

ACID STRENGTH - GENERAL CHEMISTRY FORMATIVE ASSESSMENT - KEY



STUDENT CHECK FOR UNDERSTANDING

DIRECTIONS:

Identify the reactants and products from the bank that fulfill each scenario described in the table. Simply write the coefficients (if needed), chemical formulas, and state symbols (use "aq" for most, "ℓ" for H₂O, and "s" for solid when using Mg(OH)₂ as it is mostly insoluble in water) on the appropriate lines in the "Balanced Molecular Equation" column. Use the sandbox to help as needed. **Some substances may be used more than once and some scenarios might have more than one correct answer.**

Concepts:
Bronsted-Lowry Acids & Bases, Strong vs Weak Acids, Percent Dissociation, Neutralization Reactions, Polyprotic Acids, Amphoteric Substances, Conjugate Acids & Bases, and Charge of Resulting Ions

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Answers are examples. There may be more than one answer.

Scenario	Balanced Molecular Equation
A base that is NOT ionic reacts with an amphoteric substance to form hydroxide and another ion.	$\begin{array}{ccccccc} \underline{\hspace{1cm}} & \text{NH}_3 & + & \underline{\hspace{1cm}} & \text{H}_2\text{O} & \rightleftharpoons & \underline{\hspace{1cm}} & \text{NH}_4^+ & + & \underline{\hspace{1cm}} & \text{OH}^- \\ \text{Coefficient} & \text{Chemical} & & \text{Coefficient} & \text{Chemical} & & \text{Coefficient} & \text{Chemical} & & \text{Coefficient} & \text{Chemical} \\ \text{(If needed)} & \text{Formula} & + & \text{(If needed)} & \text{Formula} & + & \text{(If needed)} & \text{Formula} & + & \text{(If needed)} & \text{Formula} \\ & \text{State} & & & \text{State} & & & \text{State} & & & \text{State} \end{array}$
An acid that dissociates only partially at 0.1 M reacts with an ionic salt that fully dissociates at the same concentration.	$\text{HF (aq)} + \text{LiOH (aq)} \rightarrow \text{LiF (aq)} + \text{H}_2\text{O (ℓ)}$

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FORMATIVE ASSESSMENT - KEY

<p>Addition of this substance to water produces an amphoteric substance which can also dissociate in water. Write the equations for each individual reaction. You must determine the formula of the amphoteric substance yourself.</p>	$\text{H}_2\text{CO}_3 (\text{aq}) + \text{H}_2\text{O} (\ell) \rightleftharpoons \text{H}_3\text{O}^+ (\text{aq}) + \text{HCO}_3^- (\text{aq})$ $\text{HCO}_3^- (\text{aq}) + \text{H}_2\text{O} (\ell) \rightleftharpoons \text{H}_3\text{O}^+ (\text{aq}) + \text{CO}_3^{2-} (\text{aq})$
<p>The neutralization reaction between these two substances produces anions with -1 charges and cations with +2 charges.</p>	$2 \text{HNO}_3 (\text{aq}) + \text{Mg}(\text{OH})_2 (\text{s}) \rightarrow \text{Mg}(\text{NO}_3)_2 (\text{aq}) + 2 \text{H}_2\text{O} (\ell)$
<p>An acid with an extremely weak conjugate base reacts with a base that is NOT an ionic compound.</p>	$\text{HI} (\text{aq}) + \text{NH}_3 (\text{aq}) \rightarrow \text{NH}_4\text{I} (\text{aq})$
<p>A reaction occurs between a weak acid and a base with a very weak conjugate acid.</p>	$\text{HCN} (\text{aq}) + \text{KOH} (\text{aq}) \rightarrow \text{KCN} (\text{aq}) + \text{H}_2\text{O} (\ell)$

Answers are examples. There may be more than one answer.