Chapter 7 Homework Key

Items boxed in purple were graded out of two points each, with two points earned for a correct answer and one point earned for a reasonable, but incorrect, attempt. Four points were awarded for submission of a completed assignment.

5, 6, 15, 19, 21, 25, 26, 34, 37, 40, 43, 45, 49

5. The proton in acid–base chemistry is solvated by water. The proton in nuclear chemistry is a nucleon and is not solvated.

6. Hydrogen. No, only those that dissociate in water to form H^+ ions are acids.

15. $H_2PO_4^- + H_2O \rightarrow H_3O^+ + HPO_4^{2-}$

19. (a) $HCOOH + H_2O \rightarrow H_3O^+ + HCOO^-$
(b) $C_5H_5N + H_2O \rightarrow C_5H_5NH^+ + OH^-$

21. $NH_3 + H_2O \rightarrow NH_4^+ + OH^-$

25. (a) phosphoric acid (b) cesium hydroxide: base (c) carbonic acid

26. (a) magnesium hydroxide: base (b) ammonia:base (c) acetic acid

34. weak acid; $HOCN\ (aq) \rightarrow H^+(aq) + OCN^-(aq)$

37. a is highest; b is lowest

40. (a) $Ca(OH)_2 + 2\ HCl \rightarrow CaCl_2 + 2\ H_2O$
(b) $2\ KOH + H_2SO_4 \rightarrow 2\ H_2O + K_2SO_4$

43. (a) acidic (b)neutral (c) acidic (d) basic

45. $pH = -\log([H_3O^+])$
$pH = -\log(1.0 \times 10^{-5})$
$pH = -(-5)$
$pH = 5$

49. $pH = -\log([H_3O^+])$
$-pH = \log([H_3O^+])$
$10^{-pH} = 10^{\log([H_3O^+])}$
$10^{-pH} = [H_3O^+]$
$10^{-3} = [H_3O^+]$
$1.0 \times 10^{-3}\ M = [H_3O^+]$