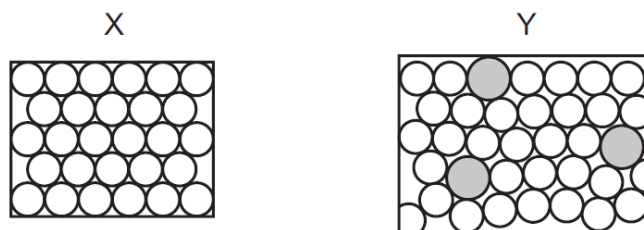


Metals – 2019 June

1. 0620/11,12,13,21,22,23/M/J/19/No.24,23

The diagrams show the structure of two substances used to make electrical conductors.



Which statement correctly describes X and Y?

- A X is a pure metal and Y is a compound.
- B X is a pure metal and Y is an alloy.
- C X is a solid and Y is a liquid.
- D X is harder and stronger than Y.

2. 0620/11/M/J/19/No.25

The reactions of three metals, P, Q and R, are shown.

	metal reacts with dilute hydrochloric acid	metal reacts with water
P	yes	no
Q	no	no
R	yes	yes

What is the order of reactivity of the metals?

	most reactive	→	least reactive
A	P	Q	R
B	Q	R	P
C	R	Q	P
D	R	P	Q

3. 0620/11,12,13/M/J/19/No.26

Iron is extracted from its ore in a blast furnace.

Hematite, coke, limestone and hot air are added to the furnace.

Which explanation is **not** correct?

- A Coke burns and produces a high temperature.
- B Hematite is the ore containing the iron as iron(III) oxide.
- C Hot air provides the oxygen for the burning.
- D Limestone reduces the iron(III) oxide to iron.

4. 0620/11,21/M/J/19/No.27

Why is aluminium used to make containers for storing food?

- A It conducts electricity.
- B It has a high melting point.
- C It is resistant to corrosion.
- D It is strong.

5. 0620/12/M/J/19/No.25

Three different metals are reacted separately with dilute hydrochloric acid and with water. The results are shown.

metal	reaction with dilute hydrochloric acid	reaction with water
R	reacts	no reaction
S	no reaction	no reaction
T	reacts	reacts

What is the order of reactivity of the metals starting with the most reactive?

- A $R \rightarrow S \rightarrow T$
- B $S \rightarrow R \rightarrow T$
- C $T \rightarrow R \rightarrow S$
- D $T \rightarrow S \rightarrow R$

6. 0620/12,22/M/J/19/No.27

Which property of aluminium makes it useful in the manufacture of aircraft?

- A conducts electricity
- B high boiling point
- C low density
- D silver colour

7. 0620/13/M/J/19/No.25

Three metals, L, M and N, are added separately to dilute hydrochloric acid and cold water.

The results are shown.

metal	reaction with hydrochloric acid	reaction with cold water
L	hydrogen forms	no reaction
M	hydrogen forms	hydrogen forms
N	no reaction	no reaction

What is the order of reactivity of the metals?

	least reactive	→	most reactive
A	L	N	M
B	M	L	N
C	N	L	M
D	N	M	L

8. 0620/13,23/M/J/19/No.27

Aluminium is used to make containers for storing food.

Which property makes it suitable for this use?

- A conducts heat
- B low density
- C resists corrosion
- D shiny surface

9. 0620/21/M/J/19/No.24

Three metal compounds, P, Q and R, are heated using a Bunsen burner.

The results are shown.

P colourless gas produced, which relights a glowing splint

Q colourless gas produced, which turns limewater milky

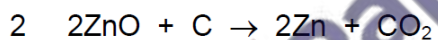
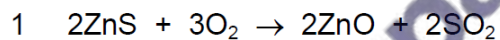
R no reaction

Which row shows the identity of P, Q and R?

	P	Q	R
A	magnesium carbonate	potassium carbonate	potassium nitrate
B	magnesium carbonate	potassium nitrate	potassium carbonate
C	potassium nitrate	magnesium carbonate	potassium carbonate
D	potassium nitrate	potassium carbonate	magnesium carbonate

10. 0620/21,22,23/M/J/19/No.25

Zinc is extracted from its ore, zinc blende, using two chemical reactions.



Which substance is reduced in reactions 1 and 2?

	reaction 1	reaction 2
A	O ₂	C
B	O ₂	ZnO
C	ZnS	C
D	ZnS	ZnO

11. 0620/21,22,23/M/J/19/No.26

Four metals, zinc, M, copper and magnesium, are reacted with aqueous solutions of their nitrates.

The results are shown.

metal	magnesium nitrate	M nitrate	copper nitrate	zinc nitrate
magnesium		✓	✓	✓
zinc	x	✓	✓	
M	x		✓	x
copper	x	x		x

key
✓ = reacts
x = no reaction

What is the order of reactivity of these four metals starting with the most reactive?

- A copper → zinc → M → magnesium
- B copper → M → zinc → magnesium
- C magnesium → M → zinc → copper
- D magnesium → zinc → M → copper

12. 0620/22/M/J/19/No.24

A student heated the carbonates and nitrates of sodium and copper.

The results are shown.

	compound heated	gases released	solid formed
1	sodium carbonate	carbon monoxide	sodium oxide
2	copper(II) carbonate	carbon dioxide	copper
3	sodium nitrate	oxygen only	sodium nitrite
4	copper(II) nitrate	nitrogen dioxide and oxygen	copper(II) oxide

Which rows describe the correct results?

- A 1 and 3
- B 2 and 3
- C 3 and 4
- D 4 only

13. 0620/12/F/M/19/No.24

The electrical conductivity of magnesium was tested.

Magnesium was then added to dilute sulfuric acid and a gas, Q, was produced.

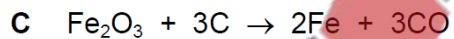
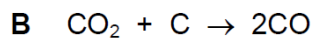
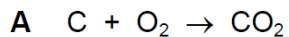
Which row is correct?

	electrical conductivity of magnesium	gas Q
A	good	hydrogen
B	good	oxygen
C	poor	hydrogen
D	poor	oxygen

14. 0620/12/F/M/19/No.25

Four reactions that take place in the blast furnace to produce iron are shown.

Which reaction is used to keep the furnace hot?



15. 0620/12,22/F/M/19/No.26,28

The list gives the order of some metals and hydrogen in the reactivity series.

Metal X is also included.

most reactive K
 Mg
 Zn
 H
 X
least reactive Cu

Which row correctly shows the properties of metal X?

	reacts with dilute acids	oxide reduced by carbon
A	no	no
B	no	yes
C	yes	no
D	yes	yes

16. 0620/12/F/M/19/No.27

The properties of four elements are shown.

Which element is used to make aircraft bodies?

	density	brittle or malleable
A	high	brittle
B	high	malleable
C	low	brittle
D	low	malleable

17. 0620/2 2/F/M/19/No.27

In which reaction does Fe(s) form ions when the mixture is heated?

- A Fe(s) + CaO(s)
- B Fe(s) + MgO(s)
- C Fe(s) + ZnO(s)
- D Fe(s) + CuO(s)

18. 0620/22/F/M/19/No.29

Which metal carbonate does **not** produce carbon dioxide when it is heated?

- A copper(II) carbonate
- B iron(II) carbonate
- C potassium carbonate
- D zinc carbonate

19. 0620/22/F/M/19/No.30

Which statement about the extraction of metals is correct?

- A Aluminium is extracted by the electrolysis of hematite.
- B Cryolite acts as a reducing agent in the extraction of aluminium.
- C Zinc is extracted by the electrolysis of zinc blende.
- D Zinc is obtained by heating zinc oxide with coke.