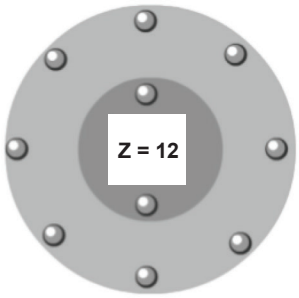
IONIZATION ENERGY - GENERAL CHEMISTRY
FORMATIVE ASSESSMENT - KEY

STUDENT CHECK FOR UNDERSTANDING

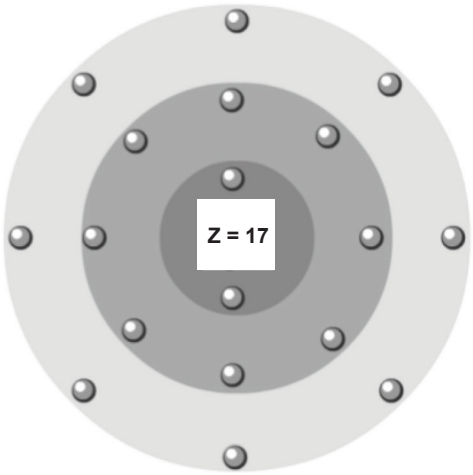
Concepts: Ion Formation, Octet Rule, Ionic Radii, Ionization Energy Trends, Electron Affinity Trends

PART I

Use a periodic table to determine the identity and charge of the two ions below.



Ion	Mg^{2+}
Cation or Anion?	Cation
Number of electrons lost or gained?	2 lost



Ion	Cl^{-}
Cation or Anion?	Anion
Number of electrons lost or gained?	1 gained

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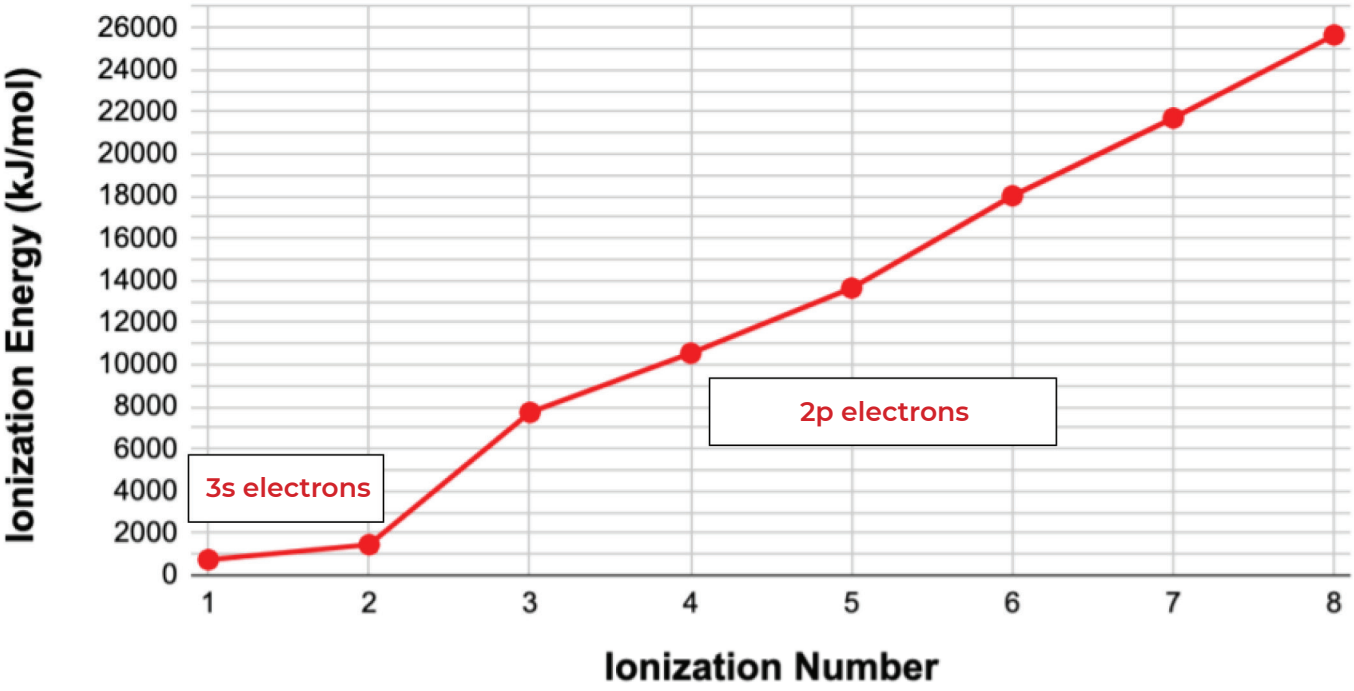
PART II

Below is a graph of successive ionization energies for one of the two elements you identified in Part I. Determine which one it is and enter the name in the blank of the graph title. Afterwards, label it with the location of electrons that have been removed in each section of the graph. A bank of options has been provided beneath the graph.

Successive Ionization Energies of Magnesium



Bank: 2s electrons | 2p electrons | 3s electrons | 3p electrons | 3d electrons | 4s electrons

In the space below, explain how you determined the identity of the element for which the ionization energies are shown.

It can be determined that the graph shows the successive ionization energies of magnesium due to the large jump in ionization energy between the removal of the second and third electrons. The jump in ionization energy between those two electrons is almost 7,000 kJ/mol, which is much larger than the jumps between any other successive electrons on the graph. This suggests that the element in the graph has two valence electrons and the removal of the third electron breaks a complete octet. Of the two elements given in Part I, only magnesium has two valence electrons.