potassium		
		Fe
	Cuprum	
Silver		
		Pb
	Hydrargyrum	

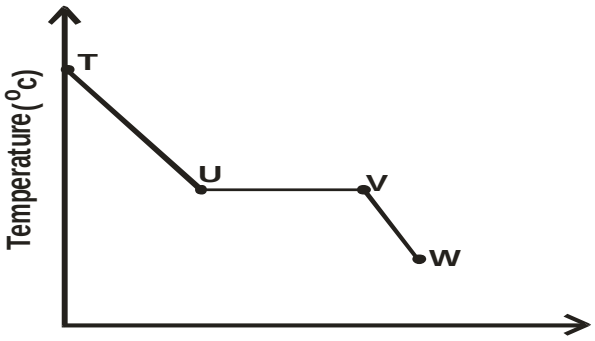
74. The following diagram shows a **paper chromatogram** of substances **A, B, C,** and **D** which are coloured



(a) Which of the four substances **A, B, C** and **D** was:
(i) A **pure** substance? (1mark)
(ii) The most **impure**? (1mark)
(b) Given that substance **E** is a **mixture** of **C** and **D**. **Indicate/show the results** of its **chromatogram** in the diagram above. (1mark)

(c) Name **one suitable solvent** for the above technique of separation. (1mark)
(d) What is the **name** of the part **labelled Q** on the above diagram? (1mark)
(e) State **one application** of chromatography as a method of separation (1mark)

75. The sketch below shows a graph of temperature against time obtained when a gaseous substance was cooled.



a) Explain **what happens** to the gaseous substance between:

(i) T and U (1mark)

(ii) U and V (1mark)

b) State the **criteria** for determining **purity** of a liquid substance. (1mark)

c) Explain how **chromatography** can be used to determine **purity** of substances. (2marks)

d) State **two applications** of the concept of impurities. (2marks)

76. Write down **correct word equations** for each of the following reactions. (2marks)

(a) Zinc Carbonate reacting with Sulphuric (VI) acid.
(b) Copper metal reacting with Oxygen

77. Name the method of separation that can most suitably be used to separate the following mixtures

a) Gasoline from petroleum. (1mark)
b) Benzoic acid and potassium carbonate. (1mark)
c) Oil from cashew nuts. (1mark)

78. The table below shows information about three solid substances A, B and C. Study it and answer the question that follow.

SOLID A	COLD WATER	HOT WATER
A	Soluble	Soluble
B	Insoluble	Insoluble
C	Insoluble	Soluble

Describe how you will separate the three solids from a mixture of these three. (3marks)

79. The table below gives information about some reactions of metals A,B, C and D and their rates.

METAL	Reaction with acid	Reaction with water	Action of heat on its nitrate
A	Hydrogen evolved	No reaction	Oxide formed
B	NO reaction	No reaction	Metal formed
C	Hydrogen evolved	Hydrogen evolved	Oxide formed
D	NO reaction	NO reaction	Oxide formed

Arrange the metals in order of decreasing activity (Starting with the most reactive) (2marks)

80. The table below gives information on four elements by letters K, L, M and N. Study it and answer the questions that follow. The letters do not represent the actual symbol of the elements

Element	Electron arrangement	Atomic radius (nm)	Ionic radius(nm)
K	2.8.2	0.136	0.065
L	2.8.7	0.099	0.181
M	2.8.8.1	0.203	0.133
N	2.8.8.2	0.174	0.099

(a) Which <u>two</u> elements have similar properties? Explain (2marks)
(b) What is the most likely formula of the oxide of L? (1mark)
(c) Which element is a non – metal. Explain. (1mark)

81. Name the particles responsible for the electrical conductivity of

a) Graphite (b) Molten Magnesium chloride. (2marks)

82. State and explain what would be observed when hydrogen gas is passed over heated copper (II) oxide in a combustion tube. (3marks)

83. Solution R, S and T have PH values shown in the table below:

Solution	pH value
R	1.0
S	6.5
T	8.0

a) What do you deduce about the nature of solution R? (1mark)
b) Which solution would react most vigorously with sodium hydrogen carbonate? (1mark)
c) Which solution is likely to be ammonia solution? (1mark)

84. Compare the second ionisation of Magnesium with its first ionisation energy. Explain your answer. (2marks)

85. The electron arrangement of ions X^{+2} and Y^{-3} are 2.8.8 and 2.8 respectively. Write the electron arrangement of the atoms of X and Y (1mark)

86. State **two** differences between ionic bond and covalent bonding compounds. (2marks)

87. Group 8 elements are known as noble gases. Explain their lack of reactivity…….. (1mark)

88. Explain the following trends observed in the periodic table.

(a) Atomic radii increase down the group in alkali metals (2marks)

(b) Melting point increases from sodium to aluminium in the third period. (2marks)

(c) Chlorine is more reactive than sulphur. (2marks)

89. Element M has an electronic configuration of **2.8.1.** Element N forms ions by gaining two electrons and react with metals to form oxides. Element P has an atomic number of 17 and reacts with water forming acidic solutions. Element Q reacts with P forming a white solid of formula QP. When a gas P is bubbled into colourless solution of MR, the solution turns reddish brown. When a gas R is bubbled into a solution of MS a dark solid is formed.

a) What is the **valency** of element P (1mark)

b) What is the **charge** of ion of element N.? (1mark)

c) Write down the **formula** of the compound formed between M and N (1mark)

d) If element M is reacted with water, what would be the **nature** of the resultingar solution. **Explain** your answer. (3marks)

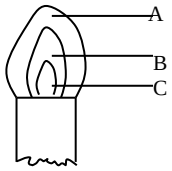
e) Write a balanced chemical equation for the reaction in (iv) above (1mark)

f) Identify elements R and S. (2marks)

g) Arrange elements P, R, S in order of their increasing reactivity. (1mark)

h) Write balanced equation for the reaction between gas P and solutions MR. (1mark)

90. The diagram below shows the flame of a bunsen burner with the air – holes open.



(a) On the diagram name the areas marked B and C. (1mark)

(b) Explain how the area marked B rises. (1mark)

(c) Explain how the area marked A would change when the air – holes are closed. (1mark)

91. The table below shows some properties and electrons arrangements of common ions of elements represented by letters P to X. Study the information in the table and answer the questions that follow.

Element	Formula of ion	Ion electron arrangement	Atomic radius (nm)	Ionic radius (nm)
P	P^{2+}	2:8:8	0.197	0.099
Q	Q^{-}	2:8	0.072	0.136
R	R^{+}	2:8:8	0.231	0.133
S	S^{3+}	2:8	0.143	0.050
U	U^{2+}	2:8	0.160	0.065
V	V^{+}	2:8	0.186	0.095
W	W^{+}	2	0.152	0.060
X	X^{-}	2:8:8	0.099	0.181

(a) Give the atomic numbers of elements P and Q. (2marks)

(b) Select elements that belong to the period 4 of the periodic table. (1mark)

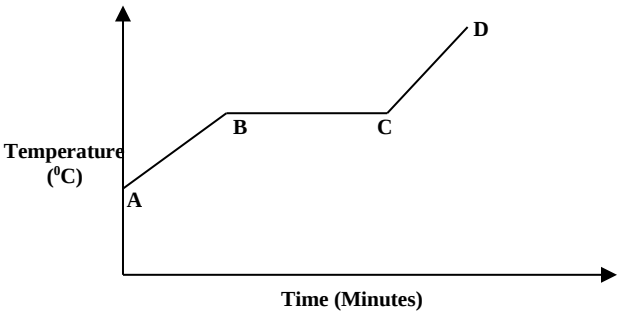
(c) Select **an** elements that would react with cold water explosively evolving hydrogen gas .(1mark)

(d) Why is the ionic radius of element X larger than its atomic radius? (2marks)

(e) Write an equation for the reaction between S and Oxygen. (1mark)

92. Salt is sprinkled on roads in Europe during winter to prevent formation of ice on roads. Explain how the salt works. (2marks)

93. The diagram below shows part of a temperature / time curve obtained when pure solid Naphthalene is heated.



(a) Explain why part BC is horizontal. (1mark)

(b) On the axis above draw the curve for impure Naphthalene solid. (2marks)

94. **(a)** The relative atomic masses of some elements are not whole numbers. Explain. (1mark)

(b) An elements Gallium has relative atomic mass **69.8**. In 100 atoms of Gallium 60 atoms are **Gallium-69** and 40 atoms are **Gallium-X**. Determine the value of X. (3marks)

95. **(a)** What is valency. (1mark)

(b) The valency of X is 3, what is the formula of its;

(i) Hydroxide. Sulphate. (2marks)