Dipole Attractions

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

The symbols δ+ and δ− represent partial positive and partial negative charge. A polar molecule has an uneven charge distribution overall.

1 Which neighboring ends of two polar molecules attract one another most directly?

(1) δ+ near δ+

(2) δ− near δ−

(3) δ+ near δ−

(4) Neutral end near neutral end only

2 Explain how the shared electrons in an H–Cl bond can create a permanent dipole in an HCl molecule. [1]

Answer and work

3 Two polar molecules turn so that their δ− ends are closest. What interaction is expected between those ends?

(1) Attraction because both are negative

(2) Repulsion because they have like charges

(3) A covalent bond must form

(4) Their nuclei exchange protons

4 Explain the difference between the H–Cl bond in one HCl molecule and an attraction between two HCl molecules. [1]

Answer and work

Comparing Orientations in a Model

Use the information below to answer the questions.

A simulation places two polar molecules at equal center-to-center distances. Each molecule has one δ+ end and one δ− end. The table records which ends are nearest.

Model	End of first molecule	End of second molecule
A	δ+	δ−
B	δ+	δ+
C	δ−	δ−

5 Which model places opposite partial charges nearest one another?

(1) A

(2) B

(3) C

(4) All three

6 Describe one change to model B that would place opposite partial charges nearest each other. [1]

Answer and work

7 Which two models place like partial charges closest to each other?

(1) A and B

(2) A and C

(3) B and C

(4) No two models

8 A student says all molecules in a liquid must stay in orientation A. Explain why favored attraction does not mean that every pair stays locked in that orientation. [1]

Answer and work