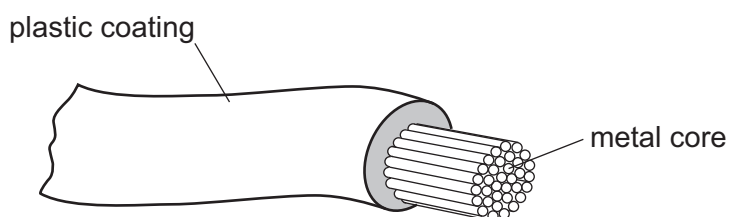


1 The diagram shows an electrical cable.



Which statement about the substances used is correct?

- A The coating is plastic because it conducts electricity well.
- B The core is copper because it conducts electricity well.
- C The core is copper because it is cheap and strong.
- D The core is iron because it is cheap and strong.

[1]

[Total: 1]

2 Steel is an alloy of iron. Write about alloys of iron.

In your answer refer to:

- the meaning of the term alloy,
- why alloys are used instead of pure iron,
- an example of the use of an alloy of iron.

.....

.....

.....

.....

.....

.....

.....

[4]

[Total: 4]

3 Iron from the Blast Furnace is impure. It contains about 5% of impurities, mainly carbon, sulfur, silicon and phosphorus, which have to be removed when this iron is converted into steel.

Mild steel is the most common form of steel. Mild steel contains a maximum of 0.3% of carbon.

High carbon steel contains 2% of carbon. It is less malleable and much harder than mild steel.

(a) Give a use of mild steel.

..... [1]

(b) Suggest a use of high carbon steel.

..... [1]

(c) Explain why metals are malleable.

.....
.....
..... [3]

(d) Suggest an explanation why high carbon steel is less malleable and harder than mild steel.

.....
..... [2]

[Total: 7]

4 Complete these sentences about the uses of aluminium using words from the list.

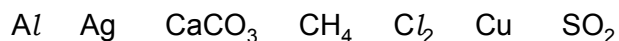
- | | | | |
|---------------------|------------------|----------------|--------------|
| conductivity | corrosion | density | heavy |
| malleability | reduction | strong | weak |

Aluminium is used in the manufacture of aircraft because it is relatively
..... and has a low Aluminium is used
for food containers because of its resistance to

[3]

[Total: 3]

- 5 The following formulae represent different substances.

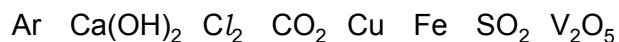


State which of these substances is used to make food containers.

..... [1]

[Total: 1]

- 6 The following are the symbols and formulae of some elements and compounds.



State which element or compound is used as an electrical conductor in cables.

..... [1]

[Total: 1]

7

- (a) Give **one** common use of mild steel.

..... [1]

- (b) Give **one** common use of stainless steel.

..... [1]

[Total: 2]

- 8 State **one** use of aluminium. Give a reason why it is used for this purpose.

use

reason [2]

[Total: 2]

- 9 Aluminium is in Group III of the Periodic Table.

Explain why aluminium is often used in containers for food and drinks.

.....

..... [2]

[Total: 2]

10 Steel is an alloy.

State **one** use of:

mild steel,

stainless steel. [2]

[Total: 2]

11 Alloys of copper are used to make coins.

(a) What is meant by the term *alloy*?

.....

..... [1]

(b) Suggest why an alloy of copper is used to make coins instead of using pure copper.

..... [1]

[Total: 2]

12 Iron is a transition element.

(a) Which **two** substances react with iron to form rust?

1

2 [2]

(b) Which metal is used to galvanise iron?

..... [1]

[Total: 3]

13 Stainless steel is an alloy of iron.

(a) What is meant by the term *alloy*?

..... [1]

(b) Give **one** common use of stainless steel.

..... [1]

[Total: 2]

14 Cobalt is added to iron to make steel alloys.

(a) What is meant by the term *alloy*?

.....
 [1]

(b) Give **one** reason why alloys are used instead of pure metals.

..... [1]

[Total: 2]

15 The table shows some properties of four metals.

metal	density in g/cm ³	melting point in °C	relative strength	relative electrical conductivity
aluminium	2.7	660	7	9
cobalt	8.9	1495	21	4
gallium	5.9	30	1	1
nickel	8.9	1455	20	3

Answer these questions using **only** the information shown in the table.

(a) Which metal is most suitable to make the body of an aircraft?
 Give a reason for your answer.

.....
 [2]

(b) Which metal is most suitable to use for overhead power cables?
 Give a reason for your answer.

.....
 [2]

(c) Which **two** metals in the table are transition elements?

.....and [1]

[Total: 5]

16 The table shows the properties of four substances.

substance	boiling point	electrical conductivity of solid	electrical conductivity when molten	density in g/cm ³
-----------	---------------	----------------------------------	-------------------------------------	------------------------------

aluminium	high	conducts	conducts	2.70
diamond				3.51
potassium bromide	high	does not conduct	conducts	2.75
sulfur	low	does not conduct		2.07

(a) Complete the table to show the electrical conductivity of solid diamond and molten sulfur. [2]

(b) Give **one** piece of evidence from the table that shows that sulfur is a simple covalent substance. [1]

..... [1]

(c) What information in the table shows that potassium bromide is an ionic compound? [2]

..... [2]

(d) (i) State **one** property of aluminium given in the table which makes it suitable for making aircraft. [1]

..... [1]

(ii) Aluminium oxide is obtained from the ore bauxite.

What method is used to extract aluminium from aluminium oxide?

..... [1]

[Total: 7]

17 The table shows the properties of some metals.

metal	density in g/cm ³	melting point in °C	relative strength	relative electrical conductivity	cost
aluminium	2.7	660	7.0	4.0	expensive
iron	7.9	1535	21.0	1.1	cheap
lead	11.3	328	1.5	0.5	expensive
silver	10.5	962	2.0	6.7	very expensive
tungsten	19.4	3420	12.0	2.0	expensive

Use the information in the table to answer the questions.

- (a) Which metal would be most useful for making overhead power cables?
Give **two** reasons for your answer.

metal

reason 1

reason 2 [2]

- (b) Why is iron and **not** tungsten used to reinforce concrete?

..... [1]

- (c) The front part of a space rocket is called a nose cone. The nose cone gets very hot as the space rocket moves through the air.

Which metal is best to make a space rocket nose cone? Explain your answer.

..... [1]

[Total: 4]

- 18 The table shows the properties of some types of steel.

type of steel	density in g/cm ³	resistance to corrosion	relative strength	relative hardness
L	7.80	poor	4.8	200
N	7.82	very good	5.1	210
M	7.85	good	4.6	210

Which type of steel, **L**, **M** or **N**, would be best to reinforce concrete?

Give **two** reasons for your answer.

type of steel

reason 1

reason 2 [2]

[Total: 2]

- 19 A major use of aluminium is the manufacture of pots and pans. One reason for this is its resistance to corrosion.

(a) Explain why aluminium, a reactive metal, is resistant to corrosion.

.....
 [1]

(b) Suggest **two** other reasons why aluminium is suitable for making pots and pans.

.....
 [2]

[Total: 3]

20 Zinc is an important metal. Its uses include making alloys and the construction of dry cells (batteries).

Name an alloy which contains zinc. What is the other metal in this alloy?

name of alloy.....

other metal in alloy..... [2]

[Total: 2]

21 The table shows some properties of four alloys.

alloy	strength / GPa	density in g / cm ³	thermal conductivity in W / m / K
low strength steel	250	7.70	60
high strength steel	300	7.90	56
low strength aluminium	70	2.72	170
high strength aluminium	220	2.80	100

(a) How does the strength of the steel and aluminium alloys vary with their thermal conductivity?

..... [1]

(b) Which **one** of these alloys is the best one to use to make the body of an aircraft?
 Give **two** reasons for your answer.

.....

 [3]

[Total: 4]

22 Zinc is obtained from the ore, zinc blende, ZnS.

State **two** major uses of zinc.

.....
.....

[2]

[Total: 2]

23 Iron does not rust when it is completely coated with zinc. When the zinc is scratched, the iron still does not rust.

(a) Explain why the iron does **not** rust when it is completely coated with zinc.

.....

[1]

(b) Explain why the iron still does **not** rust when the zinc is scratched.

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

[3]

[Total: 4]