

Worksheet 12.1 The periodic table (Periodic trends)

I MCQs

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

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1 Which element is in the same period of the Periodic Table as silicon?

- A** germanium
B scandium
C sodium
D strontium

2 Which statement about the Periodic Table is correct?

- A** Elements in the same group have the same number of electron shells.
- B** It contains elements arranged in order of increasing proton number.
- C** Metals are on the right and non-metals are on the left.
- D** The most reactive elements are at the bottom of every group.

3 Part of the Periodic Table is shown.

Element Q has a low boiling point, low density and does not conduct electricity.

Which element is Q?

A 5x10 grid representing a periodic table. The grid is divided into sections by gaps. The top row has a gap in the middle. The second row has a gap in the middle. The third row has a gap in the middle. The fourth row has a gap in the middle. The fifth row has a gap in the middle. The labels are placed in the following cells:

- A** is in the second row, eighth column.
- B** is in the third row, first column.
- C** is in the fourth row, sixth column.
- D** is in the fifth row, eighth column.

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4 Elements in Group I of the Periodic Table react with water.

Which row describes the products made in the reaction and the trend in reactivity of the elements?

	products	trend in reactivity
A	metal hydroxide and hydrogen	less reactive down the group
B	metal hydroxide and hydrogen	more reactive down the group
C	metal oxide and hydrogen	less reactive down the group
D	metal oxide and hydrogen	more reactive down the group

5 The elements sodium to argon form Period 3 of the Periodic Table.

Which row describes the trend across Period 3 from left to right?

	number of outer shell electrons	metallic character	group number
A	decreases	decreases	decreases
B	decreases	increases	decreases
C	increases	decreases	increases
D	increases	increases	increases

6 Part of the Periodic Table is shown.

A blank periodic table grid is shown. The grid is composed of 18 columns and 4 rows. The first two columns are on the left, and the last two columns are on the right, with a gap in between. The element 'Y' is located in the first column, second row from the bottom. The element 'Z' is located in the 10th column, second row from the bottom. The element 'X' is located in the 17th column, third row from the bottom. There is an empty square box above the 10th column, fourth row from the bottom.

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

	good conductor of electricity	high melting point
A	X	Z
B	Y	Z and X
C	Y and Z	Z
D	Z and X	X

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2

- (a) Flerovium was made by bombarding atoms of plutonium, Pu, atomic number 94, with atoms of element Z.

- The nucleus of **one** atom of plutonium combined with the nucleus of **one** atom of element **Z**.
- This formed the nucleus of **one** atom of flerovium.

Suggest the identity of element **Z**.

- (b)** In which period of the Periodic Table is flerovium?

..... [1]

- (c) Predict the number of outer shell electrons in an atom of flerovium.

..... [1]

- (d) Two isotopes of flerovium are ^{286}Fl and ^{289}Fl . The nuclei of both of these isotopes are unstable and emit energy when they split up.

- (i) State the term used to describe isotopes with unstable nuclei.

..... [1]

- (ii) Complete the table to show the number of protons, neutrons and electrons in the atoms of the isotopes shown.

isotope	number of protons	number of neutrons	number of electrons
^{286}Fl			
^{289}Fl			

[2]

- (e) Only a relatively small number of atoms of flerovium 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.

- (i) Suggest **two** physical properties of flerovium.

1

2

[2]

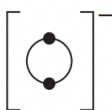
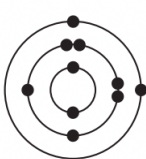
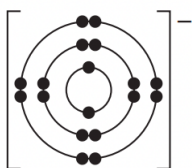
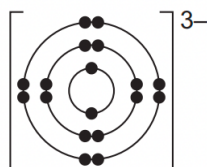
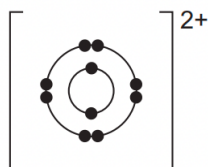
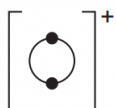
- (ii) Suggest **one** chemical property of flerovium oxide.

..... [1]

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3



(a) Write the letters, **A, B, C, D, E, F, G** or **H**, of the electronic structures which show:

(i) atoms of two different noble gases and [2]

(ii) an ion of a Group I element [1]

(iii) an ion of a Group V element [1]

(iv) a pair of ions that could form a compound with the formula XY_2 and [1]

(b) State which electronic structure, **A, B, C, D, E, F, G** or **H**, is incorrect.

Explain why.

incorrect electronic structure

explanation

[2]

(c) State how many protons are found in the nucleus of ion C. [1]

(d) Use the Periodic Table to deduce:

(i) the chemical symbol for ion G [1]

(ii) the element which forms an ion with a 3+ charge and the same electronic structure as H.

..... [1]

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