

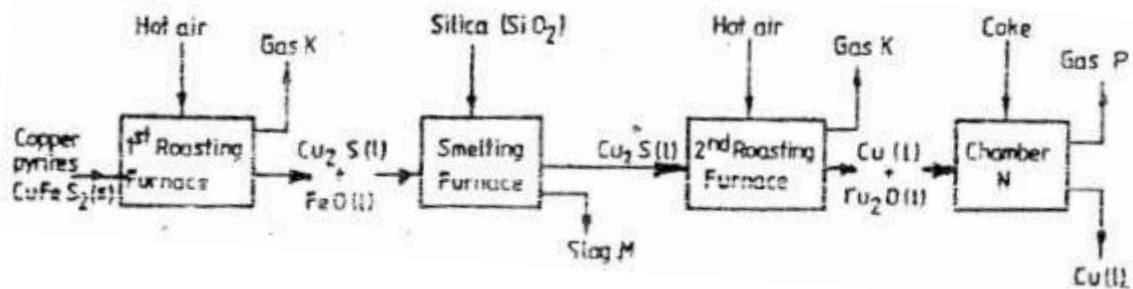
NAME \_\_\_\_\_ INDEX NUMBER \_\_\_\_\_

SCHOOL \_\_\_\_\_ DATE \_\_\_\_\_

## METALS

1. 1995 Q 4 P2

a) The flow chart below outlines some of the process involved during extraction of copper from copper pyrites. Study it and answer the questions that follow.



(i) Name gas K (1 mark)

.....

(ii) Write an equation for the reaction that takes place in the 1<sup>st</sup> roasting furnace. (1 mark)

.....

(iii) Write the formula of the cation present in slag M (1 mark)

.....

(iv) Identify gas p (1 mark)

.....

(v) What name is given to the reaction that takes place in chamber N? Give a reason for the answer. (1 mark)

.....

(b) The copper obtained from chamber N is not pure. Draw a labelled diagram to show the set up you would use to refine the copper by electrolysis. (3 marks)

(c) Given that the mass of copper obtained from above extraction was 210kg, determine the percentage purity of the ore(copper pyrites) if 810kg of it was fed to the 1<sup>st</sup> roasting furnace. (Cu = 63.5, Fe = 56.0, s=32.0) (3 marks)

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(d) Give two effects that this process could have on the environment (2 marks)

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2. 1998 Q 3

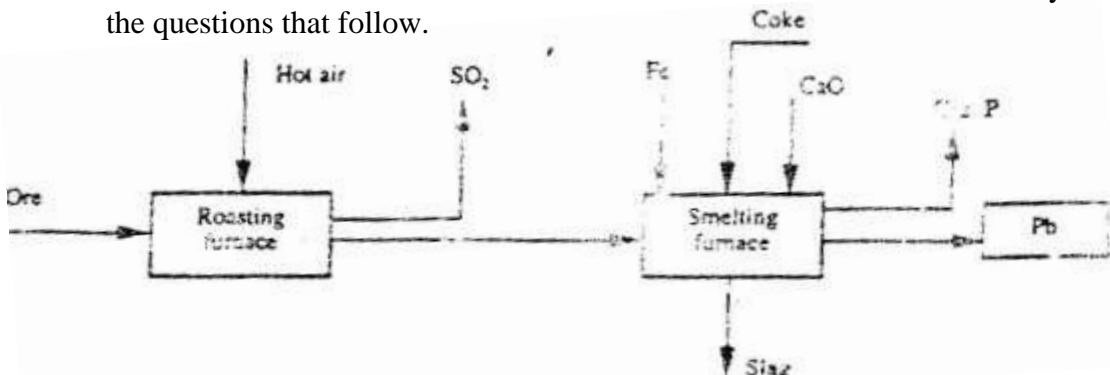
Give one advantage and one disadvantage of using petrol containing tetraethyl lead in motor vehicles.

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.....

3. 2000 Q 3

The flow chart below illustrate the industrial extraction of lead metal. Study it and answer the questions that follow.



(a) (i) Name the ore that is commonly used in this process

.....

(ii) Explain what takes place in the roasting furnace

.....

.....

(iii) Identify gas P

.....

(iv) Write the equation for the main reaction that takes place in the smelting furnace

.....

(v) What is the purpose of adding iron in the smelting furnace?

.....

(vi) Give two environmental hazards likely to be associated with extraction of lead

.....

.....

(b) Explain why hard water flowing in lead pipes may be safer for drinking than soft water flowing in the same pipes

.....

.....

.....

(c) State one use of lead other than the making of lead pipes

.....

**4. 2002 Q 14**

Iron is extracted from its ore by the blast furnace process

(a) Name one ore from which iron is extracted

.....

(b) One of the impurities in iron is removed in the form of calcium silicate.

Write an equation for the reaction in which calcium silicate is produced

.....

**5. 2003 Q 20**

Brass is an alloy of zinc and copper. Give one use of brass

(1 mark)

.....  
.....

**6. 2003 Q 5 P2**

The basic raw material for extraction of aluminium is bauxite

a) Name the method that is used to extract aluminium from bauxite

.....

b) Write the chemical formula of the major component of bauxite

.....

c) i) Name two major impurities in bauxite

(2 marks)

.....  
.....

ii) Explain how the impurities in bauxite are removed

(3 marks)

.....  
.....  
.....

d) Cryolite is used in the extraction of aluminium from bauxite. State its function

(1 mark)

.....  
.....

f) Aluminium is a reactive metal yet utensils made of aluminium do not corrode easily.

Explain this observation

(2 marks)

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.....

**7. 2005 Q 12**

In the industrial extraction of lead, the ore is first roasted in a furnace. The solid mixture obtained is then fed into another furnace together with coke, limestone and scrap iron. State the function of each of the following in this process: (3 marks)

(a) Coke

.....  
 .....

(b) Limestone

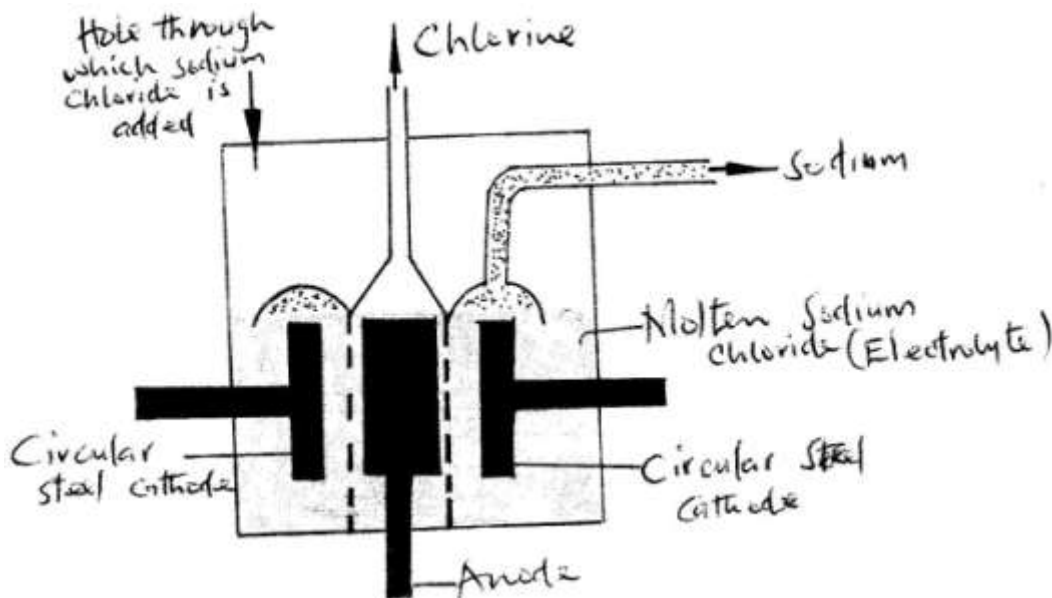
.....  
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(c) Scrap iron

.....  
 .....

8. 2005 Q7 P2

(a) Below is a simplified diagram of the Downs Cell used for the manufacture of sodium. Study it and answer the questions that follow



(i) What material is the anode made of? Give a reason (2 marks)

.....  
 .....

(ii) What precaution is taken to prevent chlorine and sodium from re-combination? (1 mark)

.....

(iii) Write an ionic equation for the reaction in which chlorine gas is formed (1 mark)

.....  
(b) In the Downs process, (used for manufacture of sodium), a certain salt is added to lower the melting point of sodium chloride from about 800<sup>0</sup>C to about 600<sup>0</sup>C.  
(i) Name the salt that is added (1mark)

.....  
(ii) State why it is necessary to lower the temperature (1mark)

.....  
(c) Explain why aqueous sodium chloride is not suitable as an electrolyte for the manufacture of sodium in the Downs process (2 marks)

.....  
(d) Sodium metal reacts with air to form two oxide. Give the formulae of two oxides (1 mark)

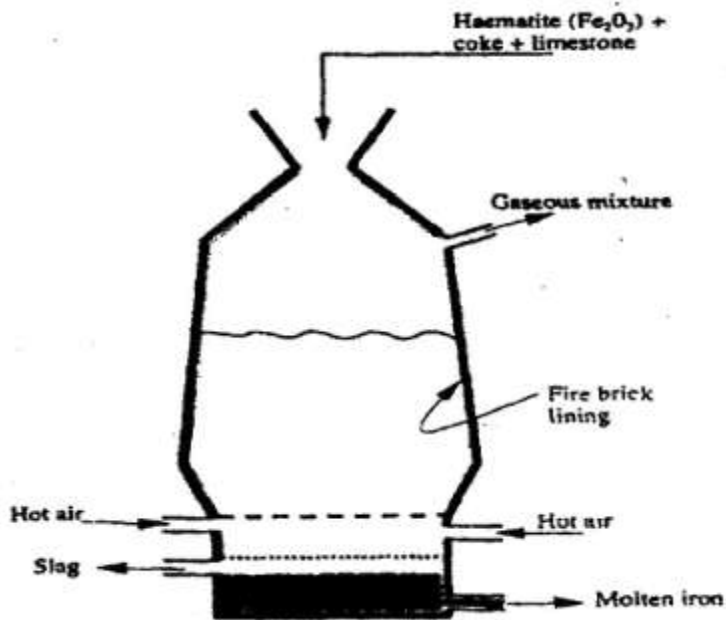
**9. 2006 Q 21**

(a) Explain why the metals magnesium and aluminium are good conductors of electricity. (1 mark)

.....  
(b) Other than cost, give two reasons why aluminium is used for making electric cables while magnesium is not (2 marks)

**10. 2006 Q 6 P2**

The extraction of iron from its ores takes place in the blast furnace.  
Study it and answer the questions that follow.



a) Name

(i) One of the substances in the slag

(1 mark)

.....

(ii) Another iron ore material used in the blast furnace.

(1 mark)

.....

(iii) One gas which is recycled.

(1 mark)

.....

b) Describe the process which leads to the formation of iron in the blast furnace

.....  
 .....  
 .....  
 .....

c) State the purpose of limestone in the blast furnace.

(3marks)

.....  
 .....  
 .....

d) Give a reason why the melting point of the iron obtained from the blast furnace is 12000 C while that of pure iron is 15350C

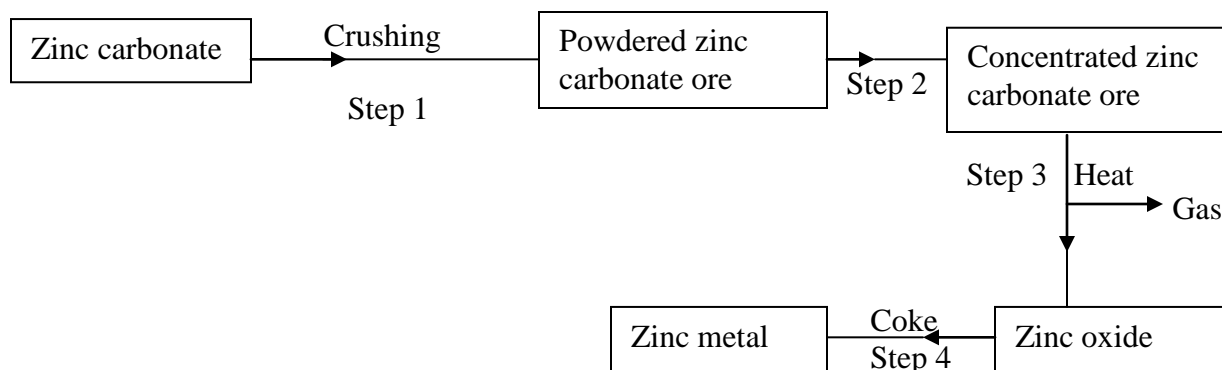
(1mark)

.....  
.....  
(e) State two uses of steel

(2 marks)

11. 2007 Q 19

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. (1mark)

.....

b) Write an equation for the reaction which takes place in step 3. (1 mark)

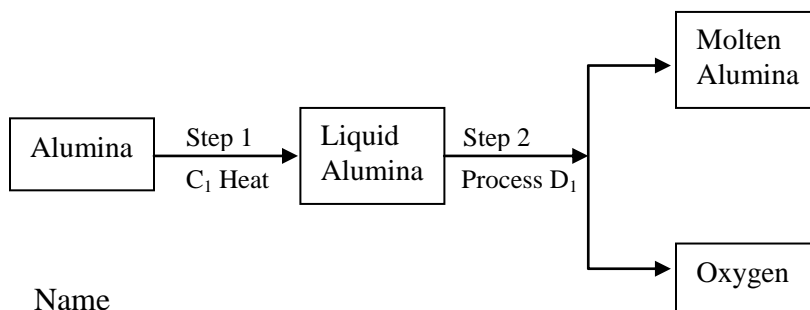
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c) Name one use of zinc other than galvanizing. (1mark)

.....

12. 2008 Q 28

During the extraction of aluminium from its ores; the ore is first purified to obtain alumina.



a) Name

(i) Substance C<sub>1</sub>

(1 mark)



.....  
(ii) Process D<sub>1</sub> (1 mark)

.....  
b) Give two reasons why aluminium is used extensively in the making of cooking pans. (1 mark)

13. 2009 Q 7 P2

Iron is obtained from hematite using a blast furnace shown in figure 5 below.

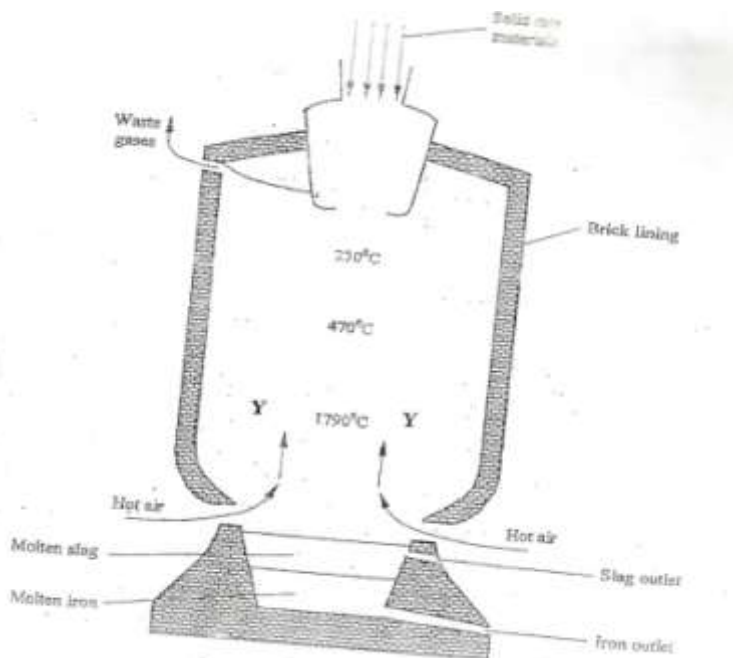


Figure 5

(a) Four raw materials are required for the production of iron. Three of these are iron oxide, hot air and limestone. Give the name of the fourth raw material. (1 mark)

.....  
(b) Write an equation for the reaction in which carbon (IV) oxide is converted into carbon (II) oxide. (1 mark)

.....  
(c) Explain why the temperature in the region marked Y is higher than of the incoming hot air. (2 marks)

.....  
(d) State one physical property of molten slag other than density that allows it to be separated from molten iron as shown in the figure 5. (1 mark)

.....  
(e) One of the components of the waste gases is Nitrogen (IV) oxide. Describe the adverse effect it has on the environment. (2 marks)

.....  
(f) Iron from the blast furnace contains about 5% carbon  
(i) Describe how the carbon content is reduced (2 marks)

.....  
(ii) Why is it necessary to reduce the carbon content? (1 mark)

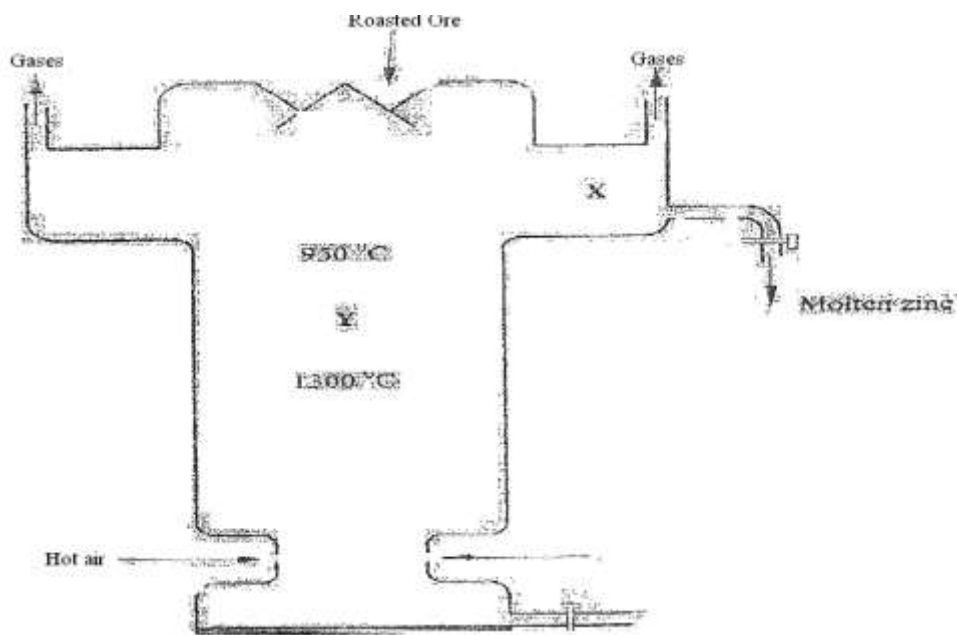
**14. 2010 Q 6 P2**

The melting and boiling points of zinc are  $419^{\circ}\text{C}$  and  $907^{\circ}\text{C}$  respectively. One of the ores of zinc is zinc blende. To extract zinc, the ore is first roasted in air before feeding it into a furnace.

a. (i) Write the formula of the main zinc compound in zinc blende. (1 mark)

.....  
ii) Explain using an equation why it is necessary to roast the ore in air before introducing it into the furnace (2 marks)

.....  
.....  
.....  
.....  
b. The diagram below shows a simplified furnace used in the extraction of zinc. Study it and answer the questions that follows:



i) Name **two** other substances that are also introduced into the furnace together with roasted ore. (1 mark)

.....  
 .....

ii) The main reducing agent in the furnace is carbon (II) oxide. Write **two** equations showing how it is formed. (2 marks)

.....  
 .....

iii) In which physical state is zinc at point **Y** in the furnace? Give a reason (1 mark)

.....

iv) Suggest a value for the temperature at point **X** in the furnace. Give a reason. (1 mark)

.....  
 .....

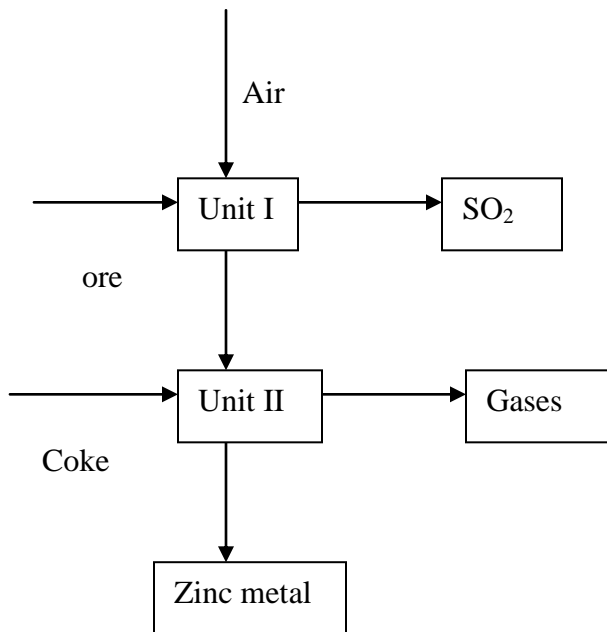
v) State and explain **one** environmental effect that may arise from the extraction of zinc from zinc blende (2 marks)

.....  
 .....

vi) Give **two** industrial uses of zinc. (1 mark)

15. 2011 Q 27

The flow chart below shows some processes involved in the industrial Extraction of zinc metal.



a) Name one ore from which zinc is extracted. (1 mark)

b) Write the equation of the reaction taking place in unit II (1 mark)

c) Name two uses of zinc metal. (1 mark)

16. 2012 Q22 P1

Aluminium is both malleable and ductile.

(a) What is meant by?

(i) Malleable: (1 mark)

(ii) Ductile (1 mark)

.....  
.....

(b) State **One** use of aluminium based on:

(i) malleability (½ marks)

.....  
.....

(ii) ductility (½ marks)

.....  
.....