1 The list shows the order of reactivity of some elements.

K Na Ca Mg Zn Fe H Cu

Which statement about the reactivity of the metallic elements is correct?

A Copper reacts with steam to form hydrogen gas.

B Magnesium is more reactive than calcium.

C Potassium reacts with water to form hydrogen gas.

D Sodium oxide is reduced by carbon to sodium.

[1]

[Total: 1]

2 Zinc is a metal.

Describe **three** physical properties which are characteristic of metals.

1 .....

2 .....

3 ..... [3]

[Total: 3]

3 Uranium is a metal.

Give **two** physical properties which are characteristic of **all** metals.

1 .....

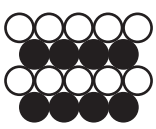
2 ..... [2]

[Total: 2]

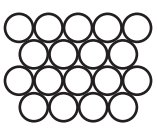
4 Brass is an alloy of copper and zinc.

Which **one** of the following diagrams best represents an alloy?

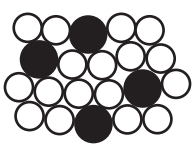
J



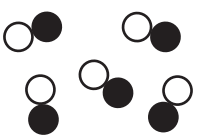
K



L



M



..... [1]

[Total: 1]

5 Zinc and iron are both metals.

Give **two** physical properties which are characteristic of metals.

1 .....

2 ..... [2]

[Total: 2]

6 Stainless steel is an alloy of iron.

What is meant by the term *alloy*?

.....

..... [1]

[Total: 1]

7 Tin is a metal that is less reactive than iron and is extracted from its ore cassiterite, SnO_2.

Which statements about tin are correct?

1 Tin can be extracted from cassiterite using carbon.

2 Tin does not conduct electricity.

3 Tin is hard and shiny.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

[1]

[Total: 1]

8 Uranium is a radioactive element but it is also a typical metal.

What is **not** a property of uranium?

A It can be hammered into shape.

B It conducts heat.

C It is used as a source of energy.

D It forms covalent compounds.

[1]

[Total: 1]

9 The table shows the composition of some different brasses.

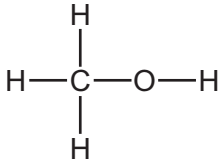
Composition of brass		strength
% zinc	% copper	/ 10^8 Pa
10	90	2.6
20	80	3.0
30	70	3.3
40	60	3.6

How does the composition of brass affect its strength?

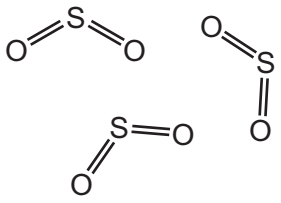
..... [1]

[Total: 1]

10 The diagrams show part of the structures of five substances, **A**, **B**, **C**, **D** and **E**.



A



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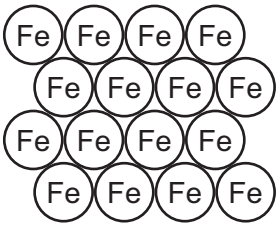

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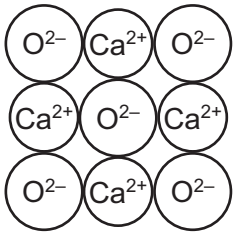

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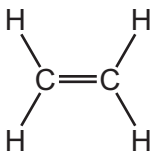


E

State which **one** of these structures, **A**, **B**, **C**, **D** or **E** conducts electricity when solid.

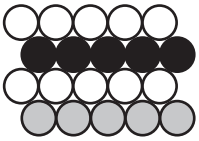
..... [1]

[Total: 1]

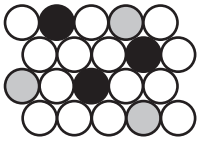
11 Nichrome is an alloy of nickel, iron and chromium.

Which **one** of these diagrams, **J**, **K**, **L** or **M**, best represents nichrome?

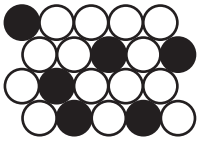
J



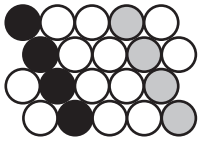
K



L



M



..... [1]

[Total: 1]

12 Stainless steel is an alloy of iron.

Suggest why stainless steel is used instead of pure iron for making cutlery.

.....

..... [1]

[Total: 1]

13 Iron is a transition element. Potassium is an element in Group I of the Periodic Table.

Describe **three** ways in which the properties of iron differ from those of potassium.

1 .....

2 .....

3 ..... [3]

[Total: 3]

14 Only a relatively small number of atoms of flerovium, atomic number 114, have been made in the laboratory and the properties of flerovium have not yet been investigated.

It has been suggested that flerovium is a typical metal.

(a) Suggest **two** physical properties of flerovium.

1 .....

2 ..... [2]

(b) Suggest **one** chemical property of flerovium oxide.

..... [1]

[Total: 3]

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 State **three** typical differences between metals and non-metals.

1 .....

2 .....

3 ..... [3]

[Total: 3]

17 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]

18 Magnesium exists as three isotopes, $^{24}_{12}Mg$, $^{25}_{12}Mg$ and $^{26}_{12}Mg$.

All isotopes of magnesium react with dilute hydrochloric acid to make hydrogen and a salt.

(a) Why do all isotopes of magnesium react in the same way?

.....

.....

..... [2]

(b) Write a chemical equation for the reaction between magnesium and dilute hydrochloric acid.

..... [2]

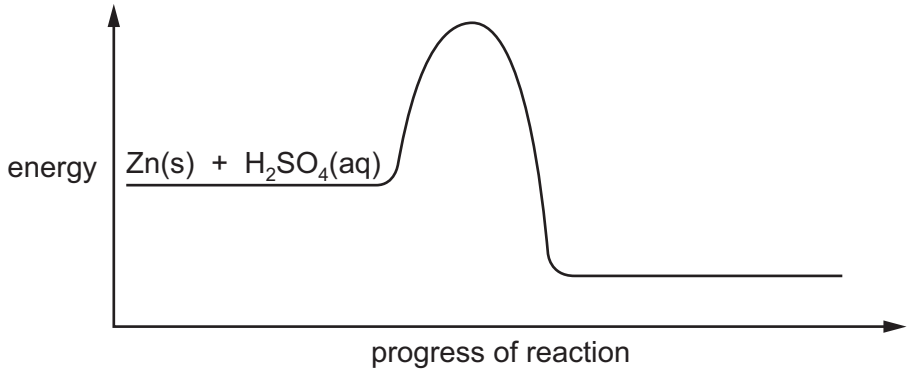
(c) Describe a test for hydrogen.

test .....

result ..... [2]

[Total: 6]

19 The energy level diagram shows the energy profile for the reaction between zinc and dilute sulfuric acid.



(a) Complete the diagram by adding the formulae of the products. Include state symbols.

[3]

(b) Draw an arrow on the diagram to represent the activation energy.

[1]

(c) Is the reaction endothermic or exothermic? Explain your answer.

.....

..... [1]

[Total: 5]

20 Describe **three** properties of iron that show that it is a transition element and **not** a Group I element.

1 .....

2 .....

3 ..... [3]

[Total: 3]