Checking Why a Melt and a Solution Conduct

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A particle exhibit compares two dry solids. It can model each pure substance as a solid or as a melt. It also mixes each substance with water and compares the resulting solution with a water-only control.

Sample	**Dry solid conducts**	**Pure melt conducts**	**Water mixture conducts**
P	No	Yes	Yes
Q	No	No	Yes
Water only	—	—	No

1 Which comparison shows that the water-mixture result cannot by itself distinguish P from Q?

(1) Both water mixtures conduct.

(2) Neither dry solid conducts.

(3) Only the melt of P conducts.

(4) The water-only control does not conduct.

A second display shows P as a solid array of positive and negative ions. Q consists of neutral molecules as a pure substance. Some Q molecules react with water and make positive and negative ions.

2 Use the particle models to explain why the melt of P conducts and the melt of Q does not. [1]

Answer and work

3 A student says Q must be an ionic solid because its water mixture conducts. Evaluate the claim with the second display. [1]

Answer and work

4 Suppose Q is mixed with a model liquid that dissolves its molecules without reacting and does not conduct by itself. Predict whether that mixture conducts in the stated model. [1]

Answer and work