Bond Types from Property Evidence

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

Different materials can conduct in different states. Use several observations when inferring a bond type.

1 Which particle model explains poor conduction in a solid ionic crystal?

(1) The ions are held in an ordered lattice.

(2) The ions can freely flow through the crystal.

(3) All ions change into neutrons.

(4) The solid consists only of mobile electrons.

2 Explain how molten ionic material can conduct through a different carrier than a solid metal. [1]

Answer and work

3 Which observation best supports a model of neutral discrete molecules?

(1) Low melting point and poor conductivity in the solid and liquid

(2) High solid conductivity and mobile electrons

(3) Strong conductivity only after an ion lattice melts

(4) The material’s color alone

4 Explain why poor solid conductivity alone cannot distinguish an ionic solid from a molecular solid. [1]

Answer and work

Classifying Three Model Materials

Use the information below to answer the questions.

The lab knows that the model set contains one metal, one ionic material, and one molecular material. These measured properties apply to pure samples under the same test conditions.

Sample	Melting point (°C)	Solid conduction	Molten conduction
P	700	High	High
Q	800	Low	High
R	45	Low	Low

5 Which sample is best classified as a metal in this set?

(1) P
(2) Q
(3) R
(4) None

6 Use both conductivity readings to explain why Q fits an ionic model. [1]

Answer and work

7 Calculate how much higher Q’s melting point is than R’s. [1]

Answer and work

8 Which observation best distinguishes P from Q?

(1) P has a melting point above 45 °C.
(2) Both conduct when molten.
(3) P conducts well as a solid, while Q conducts poorly as a solid.
(4) Both are pure samples.