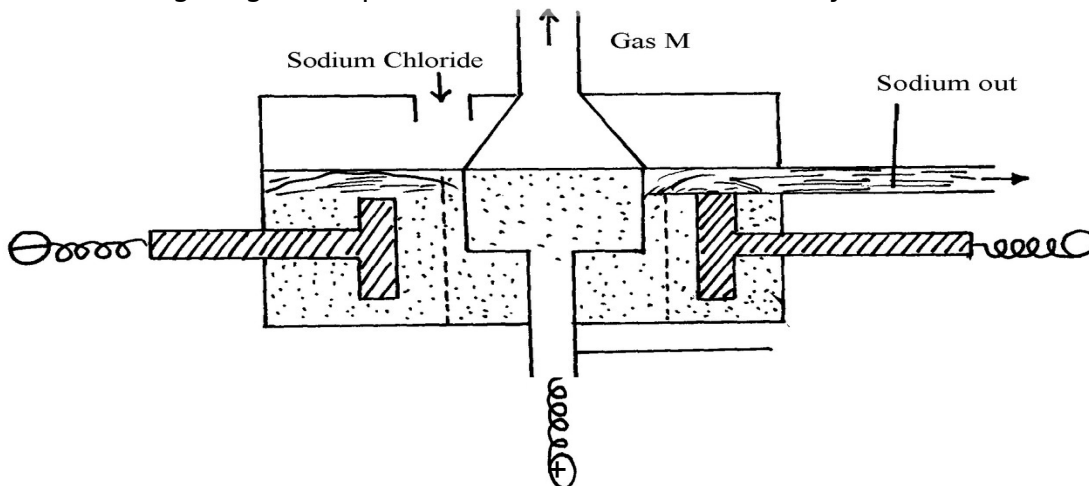
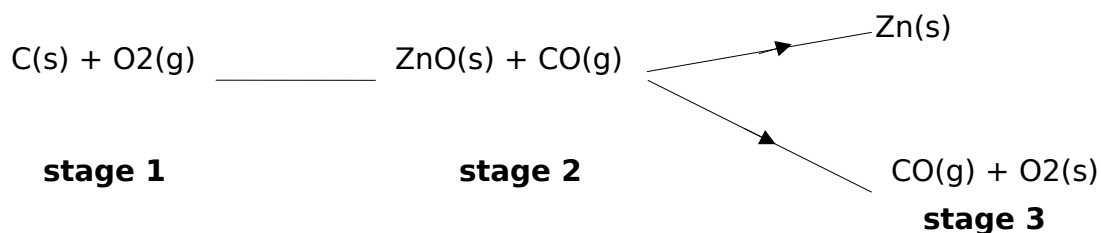


METALS

1. The following diagram represents extraction of sodium by the Down's cell



- (a) Why is the anode made of graphite in this case instead of steel which is a better conductor of electricity?
- (b) How are the electrolytic products separated from reacting?
- (c) Give reasons why large quantities of electricity is required for this process
2. a) Give **one** environmental hazard associated with the extraction of zinc metal
- b) Suggest **one** manufacturing plant that can be set up near zinc extraction plant. Give reasons for your answer
- c) What properties of aluminium and its alloys make it suitable for use in making aircraft parts
3. Aluminium is used in making overhead cables. State **two** properties of aluminium that makes it suitable for this use
4. The stages shown in the following diagram can be used to extract zinc from its oxide:-
Name the stage and the process taking place in it:-



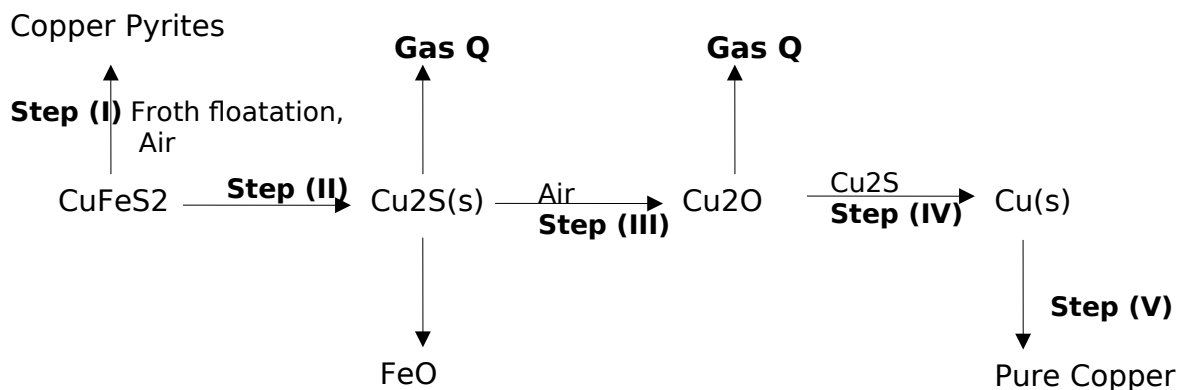
Name each stage and the process taking place in it:

Stage 1.....

Stage 2.....

Stage 3.....

5. Study the flow chart below and answer the questions that follow:



(a) Name gas **Q**

(b) With the help of diagram, describe how step (V) is carried out

6. Name the following compounds using IUPAC system

(i) CCl_4

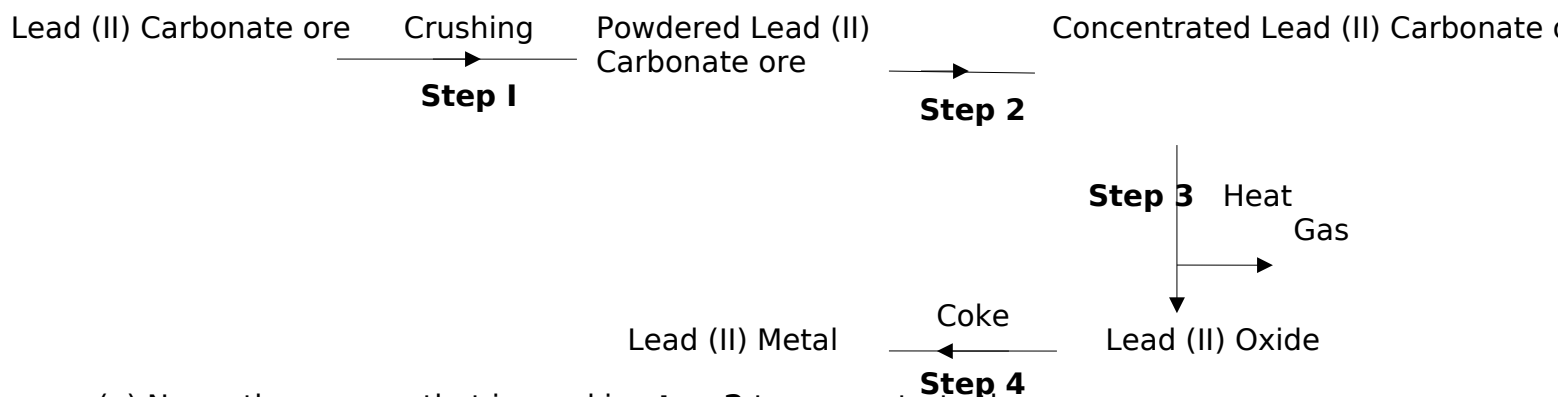
(ii) HOCl

7. Study the information provided:-

Element	Atomic radius (nm)	Ionic radius (nm)	Melting point of oxide ($^{\circ}\text{C}$)
W	0.381	0.418	-117
Y	0.733	0.669	849
Z	0.544	0.489	1399

(a) Explain why the melting point of the oxide of **W** is lower than that of the oxide of **Z**

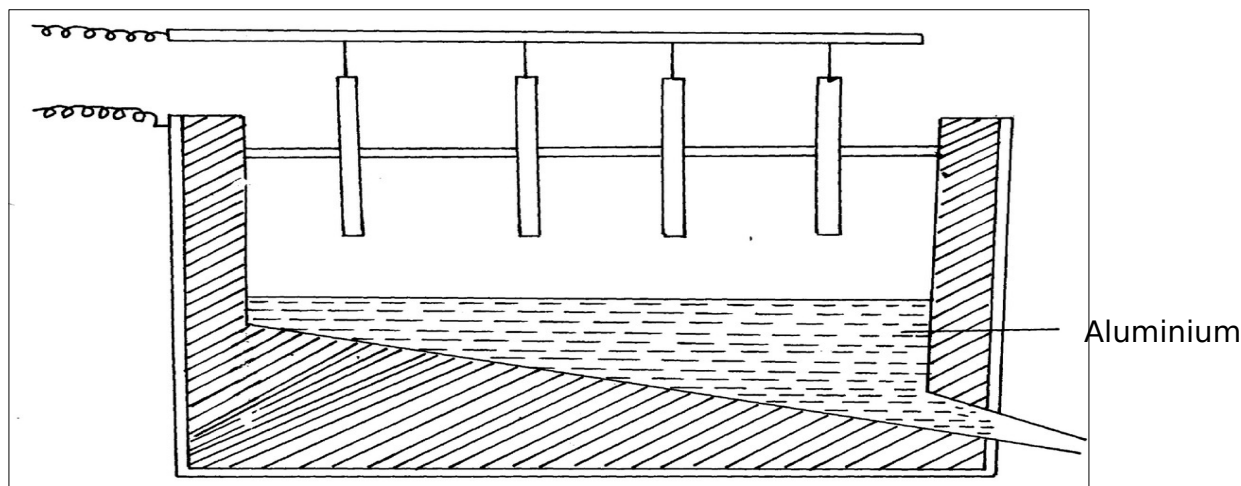
8. The flow chart below shows steps used in the extraction of zinc from one of its ores.



- (a) Name the process that is used in **step 2** to concentrate the ore
- (b) Write an equation for the reaction which takes place in **step 3**
- (c) Name **one** use of lead
9. Name the chief ores from which the following metals are extracted

- a) Aluminium
- b) Copper

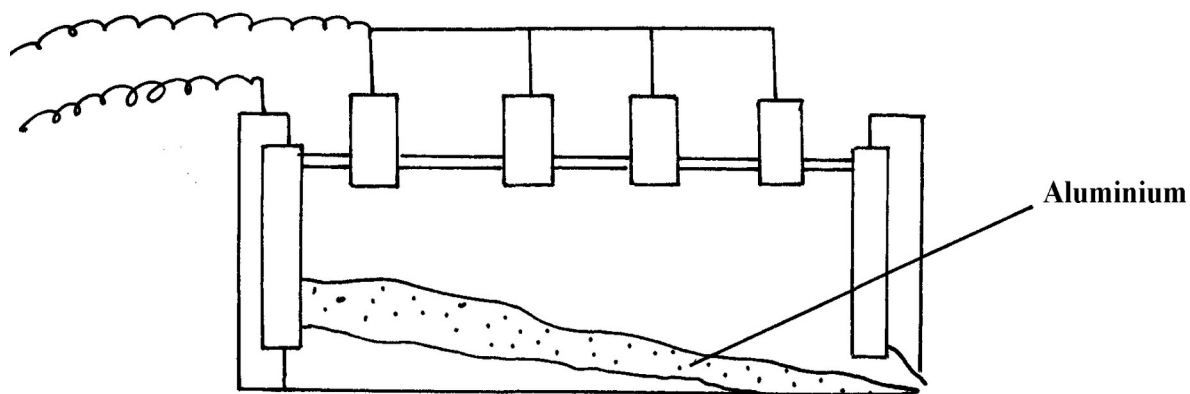
10. The diagram below represents the second stage in extraction of aluminium metal



- i) On the diagram label the: Anode, cathode and the electrolyte region (s)
- ii) The melting point of aluminium oxide is 2054°C , but the electrolysis is carried out at between $800-900^{\circ}\text{C}$
- a) Why is the electrolysis not carried out at 2054°C
- b) What is done to lower the temperature?

iii) The aluminium which is produced is tapped off as a liquid .What does this suggest about its melting points?

11. The extraction of aluminium from its ore takes place in 2 stages. Purification stage and electrolysis stage. Below is set-up for the electrolysis stage:-



(a) (i) Name the chief ore from which aluminium is extracted

(ii) Name **one** impurity which is removed at the purification stage

(b) (i) Label on the diagram each of the following:-

I - Anode

II- Cathode

III- Region containing electrolyte

(ii) The melting point of aluminium oxide is 2054°C but the electrolysis is carried out at between 80°C and 900°C

I. Why is not carried out at 2050°C

II. What is done to lower the temperature

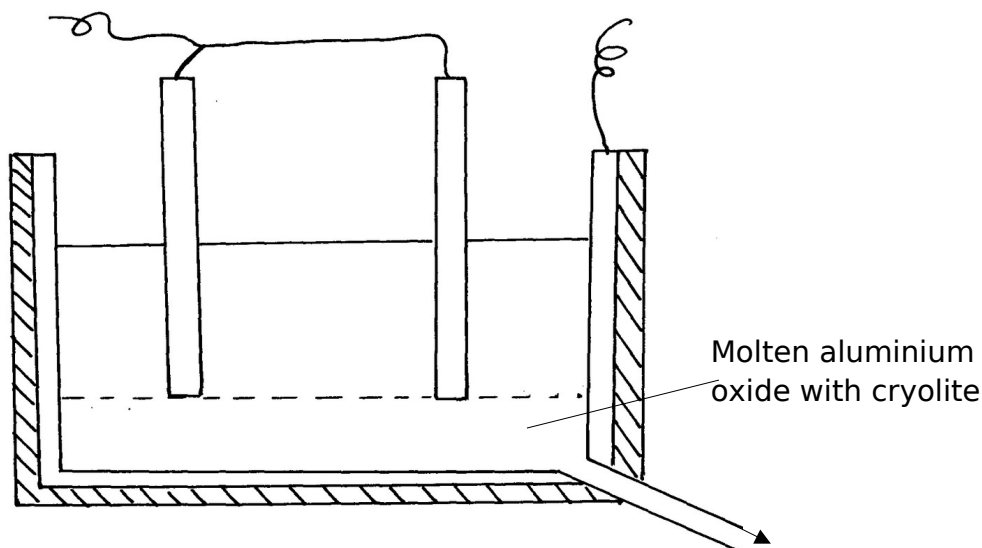
12. Aluminium is the most abundant metal in the earth crust and it is widely extracted for its wide range of uses.

(i) Name **one** major ore of aluminium and give its formula

(ii) Name **two** main impurities found in the ore

(iii)Aluminium oxide is heated first before it is electrolysed. Explain

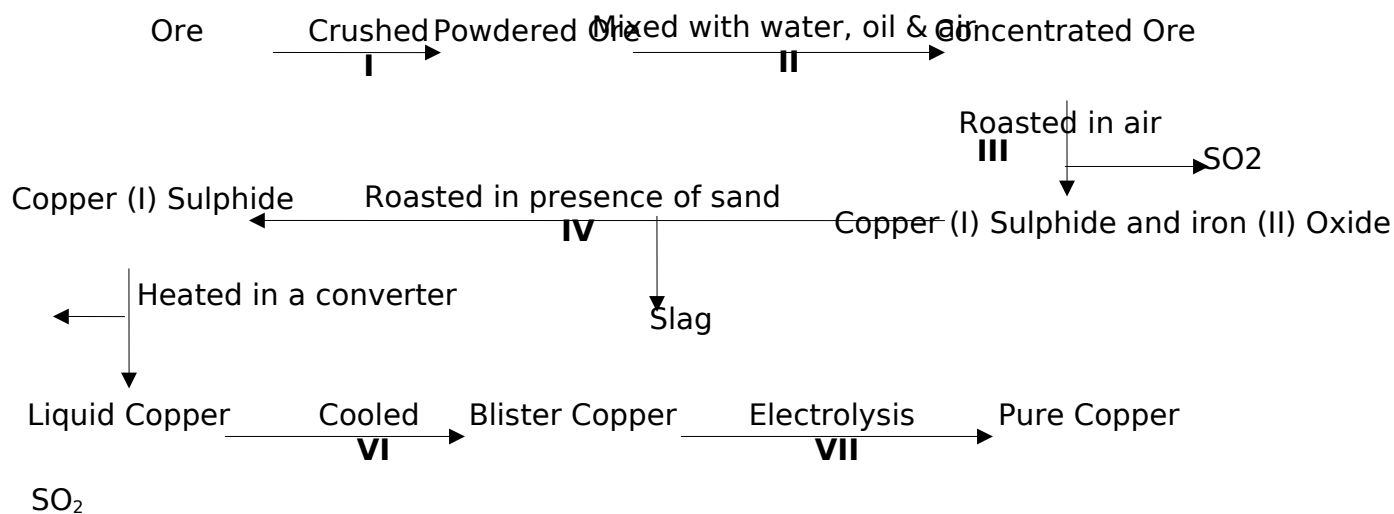
(iv) Electrolysis of aluminium oxide is done as shown below:



- Identify the anode and cathode on the diagram
- What is the role of electrolyte in the extraction ?
- Write half equations for the reactions that occur at the anode and cathode
- State **two** uses of aluminium

13. The diagram below is a flow chart for the extraction of copper. Study it and answer the questions

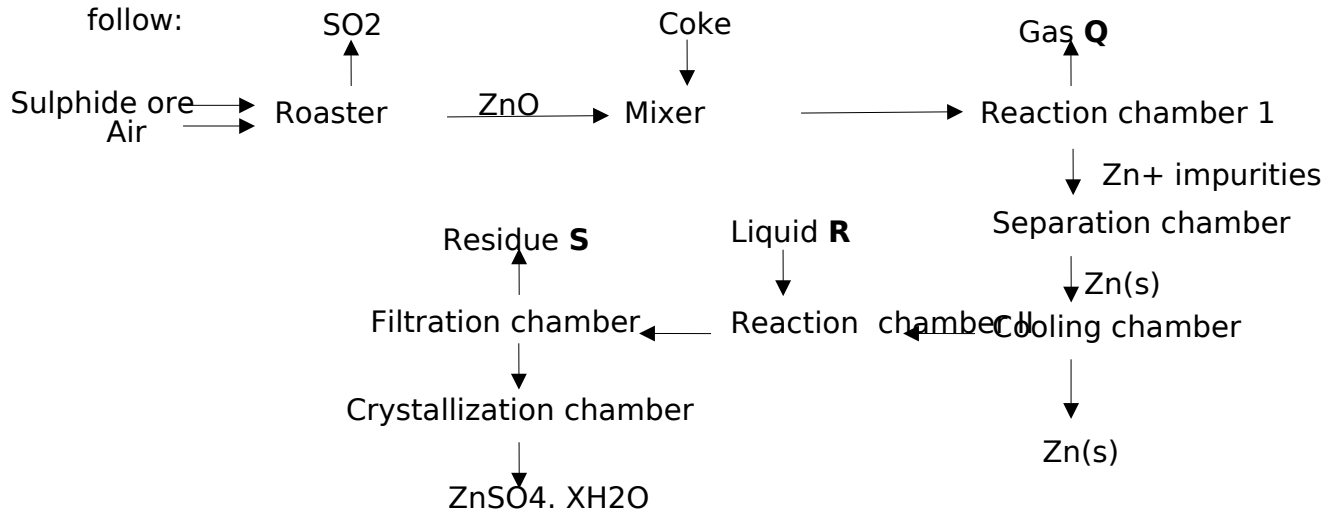
that follow:



- Write the formula of the major ore of copper metal
- Name **process II**

- (c) Give an equation for the reaction that occurs in **stage III**
- (d) Explain what happens in stage **IV**
- (e) Write half cell equations occurring at the anode and cathode in **stage VII**
- (f) Draw a simple diagram showing the set-up that is used in electrolytic purification of copper
- (g) A green rocky materials suspected to be the ore malachite $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$.

14. The flow chart below illustrates the extraction of Zinc. Study it and answer the questions that follow:



a) Name:-

i) Gas **Q**

ii) Liquid **R**

(iii) Residues **S**

b) Name the sulphide ore used

c) Before the ore is roasted, it is first concentrated;

(i) Explain why it is necessary to concentrate the ore

(ii) Explain briefly the process of concentrating the ore

d) Write an equation for the reaction that takes place in the:-

(i) Roaster

(ii) Reaction chamber

(e) (i) Name **one** major impurity present in the sulphide ore used

(ii) Write an equation to show how the impurity in **(e)(i)** above is removed

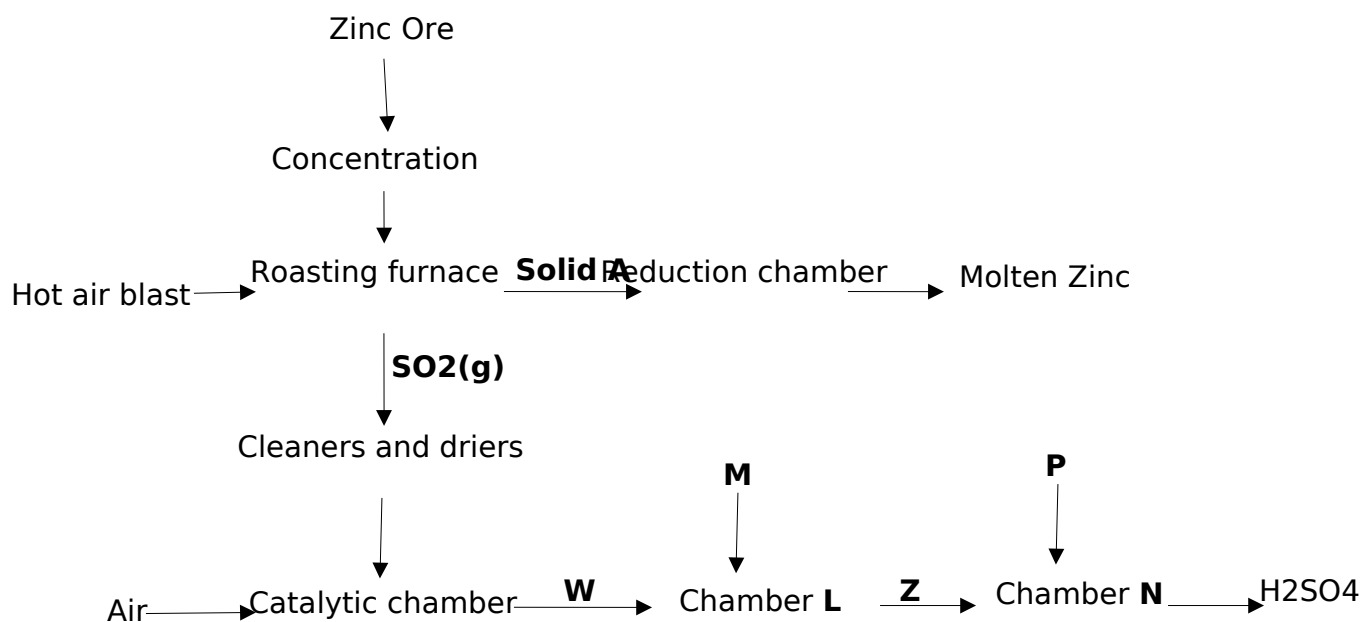
f) Given that the sulphide ore contains only 45% Zinc sulphide by mass, calculate :

(i) The mass in grams of Zinc sulphide that would be obtained from 250kg of the ore.

(ii) The volume of Sulphur (IV) oxide that would be obtained from the mass of sulphide ore at room temperature and pressure

(Zn = 65.4, S = 32.0, O = 16.0, 1 mole of gas occupies 24.0 liters at r.t.p)

15. The flow chart below represents the extraction of zinc from its ore and a by-product used in the manufacture of sulphuric (VI) acid. Study it and use it to answer the questions that follow:-



a) Name;

i) The suitable zinc ore used.

ii) The main impurity in the ore

b) Describe how zinc ore is concentrated

c) Write an equation for the reaction taking place in the roasting furnace

d) Describe what happens in the reduction chamber

e) Identify substances:-

W.....($\frac{1}{2}$ mk) **M**.....($\frac{1}{2}$ mk)

f) Write the equation for the reaction that occurs in chamber **N**.

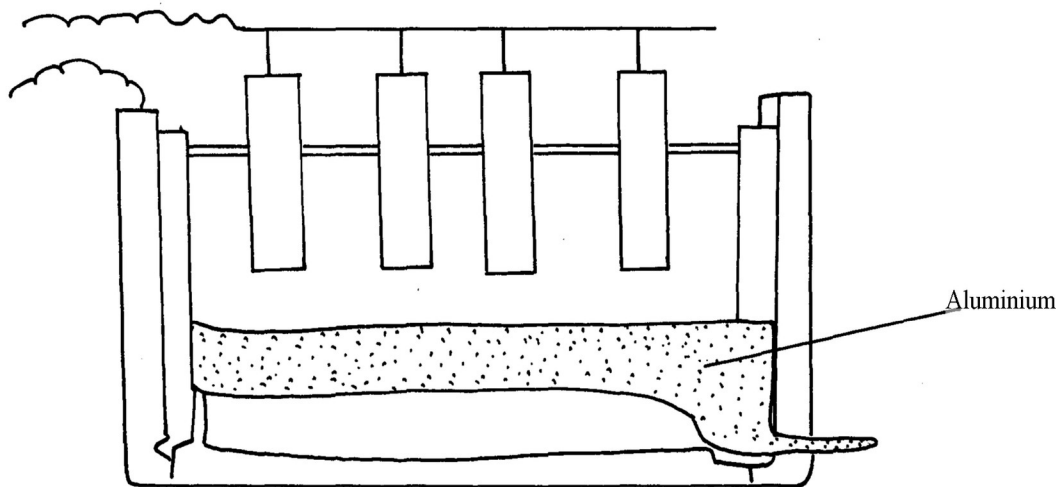
g) Explain why sulphur (VI) oxide is not dissolved directly in water

h) Explain the danger caused by this process to the environment

(2 marks)

16. The diagram below is for extraction of Aluminium from its ore. It takes place in stages.

Use it to answer the questions that follow:-



(a) Name the **two** stages mentioned above

*

(b) Name:-

(i) The ore from which Aluminium is extracted

(ii) The impurities removed during the extraction of Aluminium

*

(c) On the diagram label:-

(i) The electrodes

*

(ii) The region containing the electrolyte

*

(d) Molten cryolite is added to Aluminium Oxide during extraction. Explain

*

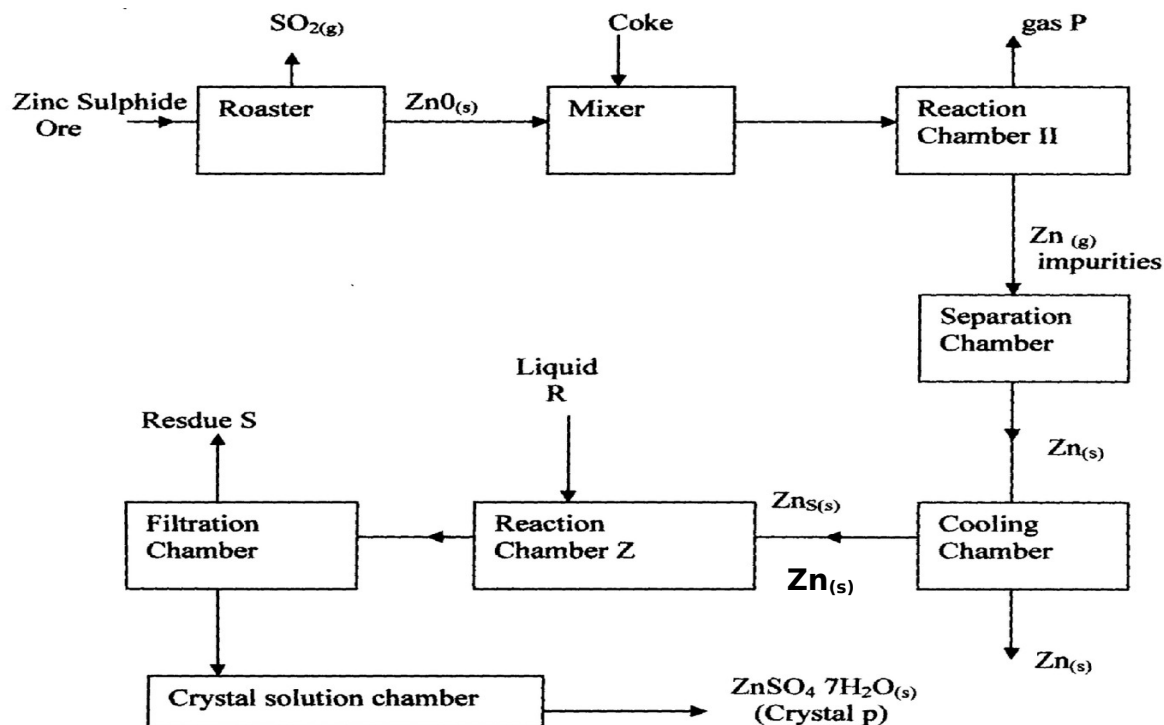
17. A current of 3A was passed through fused aluminium oxide for 10minutes. Calculate the mass of Aluminium obtained at one electrode ($Al = 27.0$, $IF = 96500C$)

*

18. (a) Name **one** ore that can be used to commercially extract Zinc metal

(b) The flow chart below illustrates the extraction of zinc and preparation of zinc sulphate

crystals.



(i) Name :

(1) Gas **P**

(11) Liquid **R**

(III) Residue **S**

(ii) What is the role of coke in the above process?

(iii) Name the main impurity removed in the separation chamber

(iv) Write an equation for the reaction that takes place in ;

(1). Roaster

(11). Reaction chamber II

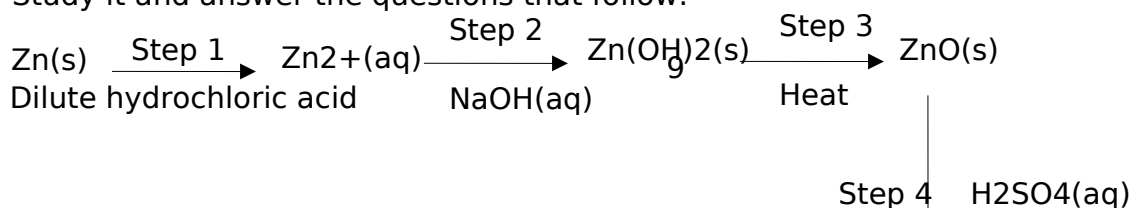
(v) Write an equation for the reaction that takes place between Zinc metal and liquid **R**

(vi) Given that zinc Sulphide ore contains only 45% of zinc Sulphide by mass, calculate the mass in grams of zinc Sulphide that would be obtained from 250kg of the ore .

(vii) Give **one** commercial use of Zinc metal

19. The flow chart below shows a sequence of chemical reactions starting with Zinc.

Study it and answer the questions that follow:-



a) In step 1, excess 3M hydrochloric acid was added to 0.5g of Zinc powder

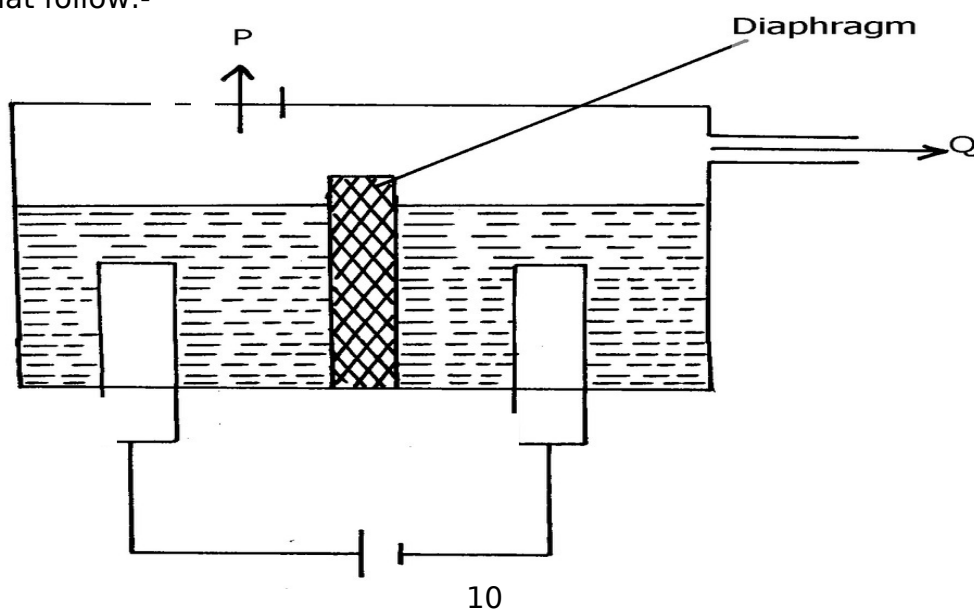
i) State **two** observations which were made when the reaction was in progress

ii) Explain why hydrogen gas is not liberated when dilute nitric acid is used in step 1

iii) a) Write the equation for the reaction that took place in **step 1**

b) Calculate the volume of 3M hydrochloric acid that was needed to react completely with 0.5g of Zinc powder ($Zn = 65.0$)

20. The diagram below is a simplified apparatus for extraction of sodium. Study it and answer the equations that follow:-

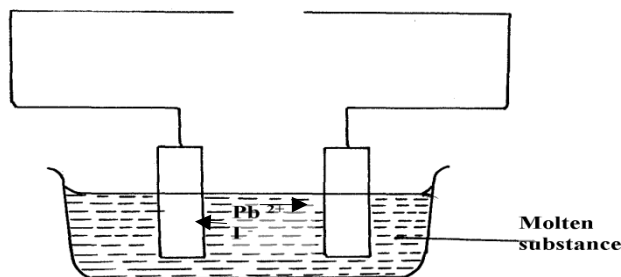


(a) Which substances come out at:- **P** & **Q**

(b) What is the role of the diaphragm

(c) Write the equation of the reaction forming sodium

21. The set-up below was used to investigate electrolysis of a certain molten compound;-



(a) Complete the circuit by drawing the cell in the gap left in the diagram

(b) Write half-cell equation to show what happens at the cathode

(c) Using an arrow show the direction of electron flow in the diagram above

22. (a) Name **two** ores from which Zinc metal is mostly extracted

(b) One of the steps in the extraction of Zinc metal from its ore is roasting of the ore in excess oxygen. Write equations for the reactions that take place when the ore in **(a)** above is roasted

23. Aluminum metal is mainly extruded from molten Bauxite by electrolysis.

a) Name the main impurity in this ore.

b) Briefly describe how the impurity is removed from the ore before electrolysis process.
(2 mks)

24. (a) In the extraction of aluminium from its ore by the use of electrolysis, explain the following observations:-

(i) the graphite anode is replaced from time to time

(ii) the steel tank which can also serve as an electrode is also lined with graphite cathode

(b) Sodium and aluminium metals both conduct electricity, but aluminium is a better conductor of electricity than sodium. Explain

25 (a) Name the process in which sodium metal is extracted

(1mk)

(b) What is the function of calcium chloride during extraction of sodium metal

(1mk)

(c) Write an equation for the reaction taking place at the anode

(1mk)

(d) Apart from liquid sodium what else can be collected at the cathode, and how is it separated from sodium . (2mks)

(e) Calculate the volume of hydrogen gas produced at s.t.p when 1.15g of sodium metal react with water. (Na=23, molar gas volume=22400cm³) (3mks)

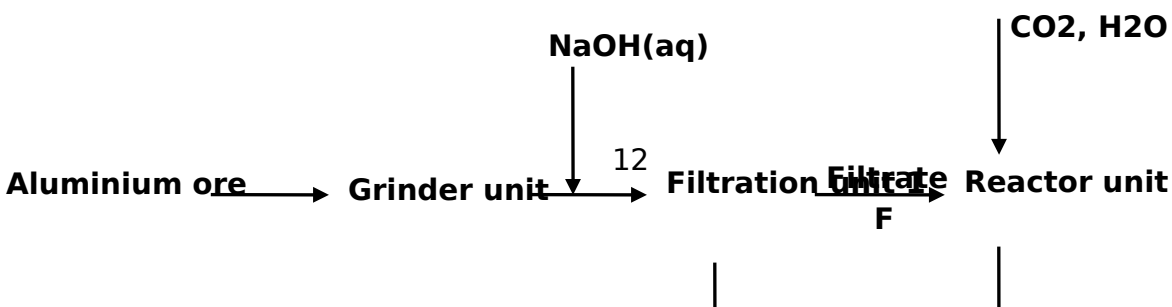
(f) (i) State one environmental hazard that is caused during extraction of sodium metal (2mk)

(ii) Give 2 uses of sodium metal (2mks)

25. a) Two ores of aluminium are bauxite, Al₂O₃.2H₂O and china clay Al₂Si₂O₇.H₂O. Suggest **two**

reasons why bauxite is usually preferred to china clay for extraction of aluminium. (2 Marks)

b) Aluminium metal is extracted from its ore according to the scheme shown below. Study the scheme and answer the questions that follow.



i) Iron (III) oxide, Titanium (II) oxide and silica are the main impurities. Identify the chambers where they are removed.

(2 Marks)

ii) Explain the functions of sodium hydroxide solution. (2 Marks)

iii) Write the formula of two ions in filtrate F. (1 Mark)

iv) Write an equation to represent the reaction in kiln G. (1 Marks)

v) Give the name of solid H and explain its function. (2 Marks)

vi) State the property of aluminium that makes it necessary to use the method of extraction in unit J. What is the name of the method?

(2 Marks)

26. (a) Name two chief ores of aluminium metal (2mks)

(b) Solid aluminium oxide doesn't conduct electricity. Explain how its made to conduct electricity, during the electrolytic extraction of aluminium in Hall process.

(1mk)

27. (a) Apart from iron ore (haematite), name two other raw materials fed into the blast furnace in the extraction of iron metal.

(2mks)

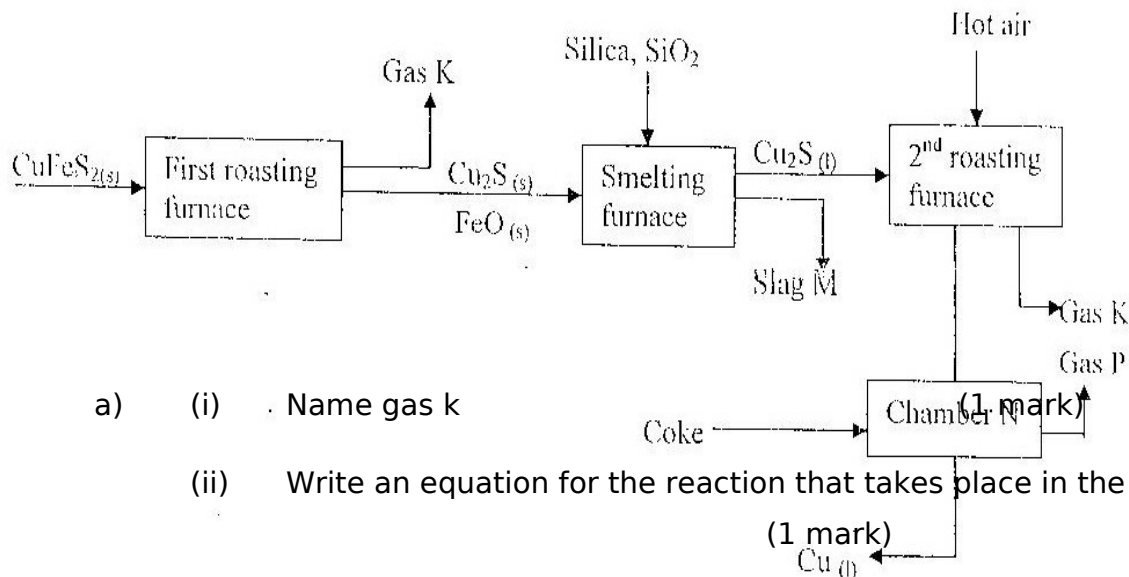
(b) Write an equation to show how the ore is reduced in the blast furnace

(1mk)

(c) Suggest two uses of iron

(2mks)

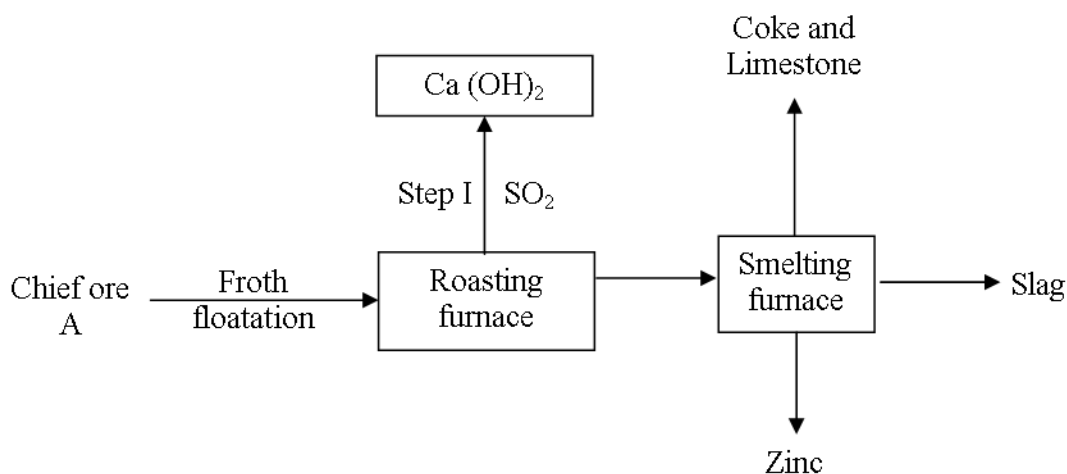
28. The flow chart below outlines some of the process involved during extraction of copper from its ore, copper pyrite (CuFeS_2). Study it and answer the questions that follow.



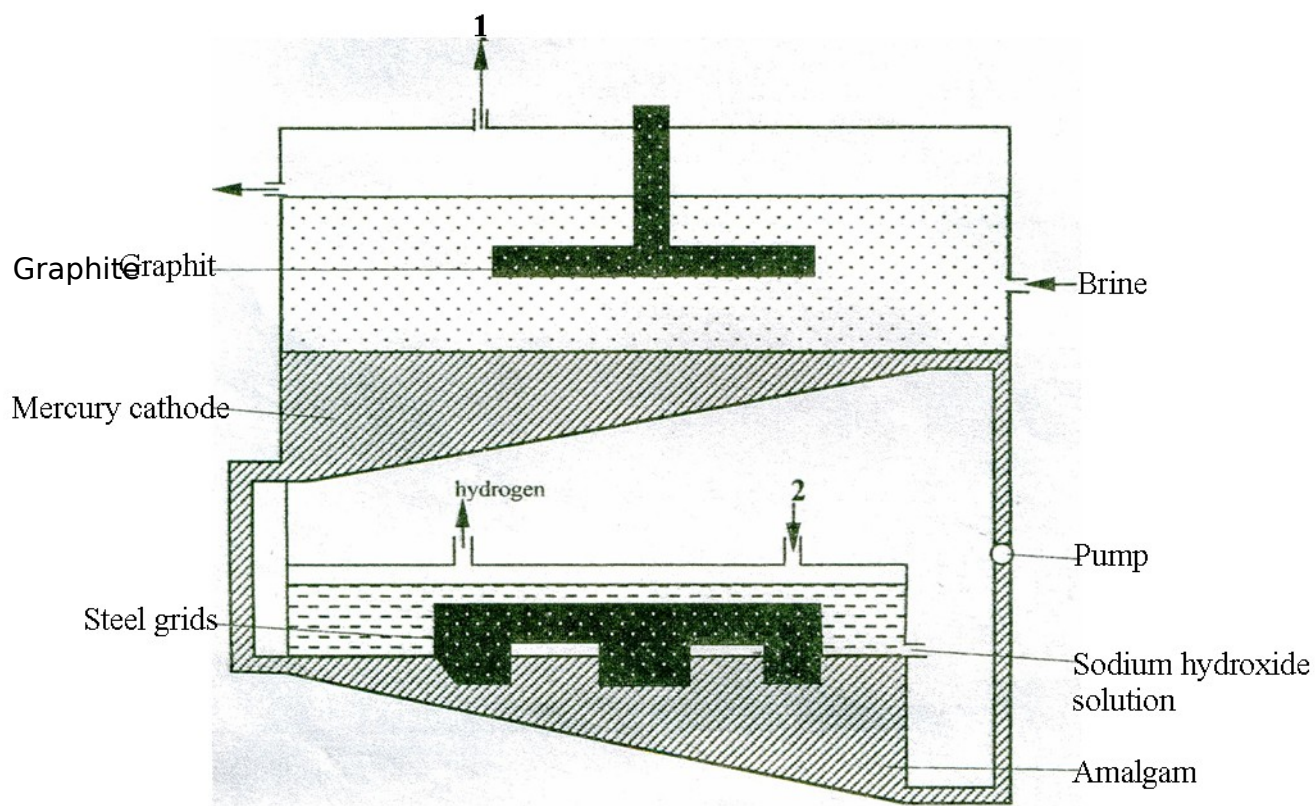
- a) (i) Name gas k (1 mark)
- (ii) Write an equation for the reaction that takes place in the first roasting furnace (1 mark)
- (iii) Write the formula of the cation present in the slag M (1 mark)
- (iv) Identify gas P (1 mark)
- (v) What name is given to the reaction taking place in chamber N (1 mark)
- b) Copper obtained from chamber N is not pure. Draw a well labelled diagram to show the set-up that can be used to refine the copper by electrolysis. (2 marks)
- c) A current of 5.0 amperes was passed through molten anhydrous Copper (II) Chloride of 10 minutes using inert graphite electrodes. Calculate the mass of copper deposited.. (3 marks)

(1 Faraday=96500 coulombs, Cl=35.5, Cu=63.5)

29. The flow chart below illustrates the industrial extraction of zinc metal. Study it and answer the questions that follow



- a) i) State the significance of froth floatation in the process above (1mk)
- ii) Name the chief ore used in this process (1mk)
- iii) Write a chemical equation for the reaction in the roasting furnace (1mk)
- iv) State the significance of step I in industries (1mk)
- v) State two applications of zinc metal (1mk)
- b) During extraction of lead metal from its ore, coke and limestone are added at same stage. When the mixture was heated, limestone decomposed to form calcium oxide and carbon (iv) oxide
- i) Name the ore from which lead is extracted (1mk)
- ii) With the aid of a chemical reaction, explain the importance of calcium oxide in the process. (2mks)
- iii) Lead obtained in the process above has impurities. Describe how pure lead is obtained from the impure lead (3mks)
30. (a) The diagram below represents a mercury cell that can be used in the industrial manufacture of sodium hydroxide. Study it and answer the questions that follow.



(i) Name

I the raw material introduced at 2 (1mk)

II another substance that can be used in the cell instead of graphite (1mk)

(ii) Identify the by-product that comes out at I (1mk)

(iii) Give:

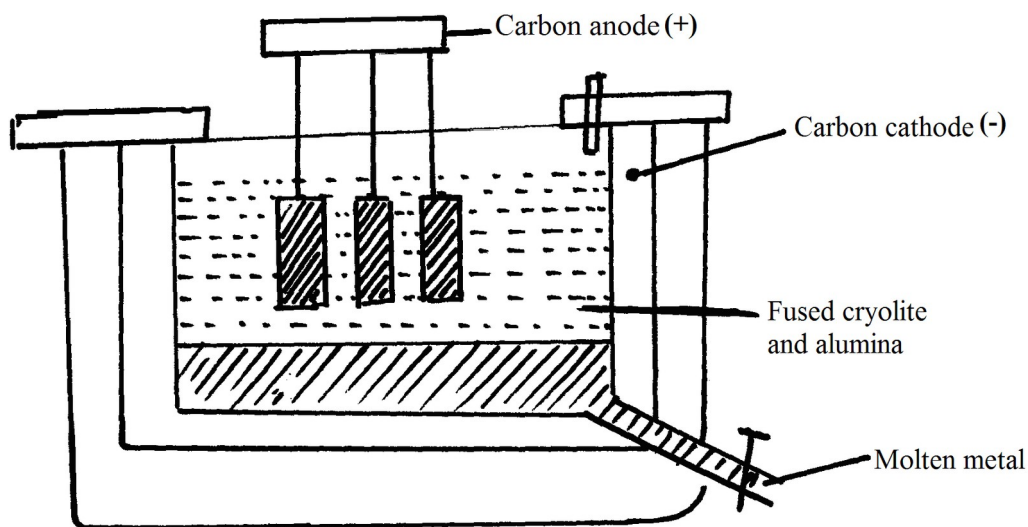
I one use of sodium hydroxide (1mk)

II two reasons why mercury is recycled (2mks)

(iv) Write an equation for the reaction in which sodium hydroxide was produced (1mk)

(b) If the mass of hydrogen gas produced was 50kg, calculate the mass of sodium hydroxide that was formed ($H = 1.0$, $Na = 23.0$, $O = 16.0$) (3mks)

31. The diagram below represents the electrolytic cell used for the extraction of a certain metal.



(a) What is the role of hot sodium hydroxide solution in the extraction of the metal?
(1mk)

(b) Why is it necessary to mix alumina and cryolite in the electrolytic cell?
(1mk)

(c) Write down the equations for the reactions at the electrodes .
(2mks)

(i) Anode

(ii) Cathode

(d) The anode requires to be replaced from time to time, suggest a reason for this.
(1mk)

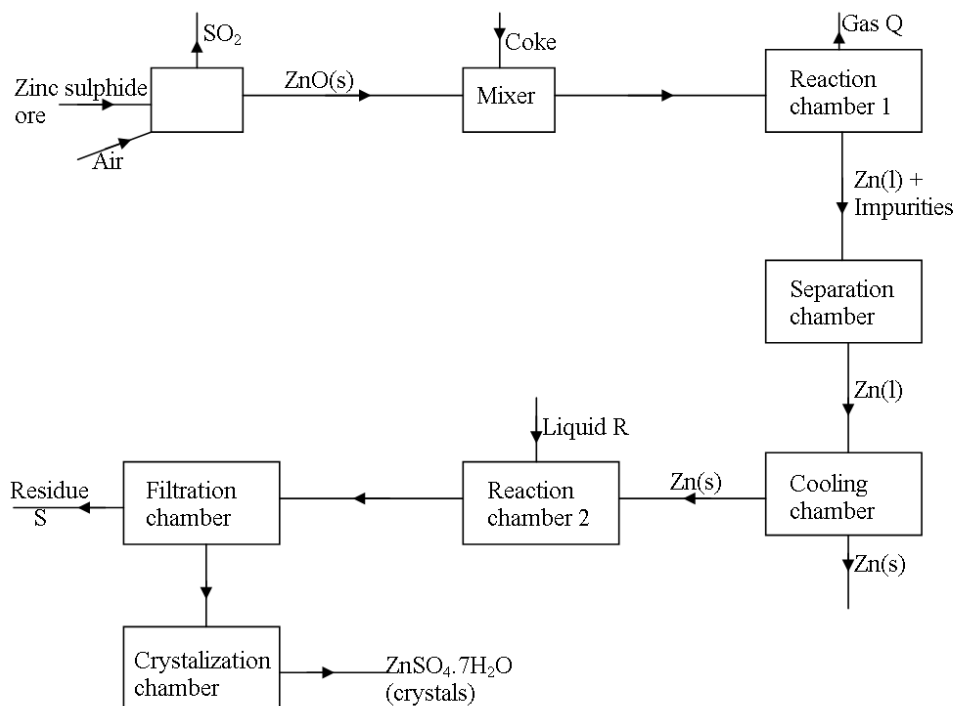
(e) Identify the chief ore in the process above and the main impurities associated with the ore.

(2mks)

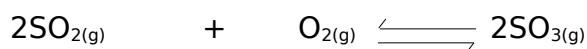
(f) Explain why electrolysis is chosen as the method of extraction of this metal.
(1mk)

(g) List down two uses of the metal being extracted. (1mk)

32. (a) The flow chart below illustrate the extraction of zinc and preparation of zinc sulphate crystals. Study it and answer the questions that follow.



(c) Sulphur (IV) oxide reacts with oxygen as shown below.



Calculate the volume of air required to convert 6.4g of sulphur(IV) oxide completely to sulphur(VI)oxide at room temperature.

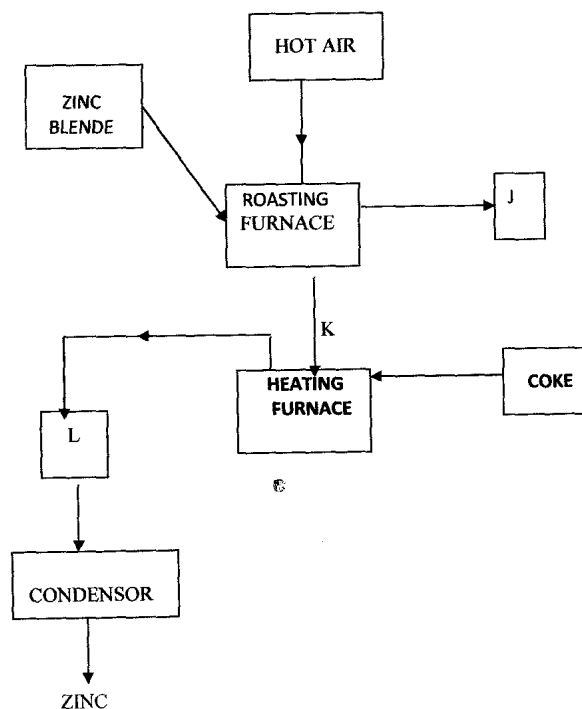
(O = 16.0, S = 32.0, molar gas volume = 24.0dm³, air contains 20% by volume of oxygen)

(2mks)

(d) Calculate the mass of silver chloride which would be precipitated when a solution containing 3.4g of zinc chloride is reacted with excess silver nitrate solution.

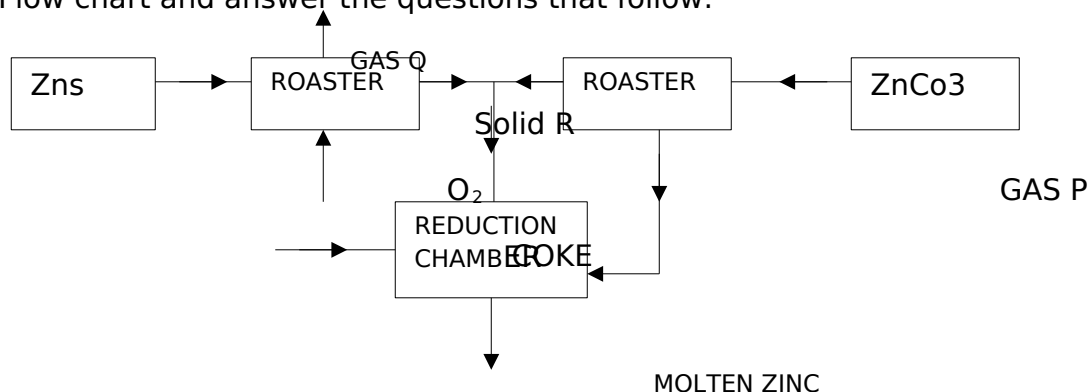
(2mks)

(Zn = 65.0 Cl = 35.5, Ag = 108)



- i) Name one other ore of zinc metal. (1mk)
- ii) Give a chemical equation for the reaction in the
 - a) Roasting furnace. (1 mk)
 - b) Heating furnace (1 mk)
- iii) Name substance: J and K (2mks)
- iv) Why is it necessary to condense substance L? (1mk)
- v) Explain the polluting effects of substance J. (2mks)
- vi) Which other factory can be set near the zinc extraction plant? (1 mk)
- vii) Give one use of zinc metal apart from galvanization. (1mk)

33. The flow chart below shows the extraction of Zinc from two ores. Study the Flow chart and answer the questions that follow:



a) What is the common name of the ore ZnS? (1 mk)

b) Name the gases

P _____ (1 mk)

Q _____ (1 mk)

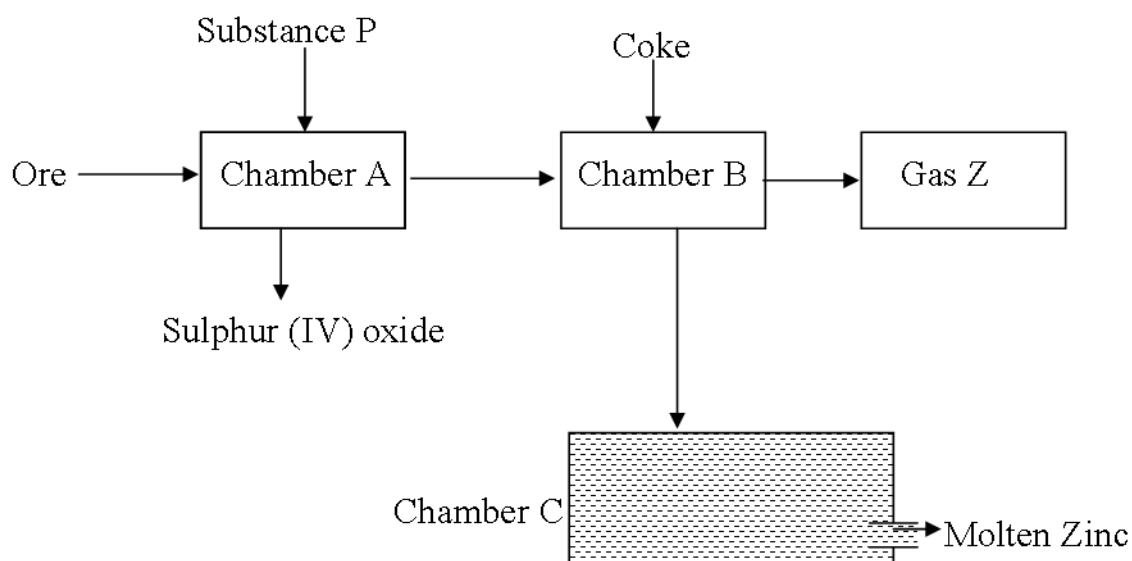
c) Write the equations for the production of the gases P and Q.

d) Name solid R (1 mk)

e) Write two equations for the reactions taking place in the reduction chamber.

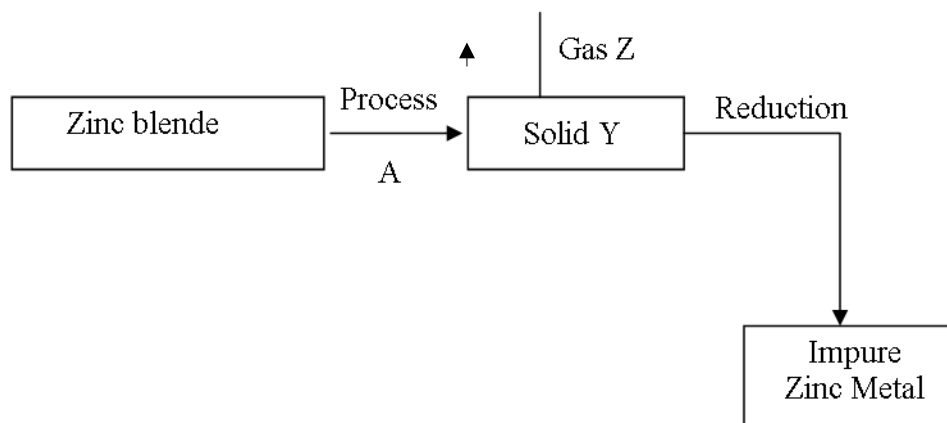
f) Give two uses of zinc metal. (2 mrks)

34. The flow diagram below shows the extraction of Zinc metal. Study it and answer the question that follow.



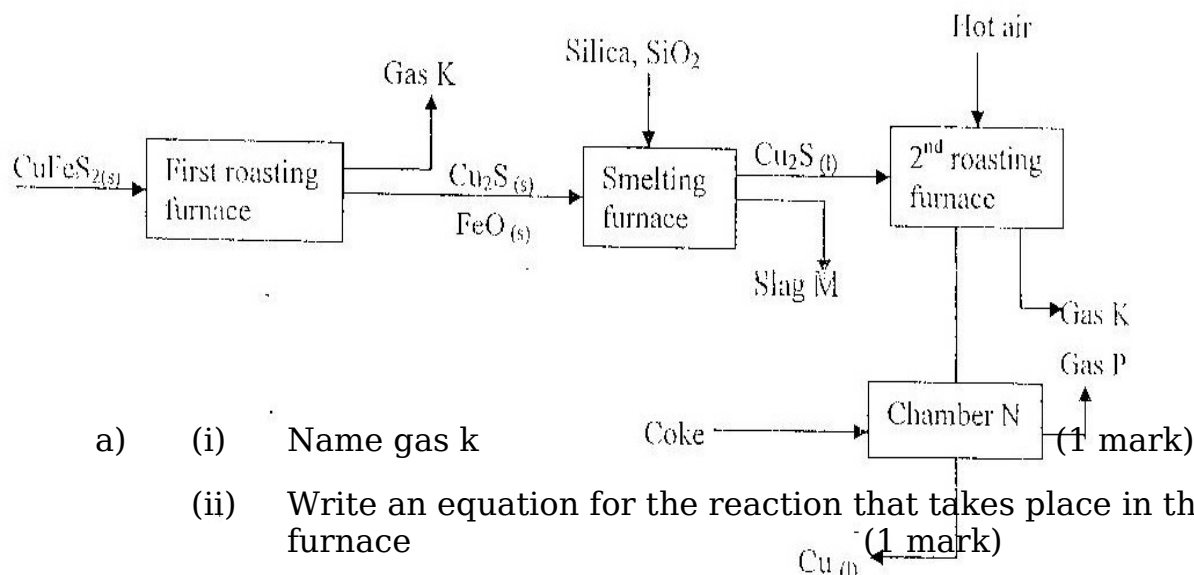
- (i) Name the ore used in this process (1mk)
- (ii) Identify substances P and Z (2mks)
- (iii) State the function of coke in chamber B (1mk)
- (iv) Write a chemical equation for the reaction between gas Z and calcium hydroxide solution. (1mk)
- (v) Explain why Zinc is preferred for coating iron to copper. (1mk)
- (vi) Give two effects that this process could have to the environment (2mks)

35. (a) Name two chief ores of aluminium metal (2mks)
- (b) Solid aluminium oxide doesn't conduct electricity. Explain how its made to conduct electricity, during the electrolytic extraction of aluminium in Hall process. (1mk)
36. (a) Apart from iron ore (haematite), name two other raw materials fed into the blast furnace in the extraction of iron metal. (2mks)
- (b) Write an equation to show how the ore is reduced in the blast furnace (1mk)
- (c) Suggest two uses of iron (2mks)
37. Study the flow chart below and use it to answer the questions that follow

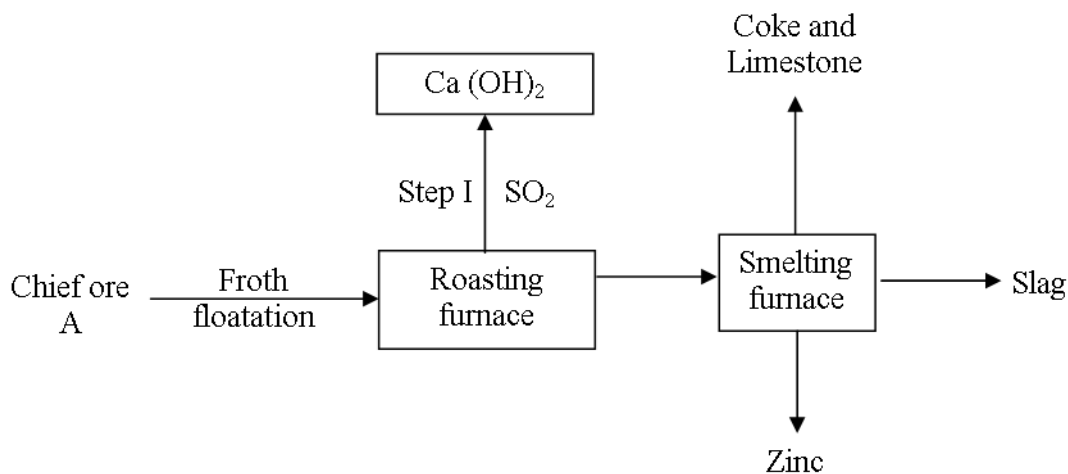


- a) Identify process A (1mk)
- b) Write a balanced chemical equation for the reaction producing solid Y and gas Z (1mk)
- c) State how pure Zinc metal can be obtained from the impure Zinc metal above (1mk)

38. The flow chart below outlines some of the process involved during extraction of copper from its ore, copper pyrite (CuFeS_2). Study it and answer the questions that follow.

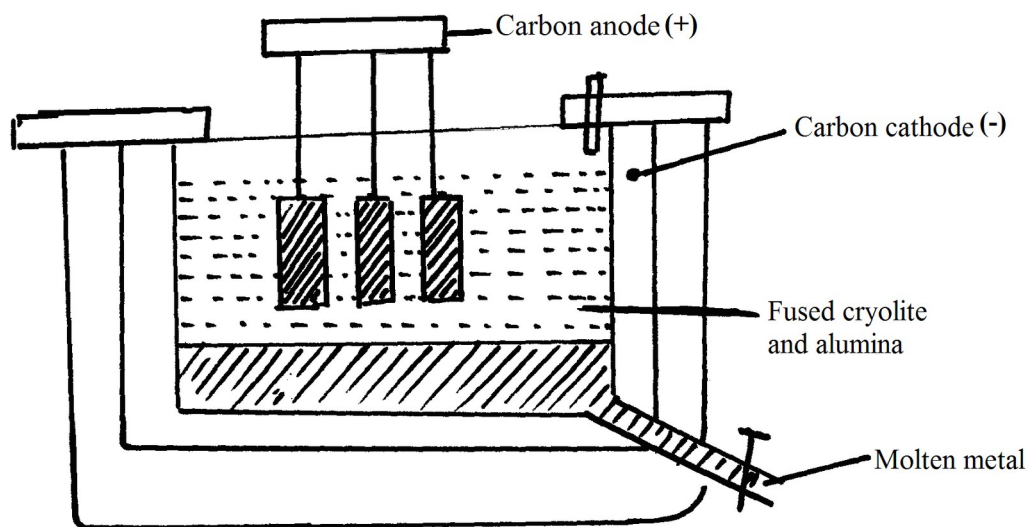


- a)
 - (i) Name gas k (1 mark)
 - (ii) Write an equation for the reaction that takes place in the first roasting furnace (1 mark)
 - (iii) Write the formula of the cation present in the slag M (1 mark)
 - (iv) Identify gas P (1 mark)
 - (v) What name is given to the reaction taking place in chamber N (1 mark)
 - b) Copper obtained from chamber N is not pure. Draw a well labelled diagram to show the set -up that can be used to refine the copper by electrolysis. (2 marks)
 - c) A current of 5.0 amperes was passed through molten anhydrous Copper (II) Chloride of 10 minutes using inert graphite electrodes. Calculate the mass of copper deposited.. (3 marks)
- (1 Faraday=96500 coulombs, Cl=35.5, Cu=63.5)
39. The flow chart below illustrates the industrial extraction of zinc metal. Study it and answer the questions that follow

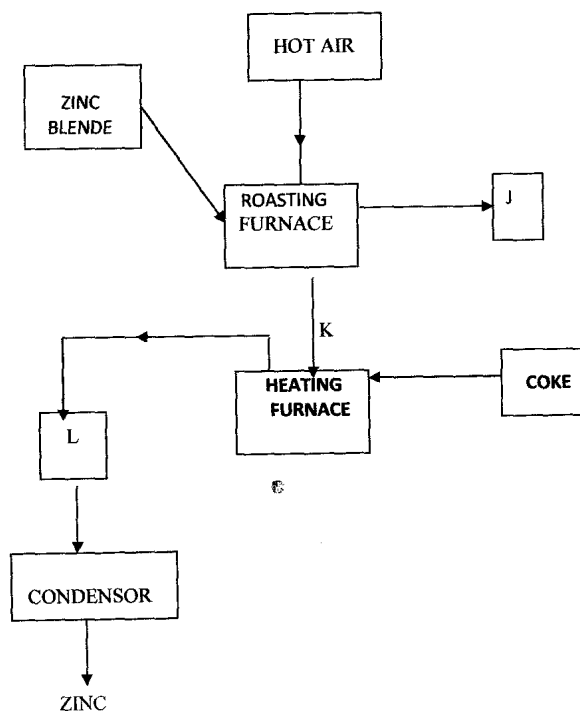


- a) i) State the significance of froth floatation in the process above (1mk)
- ii) Name the chief ore used in this process (1mk)
- iii) Write a chemical equation for the reaction in the roasting furnace (1mk)
- iv) State the significance of step I in industries (1mk)
- v) State two applications of zinc metal (1mk)
- b) During extraction of lead metal from its ore, coke and limestone are added at same stage. When the mixture was heated, limestone decomposed to form calcium oxide and carbon (iv) oxide
- i) Name the ore from which lead is extracted (1mk)
- ii) With the aid of a chemical reaction, explain the importance of calcium oxide in the process. (2mks)
- iii) Lead obtained in the process above has impurities. Describe how pure lead is obtained from the impure lead (3mks)

40. The diagram below represents the electrolytic cell used for the extraction of a certain metal.



- (a) What is the role of hot sodium hydroxide solution in the extraction of the metal?
(1mk)
- (b) Why is it necessary to mix alumina and cryolite in the electrolytic cell?
(1mk)
- (c) Write down the equations for the reactions at the electrodes .
(2mks)
- (d) The anode requires to be replaced from time to time, suggest a reason for this.
(1mk)
- (e) Identify the chief ore in the process above and the main impurities associated with the ore.
(2mks)
- (f) Explain why electrolysis is chosen as the method of extraction of this metal.
(1mk)
- (g) List down two uses of the metal being extracted.
(1mk)
41. The flow chart below illustrates the extraction of zinc from zinc blende. Use it to answer the questions that follow



- i) Name one other ore of zinc metal. (1mk)
- ii) Give a chemical equation for the reaction in the
 - a) Roasting furnace. (1 mk)
 - b) Heating furnace (1 mk)
- iii) Name substance: J and K (2mks)

.....

- iv) Why is it necessary to condense substance L? (1mk)
- v) Explain the polluting effects of substance J. (2mks)
- vi) Which other factory can be set near the zinc extraction plant? (1 mk)
- vii) Give one use of zinc metal apart from galvanization. (1mk)

42. Bronze is an alloy of Tin and Copper. **Give one** use of Bronze (1mk)

43. (i) What is an alloy? (1mk)
- (ii) Give an example of an alloy, its use and the elements it contains. (2mks)
44. (i) Usually, zinc ore is found mixed with lead ore. What property of zinc

makes it possible to separate it from its mixture with lead metal? (1mk)

(ii) Extraction of copper from copper pyrites involves the following the processes:

- Crushing the ore.
 - Mixing the crushed ore with water and oil then bubbling air through it.
 - Roasting the ore.
- (I) What name is given to procedure (a) to (b) and what is its role?

Name: (½ mk)

Role: (½ mk)

(II) State one use of copper.

45. Explain why aluminium metal is not extracted for aluminium chloride. (2mks)

46. (a) Give two reasons why one would prefer to using Aluminium to copper as overhead electric cables. (b) Study the flow chart below and answer the questions that follow:

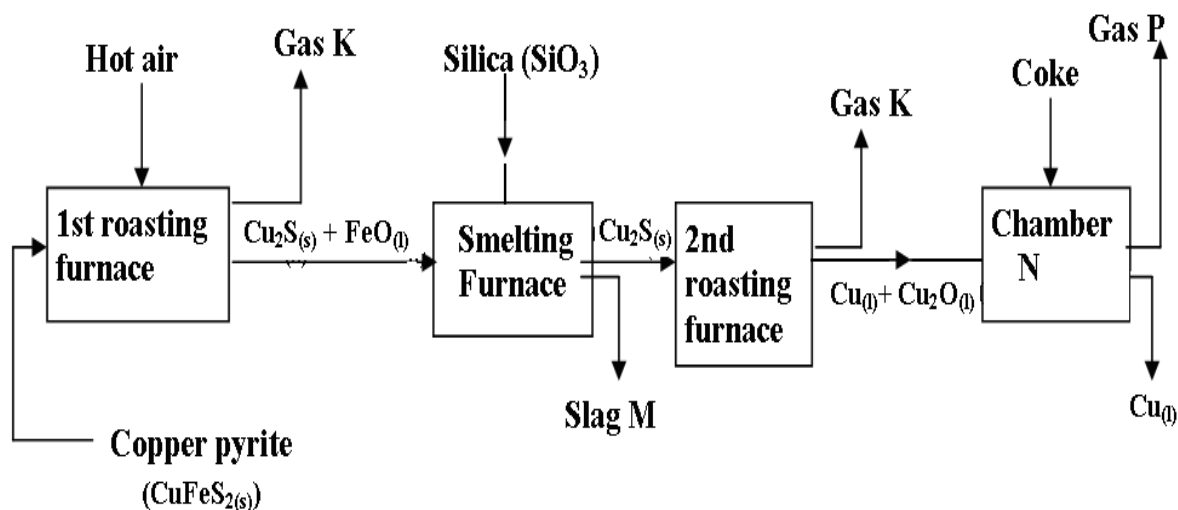


(i) Identify substance Q. (1mk)

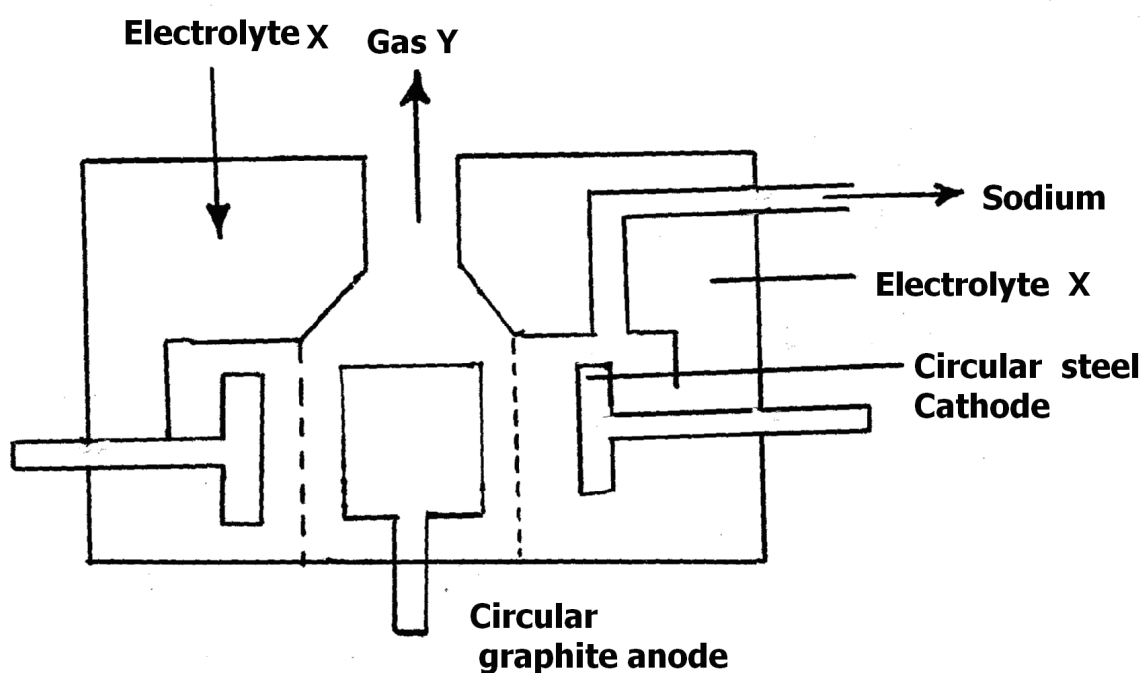
(ii) Write a chemical equation between Q and Cu_2S . (1mk)

47. The flow chart below outlines some of the process involved in extraction of copper from copper pyrites.

Study it and answer the questions that follow.



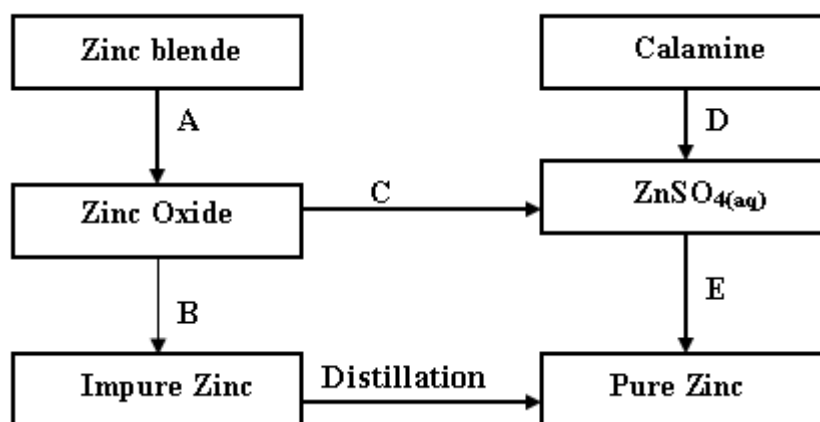
- (i) Name gas K ($\frac{1}{2}$ mks)
- (ii) Write an equation for the reaction that takes place in the first roasting furnace. (1mk)
- (iii) Write the formula for the cation present the slag M. ($\frac{1}{2}$ mk)
- (iv) Identify gas P. ($\frac{1}{2}$ mks)
- (v) What name is given to the reaction that takes place in chamber N? Give a reason for your answer. (1½ mk)
- b) Below is a simplified diagram of the Downs cell in which sodium metal is manufactured .



- (i) Identify electrolyte X and gas Y. (1mk)
- (ii) Give two properties of sodium that make it possible to collect as in (iii) above. (1mk)
- (iii) The cathode is made of steel, but the anode is made of graphite, although steel is a better conductor. Why is this? (1mk)
- (iv) How would you obtain sodium hydroxide pellets from sodium amalgam.? (1mk)

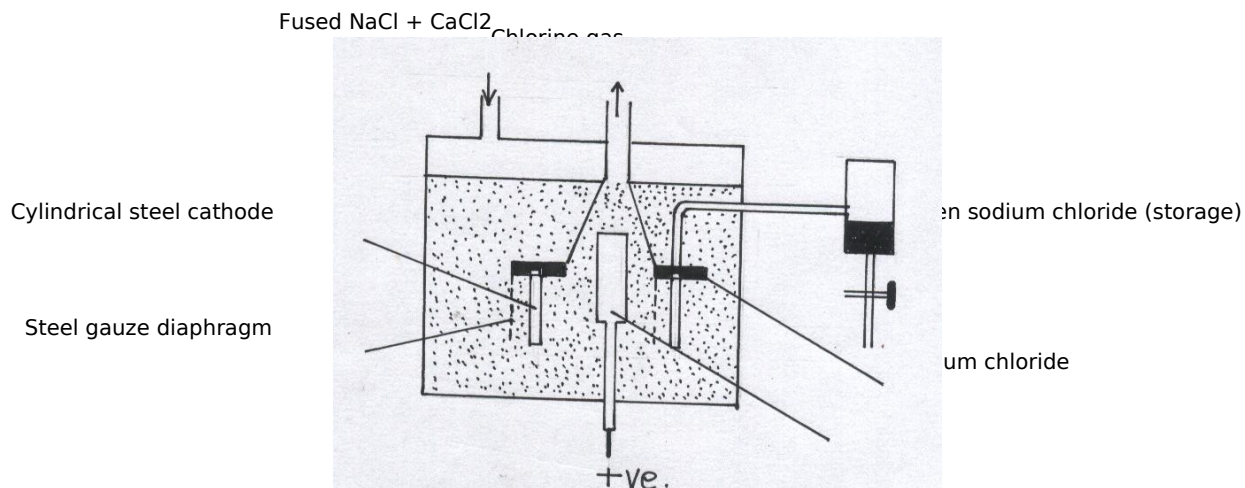
48. The flow chart below summarises the extraction of Zinc, study it and answer the questions that

follow.



- Name the process represented by A and B
(2mks)
- Identify the reagents required for process B C and D
(3mks)
- Write a chemical equation of the reaction that occurs in process B
(1mk)
- With an aid of a diagram, explain how you would obtain a pure sample of Zinc by
process E
(2mks)
- State two uses of Zinc metal
(2mks)

49. The following diagram represents a Downs cell used to manufacture sodium metal from molten Sodium chloride



a) (i) Explain why sodium chloride is mixed with calcium chloride in this process.

(1mk)

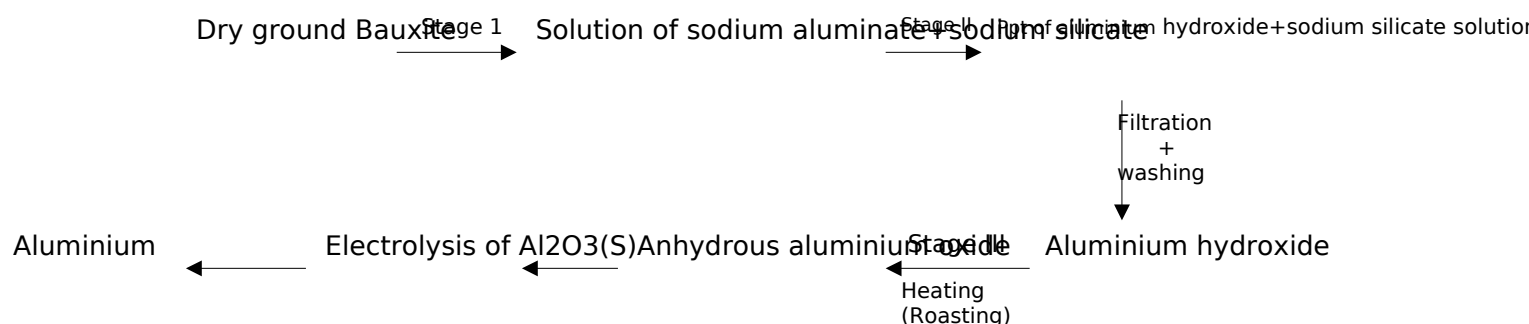
(ii) State two properties of sodium metal that make it possible for it to be collected as shown in the diagram. (2mks)

b) Write ionic equations for the reaction which take place at (2mks)

I Cathode

II Anode

c).Study the flow chart below and answer the questions that follow:



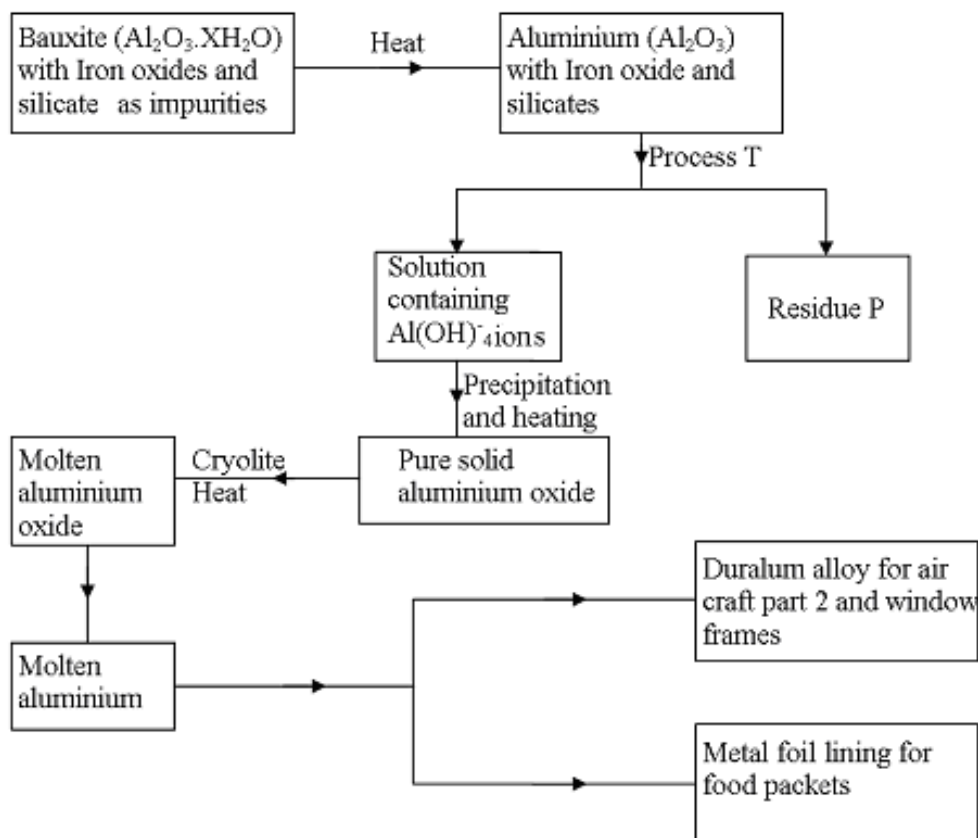
(i) Explain how stage I is carried out. (1mk)

(ii) Explain why it is necessary to heat Aluminium Oxide before electrolysis is carried out. (1mk)

(iii).Suggest a reason as to why carbon is not used for reduction of Aluminium oxide. (1mk)

(iv).What properties of Aluminium and the alloy make them suitable for the use indicated. (2mks)

50. The flow chart below shows industrial extraction of aluminium metal. Study it and answer questions that follow.



(a) (i) Explain how process T is carried out. (2mks)

(ii) Name residue P. give a reason. (1mk)

(iii) Explain why it is necessary to heat aluminium oxide in the presence of cryolite before electrolysis

is carried out. (2mks)

(b) Suggest a reason why:

(i) Aluminium is not used for marine purpose? (1mk)

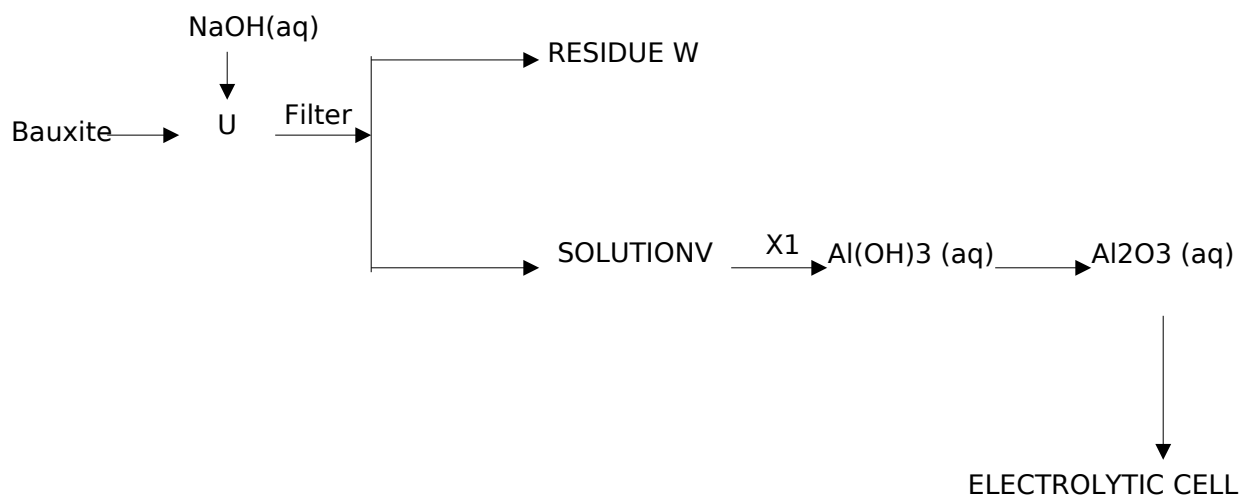
(ii) Carbon is not used for the reduction of aluminium oxide. (1mk)

© What properties of aluminium and its alloy make them suitable for the uses indicated? (2mks)

(d) When 3.12g of hydrated aluminium oxide (Al₂O₃.XH₂O) was heated to a constant mass 20.6g of

aluminium oxide (Al₂O₃) was obtained. Determine the value of X in hydrated oxide (Al = 27.0,

51. The flow chart below illustrates the major steps in the extraction of Aluminium from Bauxite. Study it and answer the questions that follow.



- a) (i) Give the chemical formula of bauxite (1 mk)
- (ii) Write the equation for the reaction in chamber U (1 mk)
- (iii) Identify the main impurity in chamber W (1 mk)
- b) Name the process that takes place at X_1 and state how it is achieved. (2 mks)
- c) State the role of cryolite (Na_3AlF_6) in the extraction of Aluminium (1 mk)
- d) When 2.16g of aluminium foil were heated in a stream of chlorine gas, the mass of the product formed was 6.94g. Calculate;
 - (i) Maximum mass of the product formed if Chlorine gas was in excess. [Al = 27, Cl = 35.5] (3 mks)
 - (ii) Percentage yield of the product formed (2 mks)
- e) Give one property which makes aluminium and its alloys suitable for making aircraft bodies (1 mk)

52. The following diagram represents the extraction process of a metal. Study it and answer the questions that follow.

Ore T

Step 1

Addition of excess NaOH

Solution A

Residue B

Step II

Aluminium Oxide

Na_3AlF_6

Step III

Molten Oxide

Step IV

Al

a)

(i) Name ore T

(1mark)

(ii) Why was ore T dissolved in excess sodium hydroxide?

(1mark)

b)

(i) Explain why sodium ions and fluoride ions are not discharged in step (iv)

(1mark)

(ii) Write the ionic equation for reactions in step (IV) at

I). Anode

(½ mark)

II). Cathode

(½ mark)

(iii) Explain the reasons why graphite anode should be replaced from time to time.

(2marks)

c) State the role of cryolite (Na_3AlF_6) in the extraction of aluminium

(1mark)

- d) When 2.16g of aluminum foil were heated in a stream of chlorine gas the mass of the product formed was 6.94g. Calculate
- (i) Maximum mass of the product formed if chlorine was in excess.
(2marks)
- (Al = 27, Cl= 35.5)
- (ii) Percentage yield of the product formed
(1mark)

53. Corrosion of aluminium is useful while corrosion of iron is harmful.

a. Explain why corrosion of aluminium is useful.

(1mark)

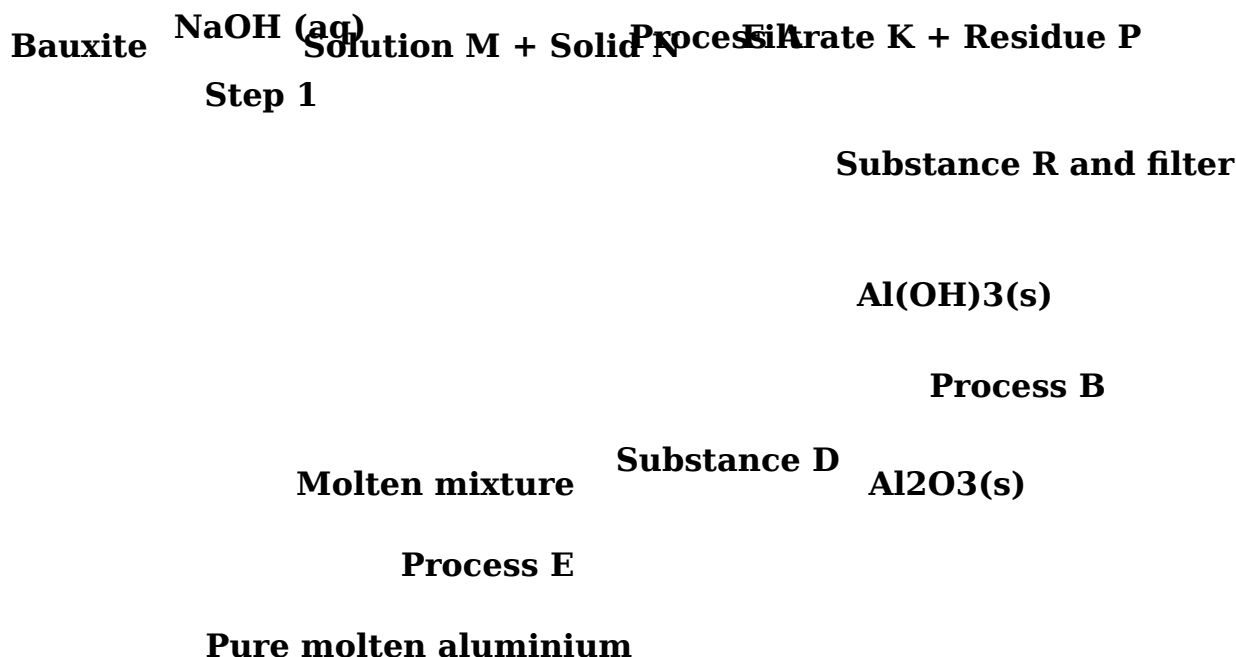
b. Explain how painting prevents corrosion in iron.

(1mark)

a) Aluminium is extracted from bauxite. Write the formula of the main component of bauxite.

54. (1 mark)

b) Study the flow diagram below to answer the questions that follow.



i) Name **two** components of solution M.

(2 marks)

ii) Identify the solid N.

(1 mark)

iii) Name the processes A, B and E.

iv) Name substance D and state its function

v) State **two** reasons why aluminium is used in overhead cables. (2 marks)

55. i) Name the common ore from which lead metal is extracted from and write the formula of the main compound.

ii) Write a chemical equation for the roasting of the ore in excess air. (1 mark)

.....

i) Why is iron added into the blast furnace during extraction of lead metal? (1 mark)