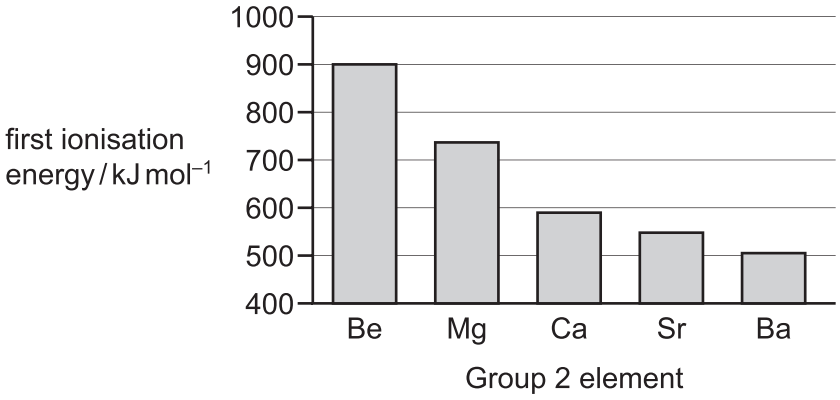
SMART EXAM RESOURCES

9701 CAMBRIDGE AS CHEMISTRY
TOPIC QUESTIONS AND MARK SCHEMES
TOPIC :ATOMIC STRUCTURE
TOPIC:EQUATION FOR IONISATION ENERGY
SET-2-QP-MS

1 The graph shows the first ionisation energies of some of the elements in Group 2.



(a) Write an equation for the first ionisation energy of Mg.

Include state symbols.

..... [1]

MARK SCHEME:

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

2 The elements phosphorus, sulfur and chlorine are in Period 3 of the Periodic Table.

Table 1.1 shows some properties of the elements P to C*l*.

The first ionisation energy of S is **not** shown.

Table 1.1

property	P	S	C*l*
number of electrons in 3p subshell			
total number of unpaired electrons			
first ionisation energy /kJ mol^{-1}	1060		1260
formula of most common anion	P^{3-}	S^{2-}	Cl^{-}

(a) (i) Complete Table 1.1 to show the number of electrons in the 3p subshell and the total number of unpaired electrons in an atom of P, S and C*l*. [2]

(ii) Construct an equation to represent the first ionisation energy of P.

..... [1]

MARK SCHEME:

(a)(i)	total # 3p e^-	3	4	5	**1**
	total # unpaired e^-	3	2	1	**1**
(a)(ii)	$P(g) \rightarrow P^+(g) + e^{(-)}$				**1**

3 Table 1.1 shows some properties of the elements Si to S.

The first ionisation energy of P is **not** shown.

Table 1.1

property	Si	P	S
total number of electrons in s subshells			
total number of electrons in p subshells			
first ionisation energy / kJ mol^{-1}	786		1000
formula of most common chloride	$SiCl_4$	PCl_5	SCl_2

(i) Complete Table 1.1 to show the total number of s and p electrons in an atom of Si, P and S.

[2]

(ii) Construct an equation to represent the first ionisation energy of Si.

..... [1]

MARK SCHEME:

)(i)	total e^- in s subshell	6	6	6	**1**
	total e^- in p subshell	8	9	10	**1**
(ii)	$Si(g) \rightarrow Si^+(g) + e^-$				**1**