

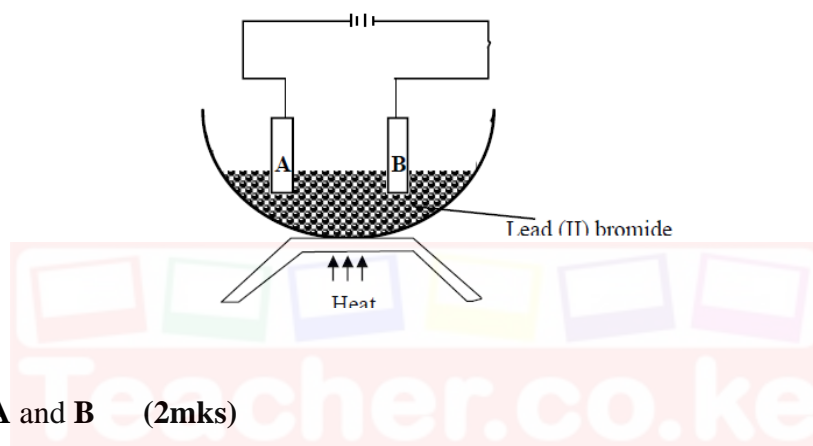
CHEMISTRY F4 OPENER 2025

MARKING SCHEME

1. You are provided with the following: - solid lead (II) nitrate, magnesium oxide powder, dilute sulphuric (VI) acid and distilled water. Describe how you can prepare a dry sample of lead (II) sulphate (3mks)

- Dissolve lead (ii) nitrate crystal in a given amount of distilled water in a beaker
- To dilute sulphuric (vi) acid $\sqrt{1/2}$ in a beaker add magnesium $\sqrt{1/2}$ oxide $\sqrt{1/2}$ powder
- React the two solutions obtained
- Filter the mixture and wash the residue
- Dry the residue between filter papers to obtain a dry sample of lead (ii) sulphate

2. Study the diagram below and use it to answer the questions that follow:-



(a) Identify electrodes A and B (2mks)

A is Anode $\sqrt{1}$

B is cathode. $\sqrt{1}$

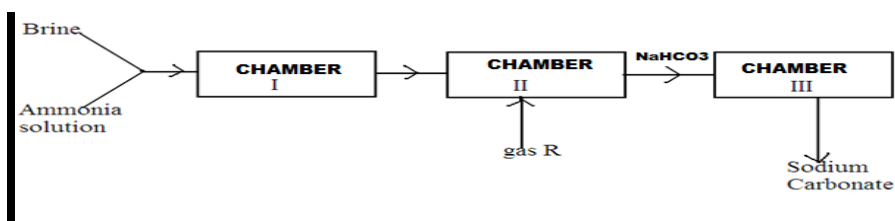
(b) Name the product formed at the anode (1mk)

Bromine gas. $\sqrt{1}$

(c) Write the electrode half equation of reaction at electrode A (1mk)



3. Below is a simplified scheme of Solvay process. Study it and answer the questions that follow.



(a).Identify gas R.

(1mk) -----Carbon

(iv) oxide//CO₂

(b)Write an ionic equation for the process in chamber III.

(1mk)



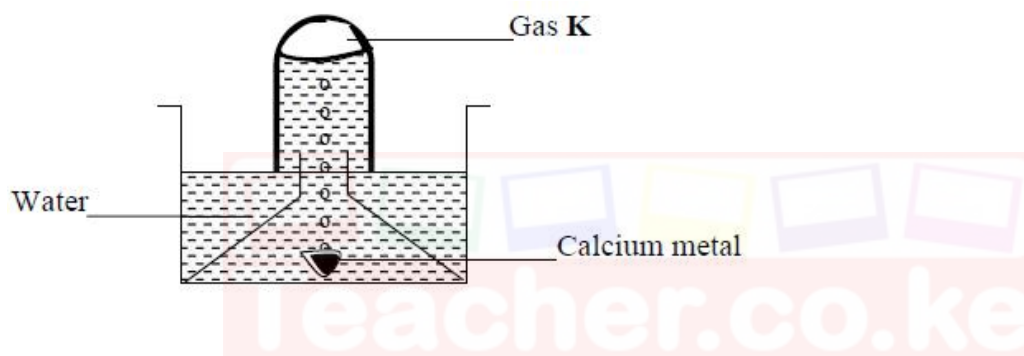
(c).Give two uses of sodium carbonate. (2mks)

-Softening hard water

-manufacture of glass

-making sodium silicate use to manufacture soap

4. The set up below was used to collect gas **K**, produced by the reaction between water and calcium metal.



(a) Name gas **K**

(1mk)

Hydrogen

(b) At the end of the experiment, the solution in the beaker was found to be a weak base. Explain why the solution is a weak base

5. Name the process which takes place when

(2mks)

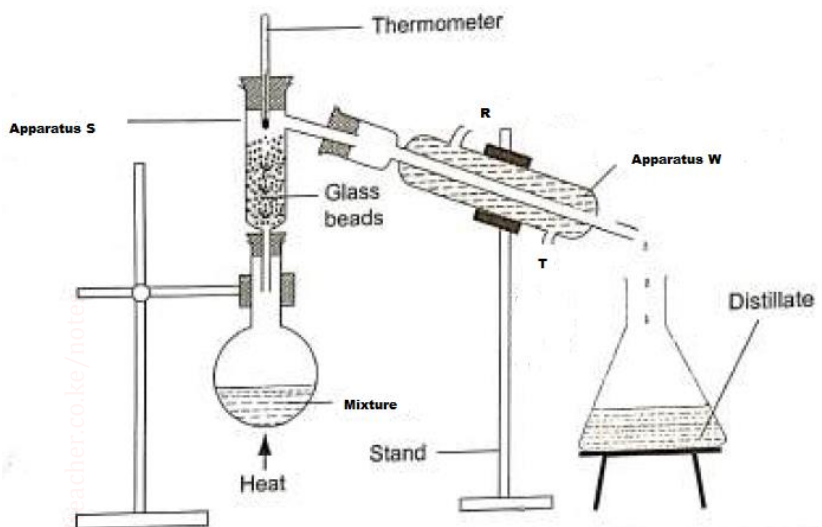
(a) Solid Carbon (Iv) Oxide (dry ice) changes directly into gas

Sublimation

(b) A red litmus paper turns white when dropped into chlorine water

Bleaching

6 .A student left some crushed fruit mixture with water for some days. He found the mixture had fermented. He concluded that the mixture was contaminated with water and ethanol with boiling point of 100oC and 78oC respectively. The set-up of apparatus below are used to separate the mixture.



(i) Name the piece of apparatus labelled **W** (1mk)
Condenser

(ii) What is the purpose of the thermometer in the set-up? (1mk)
To indicate when a liquid is boiling, a thermometer reads a constant temperature

iii) At which end of the apparatus **W** should tap water be connected? (1mk)
T

(iv) Which liquid was collected as the first distillate? Explain (1mk)
Ethanol

Reason:- It has a lower boiling of 78°C compared to water with a boiling point of 100°C

or - The liquid with the lower boiling point boils first and its vapours are condensed and the condenser to be collected as the first distillate

(v) What is the name given to the above method of separating mixture? (1mk)
Fractional distillation

(vi) State two applications of the above method of separating mixtures (1mk)
separate components of crude oil

- To

- To isolate O₂ and N₂ from air

- To manufacture spirits

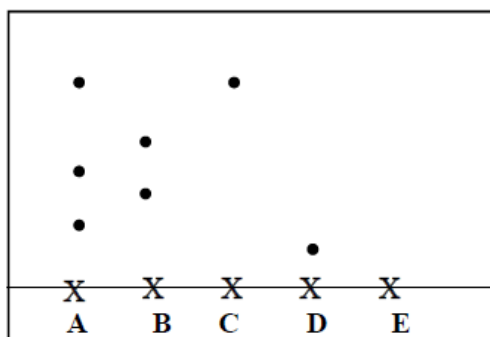
(vi) What properties of the mixture makes it possible for the component to be separated by the above methods? (1mk)

- They are miscible liquids

- They have different but close boiling points

7. The following diagram shows a paper chromatogram of substances A, B, C, and D which

are coloured



(a) Indicate the solvent front on the chromatogram (1mk)

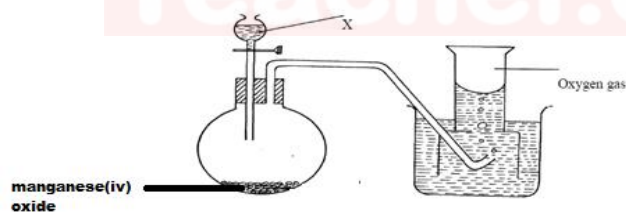
(b) Which substance is pure? (1mk)

-C

- It contains only one pigment

(c) Substance **E** is a mixture of **C** and **D**. Indicate its chromatogram in the diagram (1mk)

8. The diagram below shows students set-up for the preparation and collection of oxygen gas



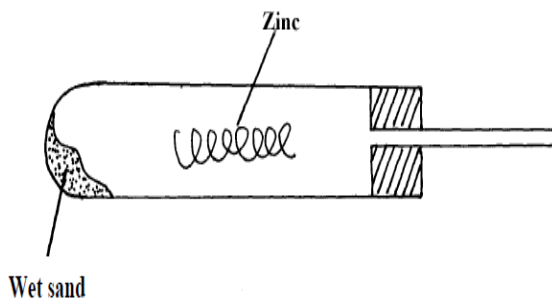
(a) Name substance **X** used (1mk)

Hydrogen peroxide

(b) Write an equation to show the reaction of sodium peroxide with the substance named in (1mk)



9. A student set-up the experiment as shown below to collect a gas. The wet sand was heated before heating zinc granules



- (a) Complete the diagram for the laboratory preparation of the gas (3mks)
- (b) Why was it necessary to heat wet sand before heating Zinc granules? (1mks)

-to generate/produce steam and expel air initially in the apparatus

10. Below are PH values of some solutions.

Solution	A	B	C	D
PH	6.7	13.0	2.1	7.0

i) Which solution is likely to be

I. rain water (½ mark)

A

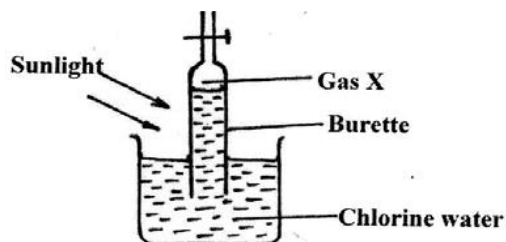
II. Sodium hydroxide (½ mark)

B

ii) Which substances will be formed when magnesium reacted with solution C?(1 mark)

salt and hydrogen gas

11. An experiment was set up using chlorine water as shown below.



(i) Identify gas X. (1mk)

Oxygen

(ii) Write an equation for the production of gas X. (1mk)



(iii) State any TWO uses of chlorine gas. (2mks)

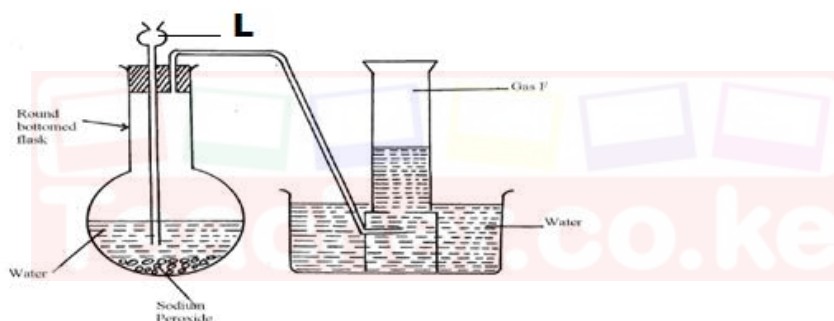
-manufacture of bleaching agent

-killing micro-organisms in water treatment works

-manufacture of hydrochloric acid

-manufacture of PVC

12. The set-up below was used to collect gas **F** produced by the reaction between sodium peroxide and water.



(i) Name gas **F** (1mk)

oxygen

(ii) At the end of the experiment, the solution in the round bottomed flask was found to be a strong base. Explain why this was so. (1mk)

- sodium peroxide reacted with water to form basic sodium hydroxide

(iii) Which property of gas **F** makes it be collected by the method used in the set-up? (1mk)

-it's slightly soluble in water

(iv) Give **one** industrial use of gas **F** (1mk)

-in oxy-acetylene flame used for welding and cutting of metals

-removes impurities from iron during steel making

-a reactant in fuel cells

13. Complete the following table to show the colour of the following indicators in acidic and basic solution

(2mks)

indicator	Colour in	
	Acidic solution	Basic solution
Phenolphthalein	Colourless	pink
Methyl orange	Red/Pink	Yellow
Litmus solution	Red	Blue

14. Define the following terms (2mks)

i) Cation

-a positively charged ion

ii) Isotopes

-Atoms of the same element with different mass numbers.

15. The diagram below represents an allotrope of carbon.



a) name the allotrope. (1mk)

-graphite

b) Explain why:- (2mks)

(i) its slippery

-made layers joined together by weak van-der-waal's forces hence slide over each other.

(ii) Conducts an electric current

-has delocalized electrons in its structure