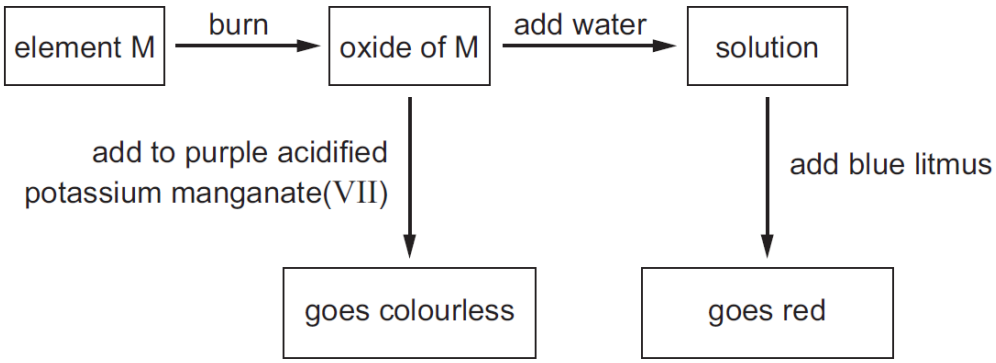
The Periodic Table – 2021 IGCSE 0620

1. June/2021/Paper_11&21/No.20

Some reactions of element M are shown.



What is element M?

A carbon

B iron

C magnesium

D sulfur

2. June/2021/Paper_11/No.21

Element X is in Group II of the Periodic Table.

Which statements about X are correct?

1 X is a metal.

2 X has two electrons in its outer shell.

3 X is a liquid at room temperature.

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

3. June/2021/Paper_11&21/No.22

Why is helium used to fill balloons?

A Helium is monoatomic.

B Helium is in Group VIII of the Periodic Table.

C Helium has a full outer electron shell.

D Helium is less dense than air.

4. June/2021/Paper_11/No.23

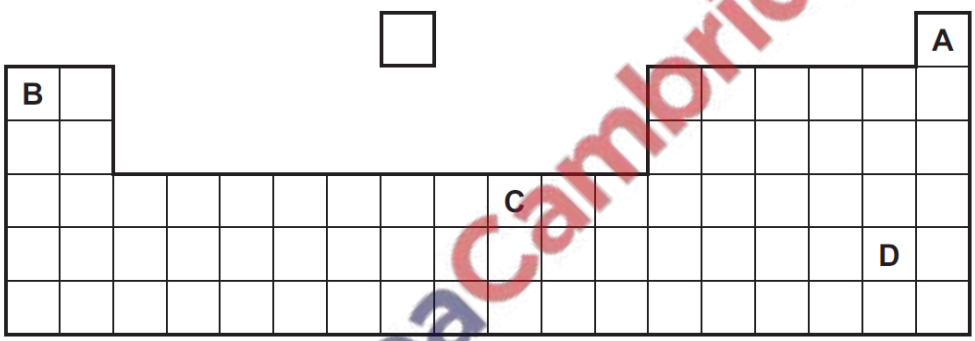
Which row describes the trend in properties of the elements in Group I as the group is descended?

	melting point	reactivity with water
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

5. June/2021/Paper_11,12&13/No.24

An element melts at 1455 °C, has a density of 8.90 g / cm^3 and forms a green chloride.

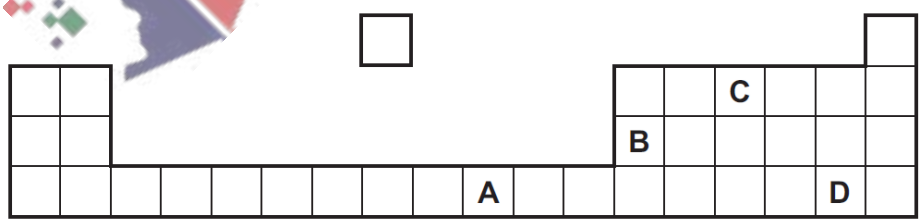
Where in the Periodic Table is this element found?



6. June/2021/Paper_12/No.21

Part of the Periodic Table is shown.

Which element is a non-metal with the lowest melting point?



7. June/2021/Paper_12/No.22

Period 3 of the Periodic Table contains the elements sodium to argon.

Which statement about the elements is correct?

A Na and Mg are poor conductors of electricity.

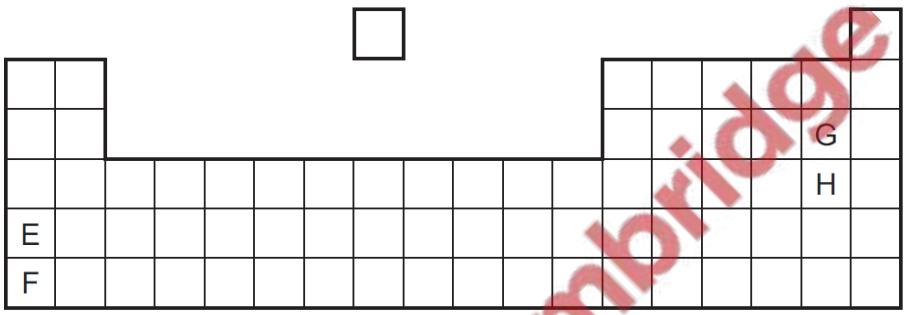
B Na and Mg react with acids to make hydrogen.

C S and C*l* are malleable and ductile.

D S and C*l* have the highest melting and boiling points.

8. June/2021/Paper_12&22/No.23

The diagram shows the positions of elements E, F, G and H in the Periodic Table.



Which statements about elements E, F, G and H are correct?

1 E has a higher density than F.

2 E has a higher melting point than F.

3 G has a darker colour than H.

4 G has a lower melting point than H.

A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

9. June/2021/Paper_12/No.25

The noble gases are placed in Group VIII of the Periodic Table.

Which statement explains why they are unreactive?

A They have eight electrons in their outer shell.

B They have a full outer shell of electrons.

C They have even numbers of neutrons.

D They have even numbers of protons.

10. June/2021/Paper_13/No.21

Which statement about the Periodic Table is **not** correct?

A Elements in the same period have similar properties.

B It can be used to predict the properties of elements.

C Non-metals are found on the right side of the table.

D There are more metals than non-metals.

11. June/2021/Paper_13/No.22

Bromine and iodine are elements in Group VII of the Periodic Table.

Which statement about these elements is correct?

A Iodine displaces bromide ions from solution.

B Bromine is a lighter colour than iodine.

C Bromine is more dense than iodine.

D Bromine is less reactive than iodine.

12. June/2021/Paper_13&23/No.23,22

Helium and neon exist as monoatomic gases at room temperature and pressure.

statement 1 Helium and neon have eight electrons in their outer shell.

statement 2 Helium and neon are unreactive.

Which option is correct?

A Statement 1 and statement 2 are incorrect.

B Statement 1 is correct and explains statement 2.

C Statement 1 is correct, but does not explain statement 2.

D Statement 1 is incorrect, but statement 2 is correct.

13. June/2021/Paper_21/No.23

Which elements in the table are transition elements?

element	property
E	forms E^{3+} ions only
F	forms F^{+} and F^{2+} ions
G	forms only white salts
H	used in catalytic converters

A E and G **B** E and H **C** F and G **D** F and H

14. June/2021/Paper_22/No.22

Which statement about the trends shown by the elements of Period 3 in the Periodic Table is **not** correct?

A The elements become less metallic across the period.

B The group number increases across the period.

C The number of electron shells increases across the period.

D The number of outer electrons increases across the period.

15. June/2021/Paper_22/No.24

When aqueous iodine is added to a solution of vanadium ions, V^{2+}, the V^{2+} ions each lose one electron.

Which property of transition elements is shown by this reaction?

A Transition elements have variable oxidation states.

B Transition elements form a stable 1+ ion.

C Transition elements are oxidising agents.

D Transition elements can act as catalysts.

16. June/2021/Paper_23/No.20

Information about element J is shown.

- Its atoms have four electrons in their outer shell.
- It is a non-metal.
- Its oxide has a macromolecular structure.
- It has a high melting point.

What is J?

A beryllium

B carbon

C silicon

D sulfur

17. March/2021/Paper_12/No.21

Which statements describe the Periodic Table?

1 The elements are arranged in order of their nucleon number.

2 The elements are arranged in order of their proton number.

3 It is used to predict the properties of elements.

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

18. March/2021/Paper_12/No.22

Which row shows how the properties of the Group I elements change on descending the group?

	density	melting point	reactivity
A	decreases	increases	increases
B	decreases	increases	decreases
C	increases	decreases	increases
D	increases	decreases	decreases

19. March/2021/Paper_12/No.23

Copper is a transition element.

Two compounds of copper are copper(II) oxide and copper(II) carbonate.

Which row describes the two compounds?

	copper(II) oxide	colour of copper(II) carbonate
A	acidic	green
B	acidic	white
C	basic	green
D	basic	white

20. March/2021/Paper_22/No.22

Metal X reacts with non-metal Y to form an ionic compound with the formula X_2Y.

Which statements are correct?

1 X is in Group I of the Periodic Table.

2 X is in Group II of the Periodic Table.

3 Y is in Group VI of the Periodic Table.

4 Y is in Group VII of the Periodic Table.

A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

21. March/2021/Paper_22/No.23

The table gives some properties of Group IV elements.

element	density / g/cm^3	boiling point / °C
carbon	2.2	4827
silicon		
germanium	5.3	2830
tin	5.8	2270
lead	11.3	1755

Which row describes the properties of silicon?

	density / g/cm^3	boiling point / °C
A	2.3	3265
B	3.1	1997
C	6.2	2920
D	24.6	11682

22. March/2021/Paper_22/No.28

The properties of an element are listed.

Its melting point is 3414 °C.

Some of its compounds are catalysts.

It has variable oxidation states.

Where is the element found in the Periodic Table?

A alkali metals

B halogens

C noble gases

D transition elements

23. June/2021/Paper_31/No.8

This question is about elements in the Periodic Table.

(a) The table shows some properties of five elements, **P**, **Q**, **R**, **S** and **T**.

element	melting point / °C	density in g / cm^3	electrical conductivity of the solid	atomic radius / nm
P	1535	7.86	very good	0.125
Q	–7	3.12	does not conduct	0.114
R	1495	8.90	very good	0.126
S	–157	0.0035	does not conduct	0.110
T	839	1.54	very good	0.174

Use only the elements shown in the table to answer this question.

State which two of the elements, **P**, **Q**, **R**, **S** and **T**, are covalent molecules.
Give **two** reasons for your answer.

elements ..... and .....

reason 1 .....

reason 2 .....

[3]

(b) Element **T** is on the left-hand side of the Periodic Table.
Suggest whether its oxide is acidic or basic.

Give a reason for your answer.

.....

..... [1]

(c) Krypton is an element in Group VIII of the Periodic Table.

Explain, using ideas about electronic structure, why krypton is unreactive.

.....

..... [1]

(d) Sodium is an element in Group I of the Periodic Table. Iron is a transition element.

Iron has a higher melting point and higher boiling point than sodium.

Give **two** other ways in which the properties of transition elements differ from the properties of Group I elements.

1 .....

2 .....

[2]

(e) The table compares the reactivity of four metals with dilute hydrochloric acid.

metal	reaction with dilute hydrochloric acid
calcium	reacts very rapidly
copper	no reaction
iron	reacts rapidly
nickel	reacts slowly

Put the four metals in order of their reactivity.
Put the least reactive metal first.

least reactive → most reactive

[2]

(f) Hot iron reacts with steam. The reaction is reversible.

Complete the equation by writing the symbol for a reversible reaction in the box.

$$3Fe + 4H_2O \quad \square \quad Fe_3O_4 + 4H_2$$

[1]

(g) Steel is an alloy of iron.

State the meaning of the term *alloy*.

..... [1]

[Total: 11]

24. June/2021/Paper_32/No.8

This question is about elements in the Periodic Table.

(a) The table shows some properties of five elements, **P**, **Q**, **R**, **S** and **T**.

element	melting point /°C	density in g/cm^3	electrical conductivity of the solid	atomic radius /nm
P	63	0.86	very good	0.235
Q	–7	3.12	does not conduct	0.114
R	839	1.54	very good	0.174
S	1495	8.9	very good	0.126
T	–157	0.0035	does not conduct	0.110

Use only the elements shown in the table to answer this question.

State which two of the elements, **P**, **Q**, **R**, **S** and **T**, are covalent molecules.
Give **two** reasons for your answer.

elements ..... and .....

reason 1 .....

reason 2 .....

[3]

(b) Describe how the metallic character of the elements depends on their position in the Periodic Table.

.....

..... [1]

(c) Potassium is an element in Group I of the Periodic Table. Cobalt is a transition element.

Cobalt has a higher density than potassium.

Give **two** other ways in which the properties of transition elements differ from the properties of Group I elements.

1 .....

2 .....

[2]

(d) State whether potassium oxide is a basic oxide or an acidic oxide.
Give a reason for your answer.

..... [1]

(e) The table compares the ease of reduction of four metal oxides when heated with carbon.

metal oxide	details of reduction
chromium(III) oxide	reduced at 1200 °C
manganese(IV) oxide	reduced at 1400 °C
potassium oxide	not reduced at 1400 °C
zinc oxide	reduced at 850 °C

Put the four metals in order of their reactivity.
Put the least reactive metal first.

least reactive ⟶ most reactive

[2]

(f) Describe how aqueous sodium hydroxide is used to test for chromium(III) ions, Cr^{3+}.

.....

.....

..... [2]

[Total: 11]

25. June/2021/Paper_33/No.8

This question is about elements in the Periodic Table.

(a) The table shows some properties of five elements, **P**, **Q**, **R**, **S** and **T**.

element	melting point /°C	density in g/cm^3	electrical conductivity of the solid	atomic radius /nm
P	114	4.93	does not conduct	0.133
Q	1083	8.92	very good	0.117
R	3550	3.51	very good	0.077
S	1495	8.9	very good	0.121
T	248	1.2	does not conduct	0.065

Use only the elements shown in the table to answer these questions.

State which two of the elements, **P**, **Q**, **R**, **S** and **T**, have covalent molecules.
Give **two** reasons for your answer.

elements ..... and .....

reason 1 .....

reason 2 .....

[3]

(b) Diamond is a form of solid carbon.

(i) Describe the structure and bonding in diamond.

.....

..... [2]

(ii) State why diamond is used for cutting tools.

..... [1]

(iii) Name one **other** form of solid carbon.

..... [1]

(c) Lithium is an element in Group I of the Periodic Table. Copper is a transition element.

Copper has a higher melting point and higher boiling point than lithium.

Give **two** other ways in which the properties of transition elements differ from the properties of Group I elements.

.....

..... [2]

(d) State whether lithium oxide is a basic oxide or an acidic oxide.
Give a reason for your answer.

..... [1]

(e) The table compares the reactions of four metals with steam.

metal	reaction with steam
copper	does not react
iron	reacts rapidly at 120 °C
lithium	reacts very rapidly at 120 °C
nickel	only reacts above 800 °C

Put the four metals in order of their reactivity.
Put the least reactive metal first.

least reactive → most reactive

[2]

[Total: 12]

26. June/2021/Paper_42/No.1

The symbols of the elements of Period 3 of the Periodic Table are shown.

Na	Mg	A*l*	Si	P	S	C*l*	Ar

Answer the following questions about these elements.
Each element may be used once, more than once or not at all.

Write the symbol of an element which:

(a) is malleable

..... [1]

(b) has only two electrons in its outermost shell

..... [1]

(c) forms an oxide which leads to acid rain

..... [1]

(d) forms an ion with a 2– charge

..... [1]

(e) is extracted from an ore called bauxite

..... [1]

(f) does **not** form an oxide

..... [1]

(g) forms an oxide with a macromolecular structure

..... [1]

(h) forms an amphoteric oxide

..... [1]

(i) exists as diatomic molecules

..... [1]

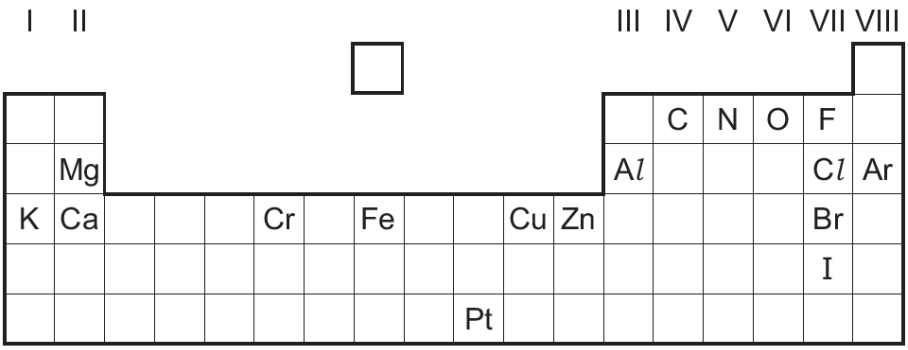
(j) forms a binary compound with hydrogen that is a strong acid.

..... [1]

[Total: 10]

27. March/2021/Paper_32/No.1

The diagram shows part of the Periodic Table.



Answer the following questions using only the symbols of the elements in the diagram.
Each symbol may be used once, more than once or not at all.

Give the symbol of the element that:

(a) is extracted from bauxite

..... [1]

(b) forms 21% of clean, dry air

..... [1]

(c) forms an oxide which contributes to acid rain

..... [1]

(d) forms an aqueous ion that gives a red-brown precipitate on addition of aqueous sodium hydroxide

..... [1]

(e) has an atom with a complete outer electron shell.

..... [1]

[Total: 5]

28. March/2021/Paper_32/No.3

The table shows some properties of four halogens.

element	melting point in °C	boiling point in °C	density of liquid at melting point in g/cm^3
fluorine	–220	–188	
chlorine	–101		1.56
bromine	–7	59	3.12
iodine	114	184	4.93

(a) (i) Complete the table by predicting:

- the boiling point of chlorine
- the density of fluorine at its melting point.

[2]

(ii) Describe the trend in the melting points of the halogens down the group.

..... [1]

(iii) Deduce the physical state of iodine at 130 °C.
Explain your answer.

.....

.....

..... [2]

(b) (i) Give the electronic structure of a fluorine atom.

..... [1]

(ii) Explain why a fluoride ion has a single negative charge.

.....

..... [1]

(c) Magnesium reacts with excess fluorine to produce magnesium fluoride.
When 2.40 g of magnesium is reacted, 6.20 g of magnesium fluoride is produced.

Calculate the mass of magnesium needed to produce 1.24 g of magnesium fluoride.

mass of magnesium = ... g [1]

[Total: 8]