Periodic table

1. Which property of elements increases across a period of the Periodic Table?

A metallic character

B number of electron shells

C number of outer shell electrons

D tendency to form positive ions

2. Magnesium, calcium, strontium and barium are Group II elements.

Group II elements follow the same trends as Group I elements.

Which statements about Group II elements are correct?

1 Calcium reacts faster than magnesium with water.

2 Barium reacts less vigorously than magnesium with dilute acid.

3 Strontium oxidises in air more slowly than barium.

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

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

Which statement explains why noble gases are unreactive?

A They all have eight electrons in their outer shells.

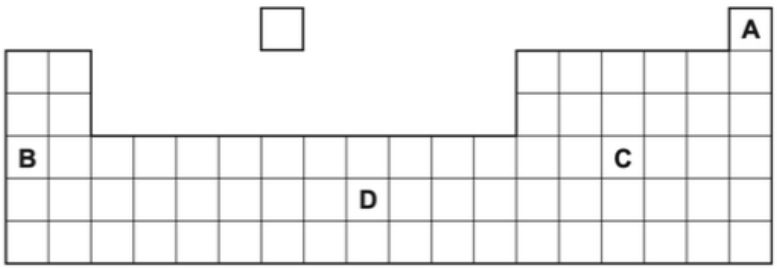
B They all have full outer shells.

C They are all gases.

D They are all monoatomic.

4. Part of the Periodic Table is shown.

Which element is used as a catalyst?



5. Which statement about **all** metals is correct?

A They are attracted to a magnet.

B They are weak and brittle.

C They may be used to form alloys.

D They react with water.

6. Which element is less reactive than the other members of its group in the Periodic Table?

A astatine

B caesium

C fluorine

D rubidium

7. The elements in Group IV of the Periodic Table are shown.

carbon

silicon

germanium

tin

lead

flerovium

What does **not** occur in Group IV as it is descended?

A The proton number of the elements increases.

B The elements become more metallic.

C The elements have more electrons in their outer shells.

D The elements have more electron shells.

8. Why are weather balloons sometimes filled with helium rather than hydrogen?

A Helium is found in air.

B Helium is less dense than hydrogen.

C Helium is more dense than hydrogen.

D Helium is unreactive.

9. The elements oxygen and sulfur are in the same group of the Periodic Table.

Which statement about oxygen and sulfur is **not** correct?

A They are non-metals.

B They have giant covalent structures.

C They have six electrons in their outer shells.

D They react together to form an acidic oxide.

10. Ununseptium (atomic number 117) is a man-made element that is below astatine in Group VII of the Periodic Table.

What is the expected state of ununseptium at room temperature?

A a diatomic gas

B a liquid

C a monatomic gas

D a solid

11. Which statements about the trends across a period of the Periodic Table are correct?

1 Aluminium is more metallic than sodium.

2 Beryllium is more metallic than carbon.

3 Boron is more metallic than lithium.

4 Magnesium is more metallic than silicon.

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

12. Astatine is an element in Group VII of the Periodic Table.

Astatine is .....1..... reactive than iodine.

The melting point of astatine is .....2..... than the melting point of iodine.

Astatine is .....3..... in colour than bromine.

Which words complete gaps 1, 2 and 3?

	1	2	3
A	less	higher	darker
B	less	lower	lighter
C	more	higher	darker
D	more	lower	lighter

13. Which row describes the properties of a typical transition element?

	melting point	forms coloured compounds	can act as a catalyst
A	high	no	no
B	high	yes	yes
C	low	no	yes
D	low	yes	no

14. Why is argon gas used to fill electric lamps?

A It conducts electricity.

B It glows when heated.

C It is less dense than air.

D It is not reactive.

15. What is a property of **all** metals?

A conduct electricity

B hard

C low melting points

D react with water

16. Which statement about nitrogen and phosphorus is **not** correct?

A Both are in the same group of the Periodic Table.

B Both are in the same period of the Periodic Table.

C Both are non-metals.

D Both have the same number of electrons in their outer shell.

17. Sodium and rubidium are elements in Group I of the Periodic Table.

Which statement is correct?

A Sodium atoms have more electrons than rubidium atoms.

B Sodium has a lower density than rubidium.

C Sodium has a lower melting point than rubidium.

D Sodium is more reactive than rubidium.

18. Which properties do the elements chromium, iron and vanadium have in common?

1 They all conduct electricity.

2 They, or their compounds, can act as catalysts.

3 They all form coloured compounds.

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

19. The table gives some properties of an element.

melting point in °C	3422
appearance of the element	grey
appearance of the chloride of the element	dark blue
density in g/cm^3	19.2
electrical conductivity when solid	good

Which other property would you expect this element to have?

A acts as a catalyst

B brittle

C forms an acidic oxide

D highly reactive with water

20. The elements in a group of the Periodic Table show the following trends.

1 The element with the lowest proton number has the lowest reactivity.

2 All the elements in the group form basic oxides.

3 The density of the elements increases down the group.

4 The melting point of the elements decreases down the group.

In which group are the elements found?

A I **B** IV **C** VI **D** VII

21. A period of the Periodic Table is shown.

group	I	II	III	IV	V	VI	VII	VIII
element	R	S	T	V	W	X	Y	Z

The letters are not their chemical symbols.

Which statement is correct?

A Element R does not conduct electricity.

B Elements R and Y react together to form an ionic compound.

C Element Z exists as a diatomic molecule.

D Element Z reacts with element T.

22. Some properties of element X are shown.

melting point in °C	98
boiling point in °C	883
reaction with cold water	gives off H_2 gas
reaction when heated with oxygen	burns to give a white solid

In which part of the Periodic Table is X found?

A Group I

B Group VII

C Group VIII

D transition elements

23. The table gives information about four elements, P, Q, R and S.

	melting point in °C	electrical conductivity of element when solid	density in g/cm^3	colour of iodide of element
P	98	good	0.97	white
Q	–39	good	13.53	red
R	1410	poor	2.33	colourless
S	1535	good	7.87	green

Which elements could be transition elements?

A P, Q and S **B** Q and S only **C** R and S only **D** S only

24. Which pair of elements will react together most violently?

A chlorine and lithium

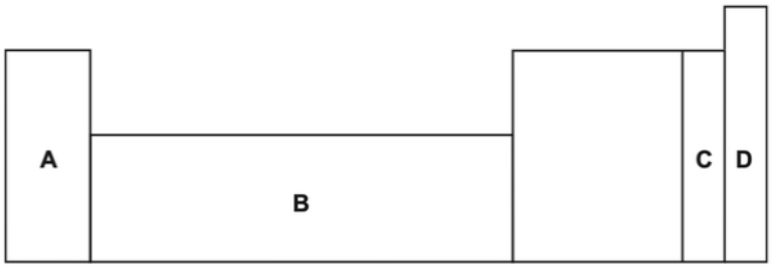
B chlorine and potassium

C iodine and lithium

D iodine and potassium

25. An element does not conduct electricity and exists as diatomic molecules.

Where in the Periodic Table is the element found?



In the Periodic Table, how does the metallic character of the elements vary from left to right across a period?

A It decreases.

B It increases.

C It increases then decreases.

D It stays the same.

26. Where in the Periodic Table is the metallic character of the elements greatest?

	left or right side of a period	at the top or bottom of a group
A	left	bottom
B	left	top
C	right	bottom
D	right	top

27. Some properties of four elements, P, Q, R and S, are shown in the table.

Two of these elements are in Group I of the Periodic Table and two are in Group VII.

element	reaction with water	physical state at room temperature
P	reacts vigorously	solid
Q	does not react with water	solid
R	reacts explosively	solid
S	dissolves giving a coloured solution	liquid

Which statement is correct?

A P is below R in Group I.

B Q is above R in Group I.

C Q is below S in Group VII.

D R is below S in Group VII.

28. Which of the following could be a transition element?

	melting point in °C	density in g/cm^3	colour	electrical conductor
A	114	4.9	purple	no
B	659	2.7	grey	yes
C	1677	4.5	grey	yes
D	3727	2.3	black	yes

29. Two statements about argon are given.

1 Argon has a full outer shell of electrons.

2 Argon is very reactive and is used in lamps.

Which is correct?

A Both statements are correct and statement 2 explains statement 1.

B Both statements are correct but statement 2 does not explain statement 1.

C Statement 1 is correct but statement 2 is incorrect.

D Statement 2 is correct but statement 1 is incorrect.

30. Rubidium is a Group I metal.

Which statement about rubidium is **not** correct?

A It has a higher melting point than lithium.

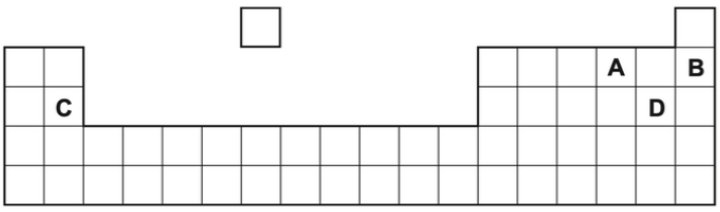
B It has one electron in its outer shell.

C It reacts vigorously with water.

D It reacts with chlorine to form rubidium chloride, RbCl.

31. Part of the Periodic Table is shown.

Which element is a gas that does **not** form a compound with potassium?



Which statement is correct for **all** metals?

A conduct electricity when molten

B gain electrons when they form ions

C have a low density

D have a low melting point

32. Which statement about the elements in Group I is correct?

A Hydrogen is evolved when they react with water.

B Ions of Group I elements have a –1 charge.

C Sodium is more reactive than potassium.

D Solid sodium is a poor electrical conductor.

33. Osmium is a transition element.

Which row gives the expected properties of osmium?

	melting point	density	compounds formed
A	high	high	coloured
B	high	high	white
C	high	low	white
D	low	high	coloured

34. Two statements about noble gases are given.

1 Noble gases are reactive, monatomic gases.

2 Noble gases all have full outer shells of electrons.

Which is correct?

A Both statements are correct and statement 2 explains statement 1.

B Both statements are correct but statement 2 does not explain statement 1.

C Statement 1 is correct but statement 2 is incorrect.

D Statement 2 is correct but statement 1 is incorrect.

35. Some properties of substance X are listed.

- It conducts electricity when molten.
- It has a high melting point.
- It burns in oxygen and the product dissolves in water to give a solution with pH 11.

What is X?

A a covalent compound

B a macromolecule

C a metal

D an ionic compound

36. What is **not** a property of Group I metals?

A They are soft and can be cut with a knife.

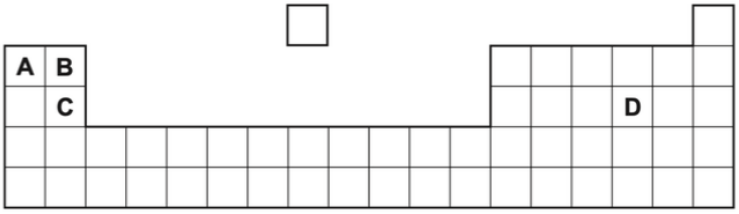
B They react when exposed to oxygen in the air.

C They produce an acidic solution when they react with water.

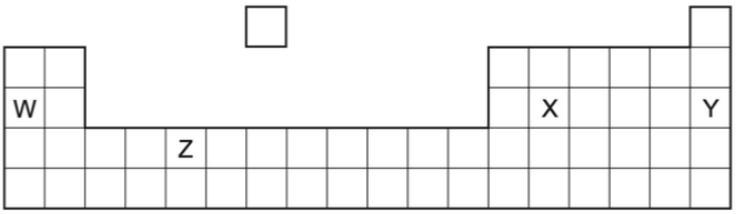
D They react rapidly with water producing hydrogen gas.

37. Part of the Periodic Table is shown.

Which element has two electrons in its outer shell and three electron shells?



38. Part of the Periodic Table is shown.



Which row correctly describes the properties of elements W, X, Y and Z?

	has variable oxidation states	reacts with cold water	very unreactive	has four outer shell electrons
A	W	Y	Z	X
B	X	W	Y	Z
C	Z	W	Y	X
D	Z	Y	X	W

39. The table shows some properties of the Group I metals.

metal	melting point / °C	hardness	reaction with water
lithium	181	moderately soft	steady effervescence
sodium	98	soft	vigorous effervescence
potassium	63	very soft	very vigorous effervescence
rubidium	?	?	?

What are the properties of rubidium?

A melts below 63 °C, very soft, reacts explosively with water

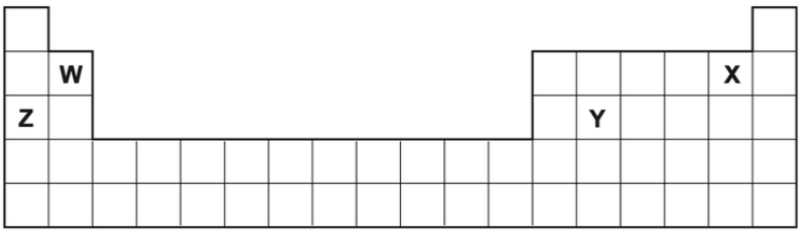
B melts below 63 °C, very soft, reacts slowly with water

C melts above 181 °C, very soft, reacts explosively with water

D melts above 181 °C, very soft, reacts slowly with water

40. Part of the Periodic Table is shown.

The letters are not the chemical symbols of the elements.



Which statement about the elements is **not** correct.

A W has two electrons in the outermost shell.

B Y is in Group IV of the Periodic Table.

C X and Y bond covalently to form a molecule XY_4.

D Z has more metallic character than Y.

41. Astatine is an element in Group VII of the Periodic Table. It has only ever been produced in very small amounts.

What are the likely properties of astatine?

	colour	state	reaction with aqueous potassium iodide
A	black	solid	no reaction
B	dark brown	gas	brown colour
C	green	solid	no reaction
D	yellow	liquid	brown colour

42. The table shows some information about elements in Group VII of the Periodic Table.

name	state at room temperature	colour
chlorine	gas	yellow-green
bromine	liquid	brown
iodine	?	?
astatine	solid	black

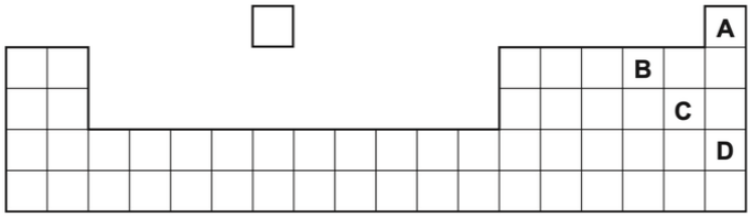
Which information about iodine completes the table?

	state	colour
A	liquid	black
B	liquid	green
C	solid	grey
D	solid	yellow

43. The diagram shows a section of the Periodic Table.

Which element is described below?

'A colourless, unreactive gas that is denser than air.'



44. Which is **not** a characteristic property of transition metals?

A act as catalysts

B form coloured compounds

C high melting point

D low density

45. Which element is in the same group of the Periodic Table as lithium?

	electrical conductivity	density in g / cm^3
A	high	0.97
B	high	8.93
C	low	0.07
D	low	3.12

46. Which properties of the element titanium, Ti, can be predicted from its position in the Periodic Table?

	can be used as a catalyst	conducts electricity when solid	has low density	forms coloured compounds
A	✓	✓	✓	✗
B	✓	✓	✗	✓
C	✓	✗	✓	✓
D	✗	✓	✓	✓

47. The following statements are about elements in the Periodic Table.

1 Their atoms have a full outer shell of electrons.

2 They form basic oxides.

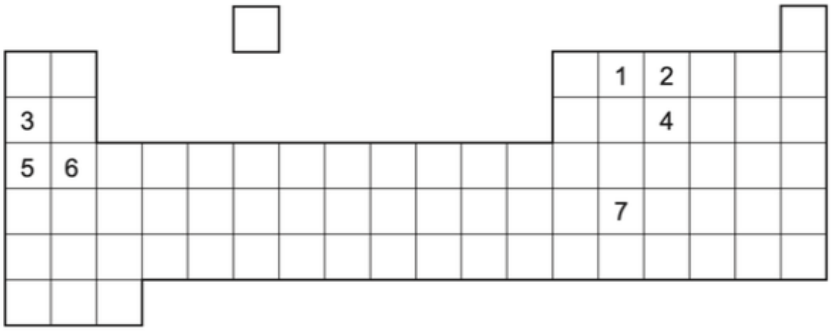
3 They are found in Group 0.

4 They are present in small quantities in the air.

Which statements are correct for the noble gases?

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

48. In the outline of the Periodic Table below, some elements are shown as numbers.

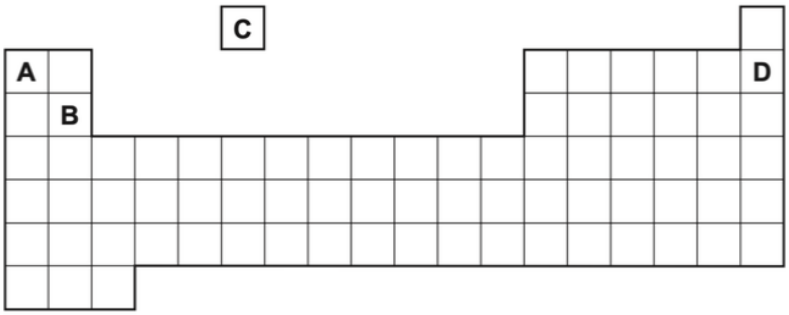


Which two numbers are **metals** in the same period?

A 1 and 2 **B** 1 and 7 **C** 3 and 5 **D** 5 and 6

49. The positions of four elements in the Periodic Table are shown.

Which element does **not** form a compound with chlorine?



50. Hydrogen and helium have both been used to fill balloons.

Which property of helium makes it the preferred choice to hydrogen?

A easily compressed into a gas cylinder

B forms monatomic molecules

C lower density

D unreactive

51. The noble gases, which are in Group 0 of the Periodic Table, are all very .....1..... .

.....2....., one of these gases, is used to provide an inert atmosphere in lamps.

Another, ...3....., is used for filling balloons because it is less dense than air.

Which words complete the sentences about noble gases?

	1	2	3
A	reactive	argon	helium
B	reactive	helium	argon
C	unreactive	argon	helium
D	unreactive	helium	argon

52. The Group 0 elements are unreactive.

The gas used to fill balloons is .....X..... .

This gas is unreactive because it has .....Y..... electrons in its outermost shell.

Which words correctly complete gaps X and Y?

	X	Y
A	argon	eight
B	argon	two
C	helium	eight
D	helium	two

53. The table gives information about four elements.

Which element is a transition metal?

	electrical conductivity	density in g/cm^3	melting point in °C
A	good	0.97	98
B	good	7.86	1535
C	poor	2.33	1410
D	poor	3.12	–7

54. Which statements about Group I and Group VII elements are correct?

1 In Group I, lithium is more reactive than potassium.

2 In Group VII, chlorine is more reactive than fluorine.

	statement 1	statement 2
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

55. The Periodic Table lists all the known elements.

Elements are arranged in order of .....1..... number.

The melting points of Group I elements .....2..... down the group.

The melting points of Group VII elements .....3..... down the group.

Which words correctly complete the gaps 1, 2 and 3?

	1	2	3
A	nucleon	decrease	increase
B	nucleon	increase	decrease
C	proton	decrease	increase
D	proton	increase	decrease

56. The table gives information about four elements.

Which element is a transition metal?

	electrical conductivity	density in g/cm^3	melting point in °C
A	good	0.97	98
B	good	7.86	1535
C	poor	2.33	1410
D	poor	3.12	–7

57. The table shows the symbols of three metals with names that begin with the letter C.

Which row correctly shows the melting point of the metals?

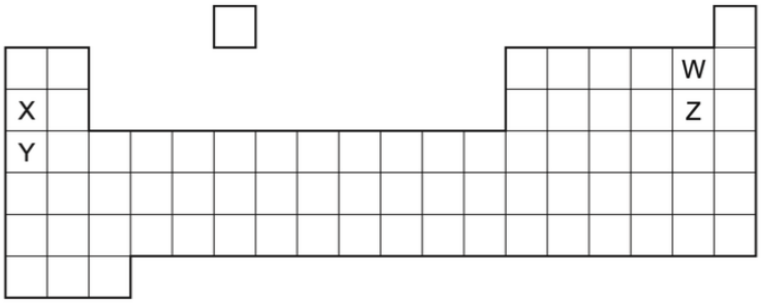
	Co	Cr	Cs
A	high	high	high
B	high	high	low
C	low	low	high
D	low	low	low

58. The table gives information about four elements.

Which element is a transition metal?

	electrical conductivity	density in g/cm^3	melting point in °C
A	good	0.97	98
B	good	7.86	1535
C	poor	2.33	1410
D	poor	3.12	–7

59. The diagram shows elements W, X, Y and Z in a section of the Periodic Table.



Which statement about the reactivity of the elements is correct?

A X is more reactive than Y, and W is more reactive than Z.

B X is more reactive than Y, and Z is more reactive than W.

C Y is more reactive than X, and W is more reactive than Z.

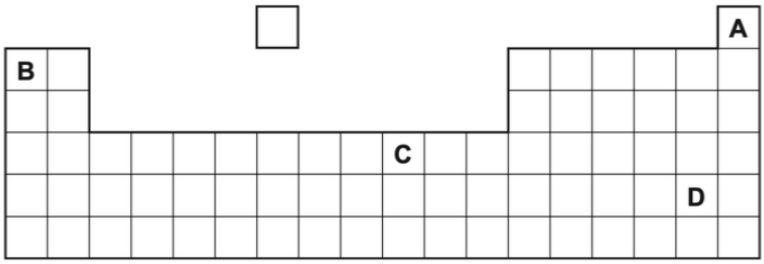
D Y is more reactive than X, and Z is more reactive than W.

60. An element, X, is a dark grey crystalline solid at room temperature.

It has a melting point of 114 °C and a density of 4.9 g / cm^3.

When heated gently it forms a purple vapour.

Where in the Periodic Table is X found?



61. J and K are two elements from the same period in the Periodic Table.

The table gives some properties of J and K.

	J	K
appearance	shiny grey	dull yellow
electrical conductivity when solid	good	poor
malleability	malleable	brittle

Which statement about J and K is correct?

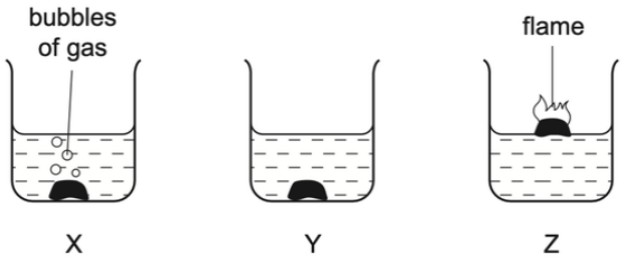
A J forms an acidic oxide.

B J is found to the left of K in the Periodic Table.

C K forms positive ions when it reacts.

D K is more metallic than J.

62. The diagrams show what happens when three different metals are added to water.



What are X, Y and Z?

	X	Y	Z
A	calcium	copper	potassium
B	copper	calcium	potassium
C	potassium	calcium	copper
D	potassium	copper	calcium

63. The table shows some physical properties of the metals, **A**, **B**, **C** and **D**.

metal	electrical conductivity	density in g/cm^3	boiling point /°C	hardness
A	fairly good	8.64	765	hard
B	good	0.97	883	soft
C	good	7.14	907	hard
D	good	0.86	760	soft

(a) (i) Which **two** metals in the table are Group I metals?
Give a reason for your answer.

.....

..... [2]

(ii) None of the metals **A**, **B**, **C** or **D** are transition elements.

Give **two** properties of transition elements or their compounds that make them different from metals **A**, **B**, **C** and **D**.

.....

..... [2]

(b) When lithium reacts with water it moves about on the surface of the water, bubbles are seen and the lithium disappears slowly.

Predict how the reaction of potassium with water compares with the reaction of lithium with water.

In your answer, include

- any differences in observations,
- the names of the products formed when lithium and potassium react with water.

.....

.....

.....

.....

.....

.....

..... [5]

64. The table shows some properties of aluminium, copper, iron and sodium.

metal	electrical conductivity	density in g/cm^3	melting point/°C	strength	colour
aluminium	very good	2.70	660	fairly strong	silver
copper	very good	8.92	1083	very strong	pink-brown
iron	good	7.86	1535	very strong	silver
sodium	good	0.97	98	weak	silver

(a) Which two metals in the table are transition elements? Explain your answer by referring to a specific property of transition elements given in the table.

.....

.....

.....[2]

(b) Use the information in the table to suggest

(i) why overhead electricity cables are made from aluminium with a steel core,

.....

.....[2]

(ii) one reason why sodium is not used for electricity cables.

.....

.....[1]

(c) Cobalt chloride is a transition element compound.

Calcium chloride is a compound of a Group II metal.

Describe one difference between cobalt chloride and calcium chloride.

.....

.....[1]

65. The table below shows the properties of some non-metallic elements, **A**, **B**, **C** and **D**.

element	state at room temperature	colour	melting point / °C	electrical conductivity
A	solid	black	3317	good
B	solid	grey	1410	poor
C	gas	green	–101	does not conduct
D	solid	yellow	119	does not conduct

(a) (i) Which **two** elements are giant covalent structures?
Give a reason for your answer.

.....

..... [2]

(ii) Which element is carbon in the form of graphite?
Give a reason for your answer.

.....

..... [2]

(iii) Which element is chlorine?

..... [1]

(b) When aqueous chlorine is added to aqueous potassium bromide, the solution turns orange. An aqueous solution of bromine and potassium chloride is formed.

Describe and explain what happens when aqueous bromine is added to separate solutions of aqueous potassium chloride and aqueous potassium iodide.

.....

.....

.....

.....

.....

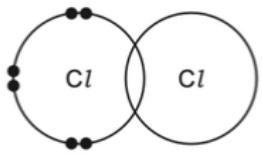
..... [4]

(c) Chlorine is used in water treatment.

Explain why.

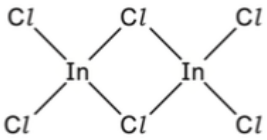
..... [1]

(d) Complete the diagram below to show the arrangement of electrons in a molecule of chlorine.



[2]

(e) Chlorine reacts with indium, In, to form a chloride with the formula shown below.



(i) Give the molecular formula for this chloride.

..... [1]

(ii) How many protons does indium have in its nucleus?
Use the Periodic Table to help you.

..... [1]

(f) Manganese is a typical transition metal.

Predict **three** physical and **two** chemical properties of this metal.

physical properties

.....

.....

.....

chemical properties

.....

.....

[5]

66. Rubidium, Rb, is a Group I element. It has similar physical and chemical properties to the other elements in Group I.

(a) Predict how many electrons there are in the outer shell of a rubidium atom.

..... [1]

(b) Predict **one** physical property of rubidium which is the same as that of a transition element such as iron.

..... [1]

(c) Predict **two** physical properties of rubidium which are different to those of a transition element such as iron.

.....

..... [2]

(d) When rubidium is added to cold water a reaction occurs.

(i) Suggest **two** observations that would be made when rubidium is added to cold water.

.....

..... [2]

(iii) Write a chemical equation for the reaction between rubidium and water.

..... [2]

(e) The phosphate ion has the formula PO_4^{3-}.

Deduce the formula of rubidium phosphate.

..... [1]