Ionic and Molecular Compounds

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

An ionic solid consists of a repeating arrangement of charged ions. A molecular solid consists of individual molecules held together by intermolecular attractions.

1 What does NaCl represent in a model of solid sodium chloride?

(1) One discrete covalent molecule

(2) The simplest ratio of sodium ions to chloride ions

(3) Two atoms with no charge in the whole solid

(4) The number of electrons in the lattice

2 Explain why an ionic compound may conduct when molten even though its solid does not conduct. [1]

Answer and work

_____

_____

3 Which description fits a sample of pure solid carbon dioxide?

(1) An array of CO_2 molecules

(2) An array of separated C^{4+} and O^{2-} ions

(3) A lattice of free electrons and carbon nuclei

(4) A mixture of elemental carbon and oxygen

4 Explain why dissolving a molecular compound in water does not always make a conducting solution. [1]

Answer and work

_____

_____

Identifying Two Compound Models

Use the information below to answer the questions.

A lab compares two model solids. One consists of ions and the other of neutral molecules. The materials melt without reacting. The table gives their electrical behavior in each state.

Sample	Solid conductivity	Molten conductivity
P	Low	High
Q	Low	Low

5 Which sample is consistent with the ionic solid?

(1) P only

(2) Q only

(3) Both samples

(4) Neither sample

6 Explain why the solid-state measurements alone do not identify the ionic compound. [1]

Answer and work

7 Which charge carriers account for P’s high molten conductivity in this model?

(1) Mobile protons released from nuclei

(2) Mobile positive and negative ions

(3) Neutral molecules only

(4) Neutrons moving between molecules

8 A student labels Q molecular. Use both readings to explain why that is a reasonable label in this two-sample model. [1]

Answer and work