Ionic Bonding and Charge Balance

New Regents original practice • Name: _____ Date: _____
Show your work for written answers.

An ionic formula shows the smallest whole-number ratio of ions that gives zero total charge.

1 Which formula represents a neutral compound formed from Mg^{2+} and Cl^{-}?

(1) MgCl

(2) Mg_2Cl

(3) $MgCl_2$

(4) Mg_2Cl_3

2 Use Al^{3+} and O^{2-} to write the formula for aluminum oxide. Show the total positive and negative charges for that ratio. [1]

Answer and work

_____

_____

3 What holds Na^{+} and Cl^{-} ions together in a sodium chloride crystal?

(1) Attraction between oppositely charged ions

(2) Attraction between ions of the same charge

(3) Sharing a pair of electrons between every ion pair

(4) Attraction between neutral sodium and chlorine atoms

4 A neutral calcium atom forms Ca^{2+}. Describe the electron change and explain why the resulting ion is positive. [1]

Answer and work

_____

_____

Road Salt Labels

Use the information below to answer the questions.

A road maintenance team checks formulas on three deicer labels. Each listed salt consists of the metal ion shown and chloride ions, Cl^-.

Salt	**Metal ion**
Sodium chloride	Na^+
Calcium chloride	Ca^{2+}
Potassium chloride	K^+

5 Which formula belongs on the calcium chloride label?

(1) Ca_2Cl

(2) $CaCl$

(3) $CaCl_2$

(4) Ca_2Cl_3

6 Compare the number of chloride ions per metal ion in sodium chloride and calcium chloride. Explain the difference using the ion charges. [1]

Answer and work

7 A model of potassium chloride contains 12 K^+ ions. How many Cl^- ions are needed for a neutral model? Show the charge balance. [1]

Answer and work

8 A drawing contains 4 Na^+ ions and 4 Cl^- ions. Which formula reports the smallest whole-number ratio?

(1) $NaCl$

(2) Na_2Cl_2

(3) Na_4Cl_4

(4) $NaCl_4$