Paper 1

Questions are applicable for both core and extended candidates

1 Four ions are listed.

N^{3-} Al^{3+} Li^{+} Cl^{-}

Which pair of ions have the same electronic configuration?

A N^{3-} and Li^{+}

B Al^{3+} and N^{3-}

C Cl^{-} and Al^{3+}

D Li^{+} and Cl^{-}

2 Rubidium and strontium are both in Period 5 of the Periodic Table.

Rubidium is in Group I. Strontium is in Group II.

Which statement about these elements is correct?

A Each element has five electrons in its outer electron shell.

B The atomic number of rubidium is greater than the atomic number of strontium.

C Rubidium forms the Rb^{+} ion; strontium forms the Sr^{2+} ion.

D Electrolysis of molten rubidium chloride and of molten strontium chloride produces hydrogen.

3 Which statement about elements in the Periodic Table is correct?

A A potassium ion, K^{+}, has the same electronic configuration as a chloride ion, Cl^{-}.

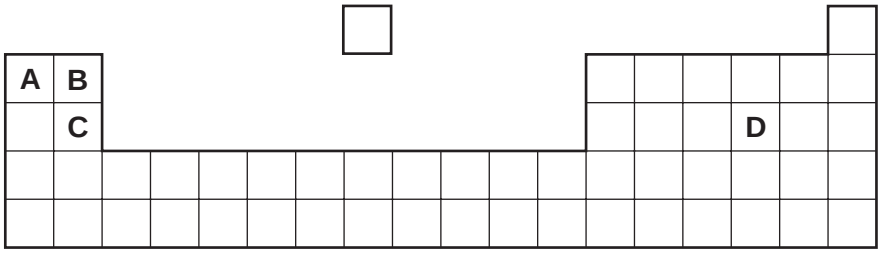
B The electronic configuration of a Ca^{2+} ion is 2,8,8,2.

C The halogens are in Group VI and so their atoms have six electrons in their outer shell.

D Magnesium is in Period 3 and so a magnesium ion, Mg^{2+}, has three occupied electron shells.

4 Part of the Periodic Table is shown.

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



5 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.

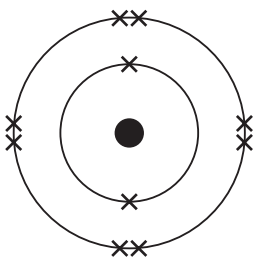
3 Boron is more metallic than lithium.

4 Magnesium is more metallic than silicon.

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

6 Which diagram shows the electronic structure of a noble gas?

A



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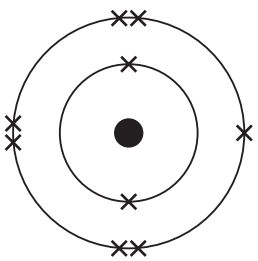

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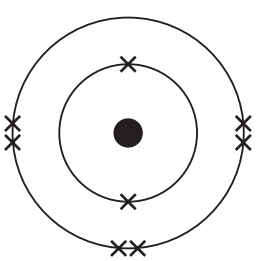

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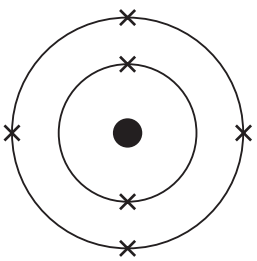


7 What are the relative charge and relative mass of an electron?

	relative charge	relative mass
A	0	1
B	0	$\frac{1}{2000}$
C	–1	1
D	–1	$\frac{1}{2000}$

8 The Group I element potassium forms an ionic bond with the Group VII element fluorine.

Which two ions are produced?

A K^+ and F^+ **B** K^+ and F^- **C** K^- and F^- **D** K^- and F^+

9 The electronic configurations of four elements, P, Q, R and S, are shown.

element	electronic configuration
P	2
Q	2,2
R	2,6
S	2,8

Which elements are unreactive monatomic gases?

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

10 Which pair of atoms contains the same number of neutrons?

A $^{59}_{27}Co$ and $^{59}_{28}Ni$

B $^{64}_{29}Cu$ and $^{65}_{29}Cu$

C $^{64}_{29}Cu$ and $^{65}_{30}Zn$

D $^{65}_{29}Cu$ and $^{65}_{30}Zn$

11 Which statement about the noble gases is correct?

A Noble gases are diatomic molecules.

B Noble gases are reactive gases.

C Noble gases have full outer electron shells.

D The noble gases are found on the left-hand side of the Periodic Table.

12 Which statement about the Periodic Table is correct?

A Elements with the highest atomic number in each period are metallic.

B Elements with the lowest group numbers are non-metals.

C Elements with similar chemical properties are placed in groups.

D Elements with similar physical properties are placed in periods.

13 Three properties of element X are listed.

- It contains atoms with a full outer shell of electrons.
- It is monoatomic.
- It is unreactive.

In which part of the Periodic Table is the element placed?

A Group I

B Group VII

C Group VIII

D transition elements

14 Information about the structures of three atoms, X, Y and Z, is shown.

atom	proton number	nucleon number
X	1	1
Y	1	2
Z	1	3

Which statements about atoms X, Y and Z are correct?

1 They are isotopes of the same element.

2 They contain the same number of electrons.

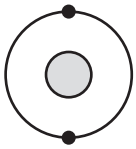
3 They contain the same number of neutrons.

4 They contain one occupied electron shell.

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

15 Which diagram represents the arrangement of the outer-shell electrons of a noble gas?

A



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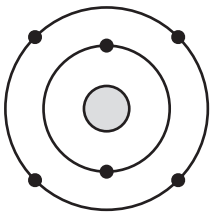

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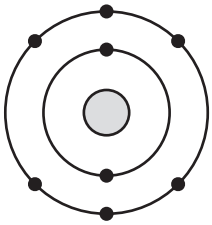

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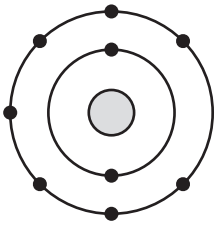
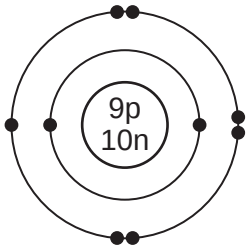


16 The structure of an atom is shown.



key
● = electron
n = neutron
p = proton

Which row shows the nucleon number and proton number of this atom?

	nucleon number	proton number
A	9	10
B	19	10
C	10	9
D	19	9

17 Which statement about the Periodic Table is correct?

A Elements in the same group have the same number of electron shells.

B Elements are 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.

18 Gas G has 10 electrons. Gas H has eight more electrons than gas G. Both gases are monoatomic.

Which statement about G and H is correct?

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

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

C Both gases are very reactive.

D Gas G has a higher atomic mass than gas H.

Paper 2

Questions are applicable for both core and extended candidates unless indicated in the question

19 Which statement about an atom of fluorine, $^{19}_{9}F$, is correct?

A It contains a total of 28 protons, neutrons and electrons.

B It contains more protons than neutrons.

C Its isotopes contain different numbers of protons.

D Its nucleus contains 9 neutrons.

20 Elements P and Q have the same number of electron shells.

An atom of Q has more electrons in its outer electron shell than an atom of P.

Which statements are correct?

1 P and Q are in the same group of the Periodic Table.

2 P and Q are in the same period of the Periodic Table.

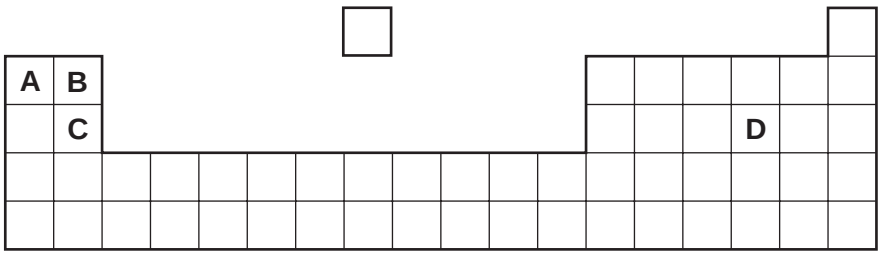
3 P has a greater tendency to form positive ions than Q.

4 The oxide of Q is more basic than the oxide of P.

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

21 Part of the Periodic Table is shown.

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



22 Nitrogen forms a nitride ion with the formula N^{3-}.

Which particle does **not** have the same electronic configuration as the nitride ion?

A Al^{3+} **B** Cl^{-} **C** Na^{+} **D** O^{2-}

23 Which statement about the noble gases is correct?

A Noble gases are diatomic molecules.

B Noble gases are reactive gases.

C Noble gases have full outer electron shells.

D The noble gases are found on the left-hand side of the Periodic Table.

24 The electronic structure of element Z is 2,8,1.

Which statements about Z are correct?

1 It is a metal.

2 It has two outer-shell electrons.

3 It is in Period 3.

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