SMART EXAM RESOURCES

9701 CAMBRIDGE AS CHEMISTRY
TOPIC QUESTIONS AND MARK SCHEMES

TOPIC :ATOMIC STRUCTURE

TOPIC:EQUATION FOR IONISATION ENERGY

SET-1-QP-MS

1 Chlorine has the highest first ionisation energy of the Period 3 elements Na to Cl.

(i) Construct an equation for the first ionisation energy of chlorine.

Include state symbols.

..... [1]

MARK SCHEME:

	$Cl(g) - e^- \rightarrow Cl^+(g)$	**1**

2 Fig. 1.1 shows how **first** ionisation energies vary across Period 2.

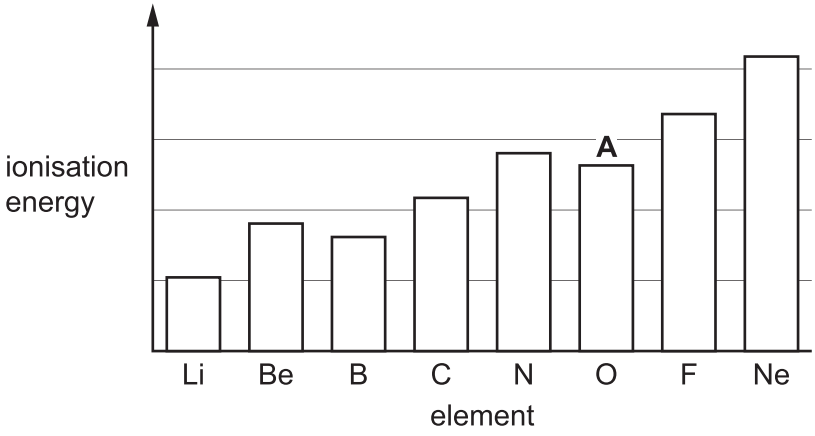

Fig. 1.1

(a) Construct an equation to represent the **first** ionisation energy of oxygen.
Include state symbols.

..... [1]

MARK SCHEME:

	$O(g) \rightarrow O^+(g) + e^-$	**1**

3 The Pauling electronegativity values of elements can be used to predict the chemical properties of compounds.

Use the information in Table 1.1 to answer the following questions.

Table 1.1

element	H	Li	C	O	S
Pauling electronegativity value	2.1	1.0	2.5	3.5	2.6
first ionisation energy / kJ mol^{-1}	1310	519	1090	1310	1000
second ionisation energy / kJ mol^{-1}	—	7300	2350	3390	2260

(i) Write an equation that represents the first ionisation energy of H.

..... [1]

(ii) Explain why there is no information given in Table 1.1 for the second ionisation energy of H.

..... [1]

MARK SCHEME:

)(i)	$H(g) \rightarrow H^+(g) + e^-$	**1**
)(ii)	H (cannot undergo second ionisation because it only) has one electron / H^+ has no electron	**1**

4 Construct an equation for the **second** ionisation energy of argon.

..... [1]

MARK SCHEME:

	$Ar^{+}(g) \rightarrow Ar^{2+}(g) + e^{(-)}$ **OR** $Ar^{+}(g) - e^{(-)} \rightarrow Ar^{2+}(g)$	**1**

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5 In the Periodic Table, the p block contains elements whose outer electrons are found in the p subshell.

Write an equation to show the first ionisation energy of silicon.

..... [1]

MARK SCHEME:

	$Si(g) \rightarrow Si^{+}(g) + e^{-}$	1