



MARANDA HIGH SCHOOL

Kenya Certificate of Secondary Education

THE MOCK EXAMINATIONS, 2026

233/1

CHEMISTRY

PAPER 1

JUNE 2026

Time: 2 Hours

Name: *Marking guide* Admission No:

Stream: Signature: Tuesday, 2ND June, 2026; 8:00-10:00Am

Instructions to Candidates

- Write your name and Admission number in the spaces provided above.
- Sign and write the date of examination in the spaces provided above
- Answer **ALL** the questions in the spaces provided below each question.
- Mathematical tables and silent electronic calculators may be used.
- All working **MUST** be clearly shown where necessary.
- This paper consists of 12 printed pages

FOR EXAMINERS' USE ONLY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

19	20	21	22	23	24	25	26	27

Grand Total

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Turn Over

1. An extract colouring matter was placed at the centre of a filter paper and allowed to dry. Drops of ethanol were added to the centre and eventually the following was observed.



(a) Name a process by which dilute extract can be made more concentrated. (1 mark)

Evaporation ✓

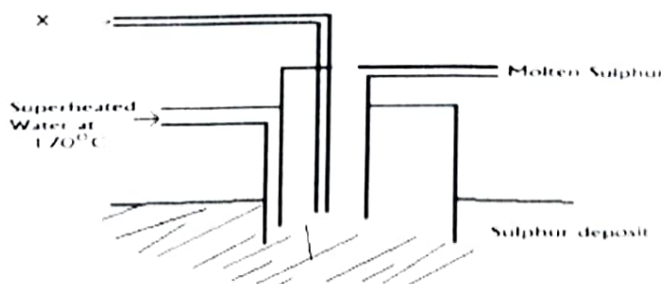
(b) Give the name of the process by which the circles were produced. (1 mark)

Chromatography ✓ / Accept Paper Chromatography

(c) Explain why water is not suitable for this process. (1 mark)

Water does not dissolve colouring matter in plants.
Accept Water does not show difference in solubility

2. The diagram below shows the Frasch process used for extraction of Sulphur. Use it to answer the questions that follow.



(a) Identify X. (1 mark)

Hot compressed air ✓ / reg compressed air

(b) Why is it necessary to use superheated water in this process? (1 mark)

To melt sulphur ✓

Edwine

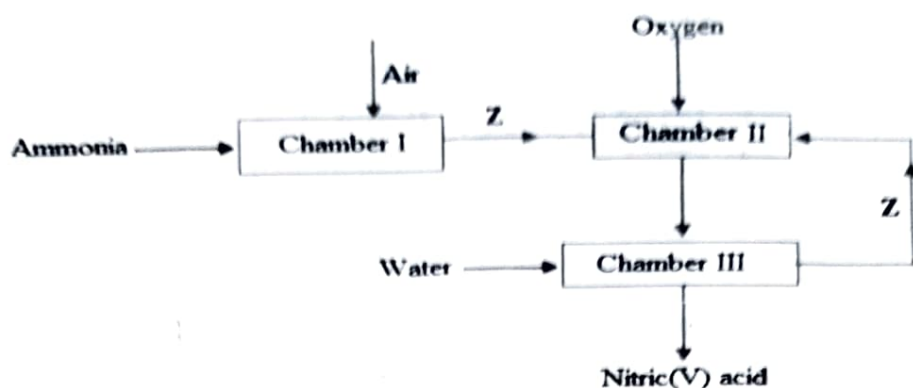
(c) Give two examples of non-crystalline allotropes of sulphur.

(1 mark)

• Powdery
• Plastic • Colloidal

Any 2 (a) 1mk

3. The flow chart below shows how nitric(V) acid can be obtained.



(a) Identify the chamber in which a catalyst is used and name the catalyst.

(1 mark)

Chamber I ✓ 4. Platinum-Rhodium / Platinum / Copper / Nichrome

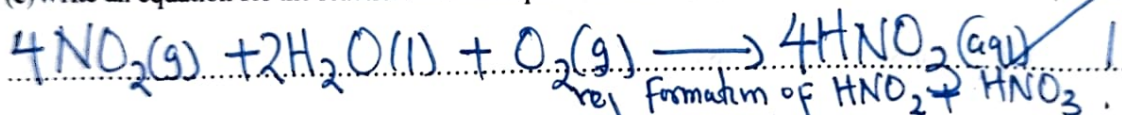
(b) Name substance Z.

(1 mark)

Nitrogen (II) oxide ✓ 1

(c) Write an equation for the reaction that takes place in chamber III.

(1 mark)



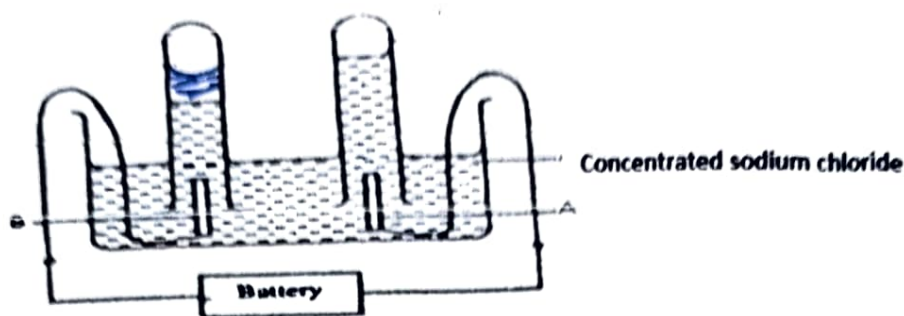
4. Starting with 25cm^3 of 0.2M potassium hydroxide solution, describe how you would prepare potassium sulphate crystals. (3 marks)

Add 25cm^3 of 0.1M pt 12.5cm^3 of 0.2M Sulphuric (VI) acid to the Potassium hydroxide solution in a beaker and stir. Heat the resultant solution to saturation and allow to cool to obtain Potassium Sulphate crystals. Filter out the crystals and dry between filter papers. 3

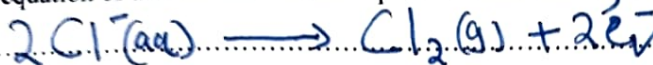
Brian

07

5. The apparatus shown below was used to investigate the products formed when concentrated sodium chloride was electrolysed using inert electrodes.



(a) Write equation of the reaction that takes place at electrodes A, anode (1 mark)



(b) If the concentrated sodium chloride was replaced with dilute sodium chloride, what product would be formed at electrode A. Explain (2 marks)

Oxygen OH⁻ preferentially discharged due to its lower position in the electrochemical series.

(Accept equation / Oxygen and water for product)

6. (a) Identify the substance that acts as acid. Give a reason. (2 marks)



NH₄⁺ Proton donor

b) Name the particle responsible for conduction of electricity in the following.

i) Magnesium sulphate solution (1/2 mark)

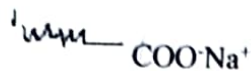
mobile ions

or free ions

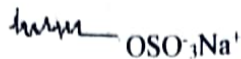
ii) Mercury (1/2 mark)

Delocalised electrons / mobile electrons

7. Two cleansing agents are represented below.



Detergent P



Detergent R

a) Classify the detergents above.

(2marks)

P - Soapy detergent ✓ 1

R - Soapless detergent ✓ 1

2

b) Select one of the detergents that would not be suitable for washing in water containing magnesium chloride. Explain.

(1mark)

P / Soapy detergent ✓ 1
Forms scum with hard water or insoluble salt with hard water. ✓ 1

8. Name the homologous series to which of the following belongs to:

(2marks)

a) $\text{C}_n\text{H}_{2n+2}$

Alkanes ✓ 1

rej Alkane.

b) $\text{C}_n\text{H}_{2n-2}$

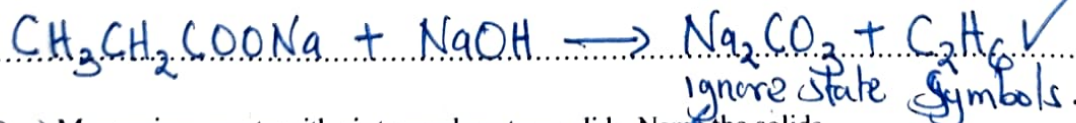
Alkynes ✓ 1

rej Alkyne.

2

c) Ethane can be prepared by use sodium propanoate and sodalime, write the equation for the reaction taking place.

(1mark)



9. a) Magnesium reacts with air to produce two solids, Name the solids.

(2marks)

Mg Magnesium oxide ✓ 1

Magnesium nitride ✓ 1

Accept Formulae.

Rose.

b) Cold water reacts slowly with a piece of magnesium to produce bubbles of hydrogen gas. Write the equation for the reaction between cold water and magnesium (1 mark)



10. A student measured the pH values of solutions A, B, C, D and E and obtained the following results.

Solution	pH Value
A	1.0
B	5.0
C	13.0
D	8.0
E	7

a) Which of the solution is likely to be;

i) Magnesium chloride.

(1 mark)

E $\checkmark$ 1

ii) Acetic acid.

(1 mark)

B $\checkmark$ 1

b) Identify the solution which can react with Beryllium oxide.

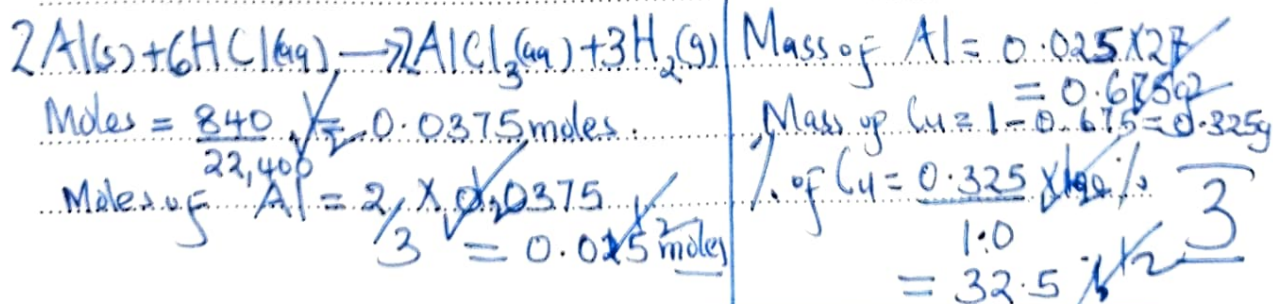
(1 mark)

A $\checkmark$ 1

11. Element U has atomic number 12 while element V has atomic number 16. How do the melting points of their oxides compare? Explain. (3 marks)

Oxide of U has a higher melting point than oxide of V. U oxide has strong ionic bond in the giant ionic structure while V oxide has simple molecular structure with weak Van der Waals forces. $\checkmark$ 3

12. 1.0g of an alloy of aluminium and copper was reacted with excess dilute hydrochloric acid. 840cm³ of hydrogen gas was produced at s.t.p. calculate the percentage of copper in the alloy. (Al = 27, molar gas volume = 22400cm³) (3 marks)

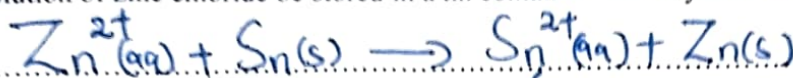


13. Given that:



Can a solution of zinc chloride be stored in a tin container? Show your working.

(3 marks)



$$E^\circ = -0.76 - (-0.14) = -0.62\text{V}$$

Yes Reaction is not possible / feasible / Will not react. 3

14. Starting with zinc powder, describe how you would obtain a sample of solid zinc carbonate.

Accept Add excess Zn to HNO_3 / HCl / H_2SO_4 for mark (3 marks)

Heat Zinc powder in open crucible to obtain zinc oxide.

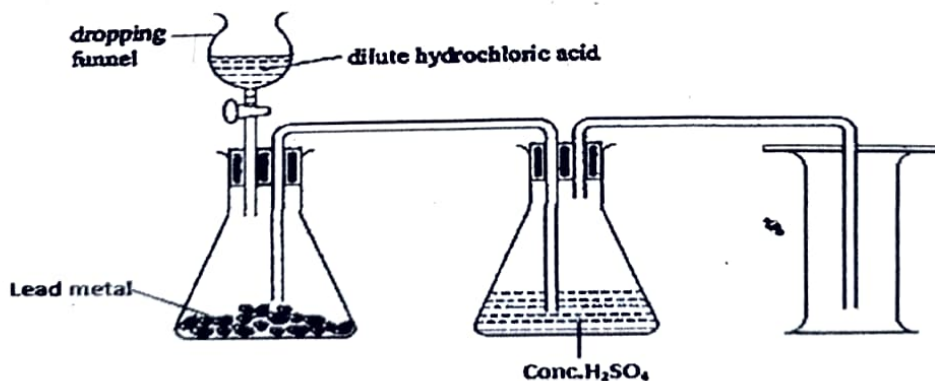
Add excess Zinc Oxide to warm dilute HNO_3 / HCl / H_2SO_4 .

Filter to obtain $\text{Zn}(\text{NO}_3)_2$ / ZnCl_2 / ZnSO_4 solution as a filtrate.

Add Na_2CO_3 / K_2CO_3 solution to the filtrate and filter to obtain

Zinc carbonate precipitate as a residue. Rinse the residue with 3 distilled water and dry between filter papers.

15. The diagram below shows an attempt to prepare dry hydrogen gas, a class set-up the experiment below



a) Identify two mistakes in the set-up

(2 marks)

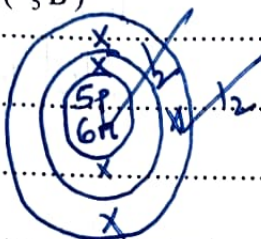
- Use of lead metal / Wrong reagent used. 2
 - Use of downward delivery / Wrong gas collection method.

b) Describe the test that would be used to completely identify the presence of hydrogen gas. (1 mark)
 Introduce a burning splint into the gas jar. It goes off or
 extinguishes a burning splint with a "pop" sound. 1

16. The control rods in a nuclear reactor are made of boron, natural boron contains about 20% ($^{10}_5\text{B}$) and 80% boron ($^{11}_5\text{B}$)

a) Draw the atomic structure of ($^{11}_5\text{B}$)

(1 mark)



b) Calculate R.A.M of boron

(2 marks)

$$\text{R.A.M} = \frac{(20 \times 10) + (80 \times 11)}{100} = 10.8$$

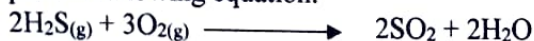
Penalise units for 1/2 mk.

17. (a) State Gay Lussac's Law.

(1 mark)

When gases react, they do so in volume that bear simple whole number ratio and to that of the products if gaseous at constant temperature and pressure. 1

(b). In an experiment, 436cm^3 of hydrogen sulphide was exploded in 363cm^3 of oxygen and reacted as per the following equation.



Determine the volume of the residual gas.

(2 marks)

$$\begin{array}{rcl} 2 \times 363 & 363 & 242 \\ 3 & & \\ \hline = 242 \end{array}$$

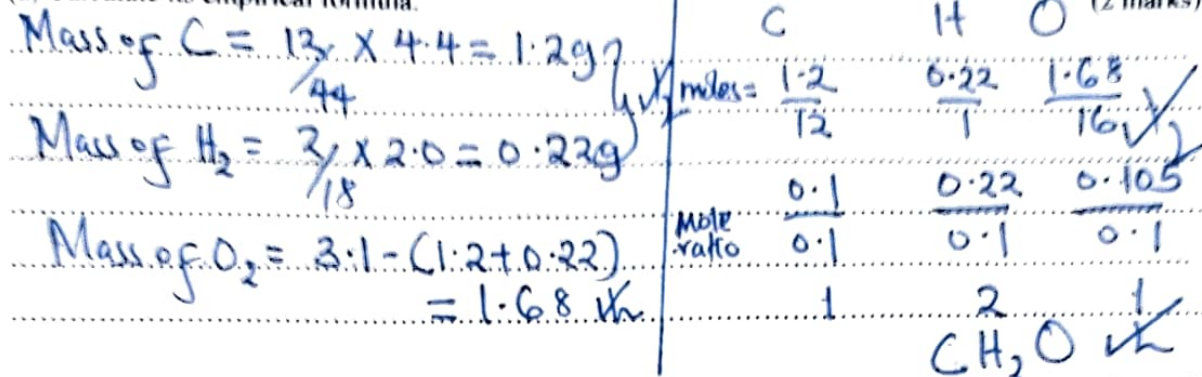
Volume of $\text{SO}_2 = 242\text{cm}^3$

Excess $\text{H}_2\text{S} = 436 - 242 = 194\text{cm}^3$

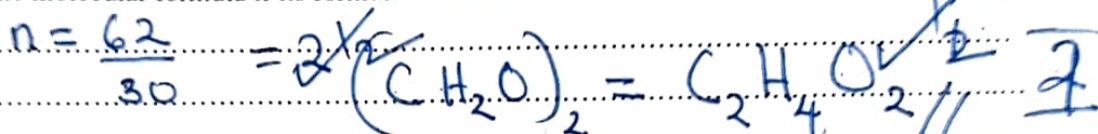
Residual gas = $194 + 242 = 436\text{cm}^3$

18. 3.1g of an organic compound containing Carbon, hydrogen and oxygen only produced 4.4g of Carbon (IV) oxide and 2.0g of water on complete combustion.

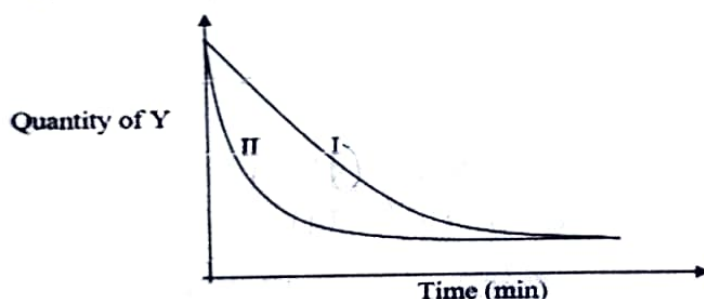
(a) Calculate its empirical formula.



(b) Calculate the molecular formula if its formula mass is 62.



19. The curves below were obtained when equal volumes of HCl acid of same concentration were reacted with 25.0g of Mabel chips. In one case, the acid was first warmed to a high temperature.

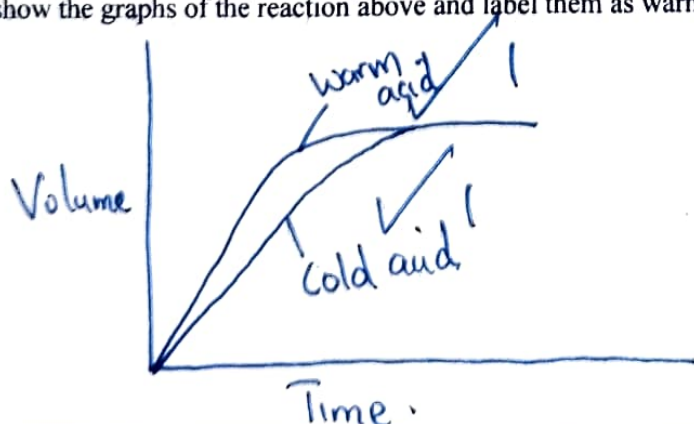


(a) Which curve represents the reaction involving warm hydrochloric acid?

(1 mark)

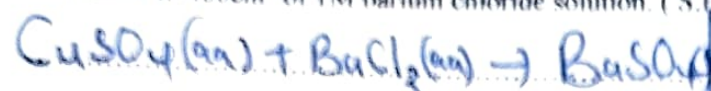
Curve II ✓

(b) Suppose a graph of volume of CO₂ produced against time was plotted, draw on the same axes a sketch to show the graphs of the reaction above and label them as warm acid and cold acid. (2 marks)



2

20. When copper (II) sulphate solution was reacted with barium chloride solution the molar enthalpy was found to be -18 kJ/mole . Calculate the temperature change if 600 cm^3 of 1 M copper (II) sulphate was added to 400 cm^3 of 1 M barium chloride solution. (S.H.C. = $4.2 \text{ J/g}^\circ\text{C}$, density of mixture = 1 g/cm^3) (3 marks)



$$7.2 = \frac{1000}{1000} \times 4.2 \times \Delta T$$

$$\text{Moles of CuSO}_4 = \frac{600 \times 1}{1000} = 0.6 \text{ moles}$$

$$\text{Moles of BaCl}_2 = \frac{400 \times 1}{1000} = 0.4 \text{ moles}$$

$$\Delta T = \frac{7.2}{4.2} = 1.71^\circ\text{C}$$

$$\Delta H = 0.4 \times 18 = 7.2 \text{ kJ}$$

21. a) Name the two common ores from which Zinc metal can be extracted.

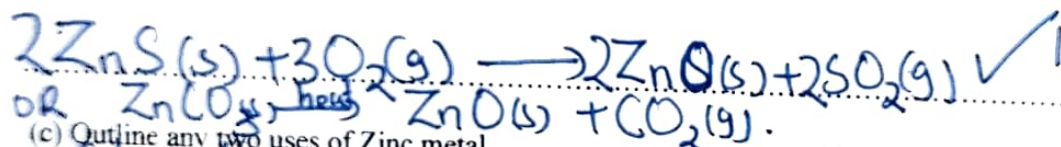
(1 mark)

Chalamine and Zinc blende

reg ZnCO_3 & ZnS
Zinc carbonate & Zinc sulphide

b) Taking one of the ores named in (a) above, write a chemical equation for the roasting process to get the required oxide.

(1 mark)



(c) Outline any two uses of Zinc metal.

(1 mark)

- Galvanization of iron sheets
- Making brass alloy
- Making outer casing of dry cells
- Making zinc cyanide for refining gold.

Any 2 @ 1mk

22. Chlorine gas was bubbled through potassium iodide solution.

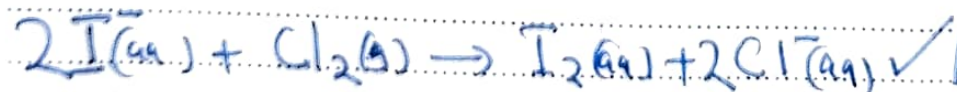
a) State the observation that would be made.

(1 mark)

Colourless solution changes to brown / Grey or black solid

b) Write the ionic equation for the reaction that took place in (a) above.

(1 mark)



c) Identify the oxidizing agent in the ionic equation (b) above.

(1 mark)

Chlorine / Cl_2

23. In the Haber process, the optimum yield of ammonia is obtained when a temperature of 450°C, pressure of 200 atmospheres and an iron catalyst are used. Equation for the reaction is shown below.



How the yield of ammonia would be affected if:

i) Temperature raised to 600°C

(1 mark)

Yield decreases ✓

ii) Pressure raised to 250 atmospheres.

(1 mark)

Increases yield ✓

iii) The amount of catalyst doubled

(1 mark)

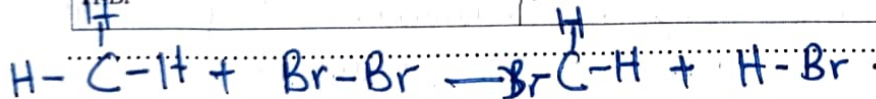
No effect ✓

24. Methane reacts with bromine as shown in the following equation.



Using the bond energies in the table below, calculate the enthalpy change ΔH , for the reaction (3marks)

Bond	Bond energy (kJmol ⁻¹)
C-H	412
C-Br	276
Br-Br	193
H-Br	366



$$\text{BFE} = 4(\text{C}-\text{H}) + 1(\text{Br}-\text{Br})$$

$$(4 \times 412) + (1 \times 193) = +1841$$

$$\text{BFE} = 3(\text{C}-\text{H}) + 1(\text{C}-\text{Br}) + 1(\text{H}-\text{Br})$$

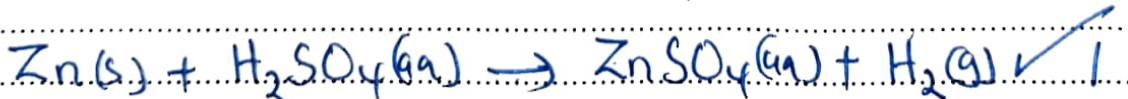
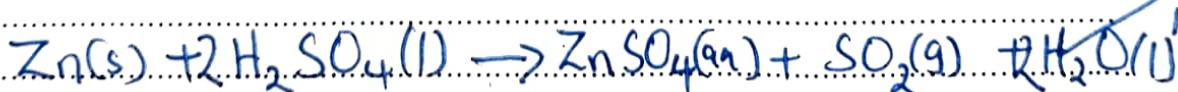
$$(3 \times 412) + (1 \times 276) + (1 \times 366) = -1878$$

$$\Delta H = +1841 - 1878$$

$$= -37 \text{ kJ mol}^{-1}$$

25. Zinc reacts with both concentrated and dilute sulphuric (VI) acid. Write the equations for the two reactions

(2marks)



Leticia

26. A current of 0.75A was passed through 300cm³ of 0.5M Copper (II) sulphate solution. Determine the time taken in seconds to deposit all the copper in the solution at the cathode. (Cu = 63.5, 1F = 96500 Coulombs) (3marks)

$$\text{Moles of Cu}^{2+} = \frac{300 \times 0.5}{1000} = 0.15 \text{ moles}$$

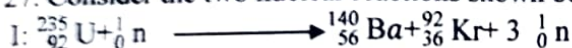
$$\text{Mass of Cu} = 0.15 \times 63.5 = 9.525 \text{g}$$

$$9.525 = \frac{Q \times 63.5}{2 \times 96,500}$$

$$Q = \frac{9.525 \times 2 \times 96,500}{63.5} = 28,950$$

$$t = \frac{28,950}{0.75} = 38,600 \text{ s}$$

27. Consider the two nuclear reactions shown below Equation



a) Name the type of reaction represented by equation (II). (1mark)

Nuclear fusion ✓

b) State two similarities between the reactions in the two reactions (1mark)

- Large quantity of energy released. Any 2 @ 1mk
- New elements are formed
- Energy released can be harnessed and converted to useful energy
- Energy released can be destructive when misused.

c) A radioactive substance emits alpha, beta and gamma particles. Explain why alpha particles are said to have highest ionizing power (1mark)

High charge and low speed / They are heavy

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Joshua / Edwine

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