Ions in Aqueous Solutions

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

In these dilute-solution models, the listed salts dissolve and separate into their component ions. The ions can move through water.

1 Which particles result when one formula unit of NaCl dissolves and separates?

(1) One Na^+ and one Cl^-

(2) One neutral Na atom and one neutral Cl atom

(3) Two Na^+ ions and one Cl^-

(4) One Na^- and one Cl^+

2 How many moles of chloride ions result when 0.200 mol of $CaCl_2$ completely dissociates? Show the formula ratio. [1]

Answer and work

_____

_____

3 What carries electric charge through a salt solution?

(1) Only neutral water molecules

(2) Only neutrons moving through the water

(3) Mobile positive and negative ions

(4) Solid pieces of salt that remain at the bottom

4 Why does dissolved glucose contribute little to a water sample’s electrical conductivity? [1]

Answer and work

_____

_____

Reading a Dissolved-Particle Model

Use the information below to answer the questions.

A model displays only the solute ions in equal-volume samples. Each counter represents an equal amount of the indicated ion. All solutes are completely dissociated in the model.

Sample	Dissolved solute	Positive-ion counters	Negative-ion counters
P	NaCl	6 Na^+	6 Cl^-
Q	$CaCl_2$	6 Ca^{2+}	12 Cl^-
R	KCl	3 K^+	3 Cl^-

5 Which sample shows the most dissolved solute-ion counters in total?

(1) P

(2) Q

(3) R

(4) All three show the same total.

6 Use Q’s ion counts and charges to explain why the modeled solute has zero total charge. [1]

Answer and work

7 Which two samples have equal numbers of positive and negative counters within each sample?

(1) P and Q

(2) P and R

(3) Q and R

(4) All three

8 How many times as great is the chloride concentration in Q as in R? Use the counters and volumes. [1]

Answer and work