Principal Species in Solution / Net Ionic Equations

Prof. Hanson

Answers to Practice 3:

In each case, follow the steps and indicate (1) the characteristics of the substances present, (2) the principal species that will be present in solution, and (3) the net ionic equation for the reaction.

NaOH(aq) and H₂S(aq)
(1) strong base and weak acid
(2) Na⁺(aq), OH⁻(aq), and H₂S(aq)
(3) OH⁻(aq) + H₂S(aq) → H₂O + HS⁻(aq)

HF(aq) and NH₃(aq)
(1) weak acid and weak base
(2) HF(aq) and NH₃(aq)
(3) HF(aq) + NH₃(aq) → F⁻(aq) + NH₄⁺(aq)

HClO₄(aq) and NH₃(aq)
(1) strong acid and weak base
(2) H⁺(aq), ClO₄⁻(aq), and NH₃(aq)
(3) H⁺(aq) + NH₃(aq) → NH₄⁺(aq)

H₃PO₄(s) and NH₃(aq)
(1) solid that will dissolve to be a weak acid; weak base
(2) in solution: H₃PO₄(aq) and NH₃(aq)
(3) H₃PO₄(s) → H₃PO₄(aq) + NH₃(aq)
overall:
H₃PO₄(s) + NH₃(aq) → H₃PO₄⁻(aq) + NH₄⁺(aq)

H₂CO₃(aq) and NH₃(aq)
(1) weak acid and weak base
(2) H₂CO₃(aq) and NH₃(aq)
(3) H₂CO₃(aq) + NH₃(aq) → HCO₃⁻(aq) + NH₄⁺(aq)

C₂H₂O₂H(aq) and NaOH(aq)
(1) weak acid and strong base
(2) C₂H₂O₂H(aq), Na⁺(aq), and OH⁻(aq)
(3) C₂H₂O₂H(aq) + OH⁻(aq) → H₂O + C₂H₂O₂⁻(aq)

HBr(aq) and C₂H₂N(aq)
(1) strong acid and weak base
(2) H⁺(aq), Br⁻(aq), and C₂H₂N(aq)
(3) H⁺(aq) + C₂H₂N(aq) → C₂H₂NH⁺(aq)

25 mL of 0.2 M H₃PO₄(aq) and 50 mL of 0.3 M LiOH(aq)
(1) weak acid and strong base
(2) 0.005 moles of H₃PO₄(aq), 0.015 moles of Li⁺(aq), and 0.015 moles of OH⁻(aq)
(3) H₃PO₄(aq) + 3 OH⁻(aq) → PO₄³⁻(aq) + 3 H₂O