Acid Strength and Conductivity

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

In these models, a monoprotic acid can transfer one proton to water per acid molecule. A stronger acid transfers a proton from a larger fraction of its molecules at the same starting concentration.

1 Which observation indicates greater acid strength at equal initial concentration in this model?

(1) More of the acid molecules transfer a proton to water.

(2) Fewer acid molecules transfer a proton to water.

(3) Both samples contain the same volume.

(4) One container is made of darker glass.

2 Explain why ions formed when an acid reacts with water allow the solution to conduct electricity. [1]

Answer and work

3 Which statement compares concentration and strength correctly?

(1) Concentration gives amount per volume, and strength concerns how readily the acid ionizes.

(2) Concentration and strength both mean the container volume.

(3) All dilute acids are weak acids.

(4) A stronger acid always has a higher starting concentration.

4 Two acid samples have different initial concentrations. Explain why a higher conductivity reading alone cannot identify which acid is stronger. [1]

Answer and work

Comparing Acid Samples

Use the information below to answer the questions.

A simulation tracks monoprotic acids at equal initial concentration, equal volume, and equal temperature. In this model the ions formed have equal mobilities. Water’s own ionization is omitted.

Sample	Starting acid particles	Acid particles that ionized	Relative conductivity
P	100	95	95
Q	100	25	25
R	100	5	5

5 Which sample shows the greatest extent of acid ionization?

(1) P

(2) Q

(3) R

(4) All three are equal.

6 Calculate the percentage of acid particles that ionized in Q. [1]

Answer and work

7 How many acid particles in R remain un-ionized?

(1) 5

(2) 25

(3) 90

(4) 95

8 Use the simulation’s particle counts to explain why P has greater conductivity than Q. [1]

Answer and work