Alternate Acid Base Theories

1 According to one acid-base theory, a base is an
(1) H_2 acceptor (3) H^+ acceptor
(2) H_2 donor (4) H^+ donor

2 Given the equation representing a reversible reaction:

$CH_3COOH(aq) + H_2O(\ell) \rightleftharpoons$

$CH_3COO^-(aq) + H_3O^+(aq)$

According to one acid-base theory, the two H^+ donors in the equation are
(1) CH_3COOH and H_2O
(2) CH_3COOH and H_3O^+
(3) CH_3COO^- and H_2O
(4) CH_3COO^- and H_3O^+

3 Given the balanced equation representing a reaction:

$HCl + H_2O \rightarrow H_3O^+ + Cl^-$

The water molecule acts as a base because it
(1) donates an H^+ (3) donates an OH^-
(2) accepts an H^+ (4) accepts an OH^-

4 According to one acid-base theory, a molecule acts as an acid when the molecule
(1) accepts an H^+ (3) donates an H^+
(2) accepts an OH^- (4) donates an OH^-

5 Given the equation representing a reaction at equilibrium:

$NH_3(g) + H_2O(\ell) \rightleftharpoons NH_4^+(aq) + OH^-aq)$

If an acid is defined as an H^+ donor, what is the acid in the forward reaction?
(1) $OH^-(aq)$ (3) $NH_3(g)$
(2) $H_2O(\ell)$ (4) $NH_4^+(aq)$

6 Given the equation representing a reversible reaction:

$HCO_3(aq) + H_2O(\ell) \rightleftharpoons H_2CO_3(aq) + OH^-(aq)$

Which formula represents the H^+ acceptor in the forward reaction?
(1) $HCO_3(aq)$ (3) $H_2CO_3(aq)$
(2) $H_2O(\ell)$ (4) $OH^-(aq)$

7 Given the equation representing a reaction at equilibrium:

$H_2S(aq) + CH_3NH_2(aq) \rightleftharpoons HS^-(aq) + CH_3NH_3^+(aq)$

According to one acid-base theory, the forward reaction is classified as an acid-base reaction because
(1) H_2S is a H^+ donor and CH_3NH_2 is a H^+ acceptor
(2) CH_3NH_2 is a H^+ donor and H_2S is a H^+ acceptor + are both H+ donors
(3) HS^- and CH_3NH_3 + and HS– are both H+ acceptors
(4) CH_3NH_3

8 Given the equation representing a reaction:

$H_2CO_3 + NH_3 \rightarrow NH_4^+ + HCO_3^-$

According to one acid-base theory, the compound NH_3 acts as a base because it
(1) accepts a hydrogen ion
(2) donates a hydrogen ion
(3) accepts a hydroxide ion
(4) donates a hydroxide ion

9 One acid-base theory defines an acid as an
(1) H^- acceptor (3) H^+ acceptor
(2) H^- donor (4) H^+ donor

10 According to one acid-base theory, NH_3 acts as a base when an NH_3 molecule
(1) accepts an H^+ ion (3) accepts an OH^- ion
(2) donates an H^+ ion (4) donates an OH^- ion

11 According to one acid-base theory, water can act as a base because a water molecule can
(1) donate an H^+ ion (3) donate an H^- ion
(2) accept an H^+ ion (4) accept an H^- ion

12 According to one acid-base theory, a water molecule acts as a base when it accepts
(1) an H^+ ion (3) a neutron
(2) an OH^- ion (4) an electron

13 According to one acid-base theory, a water molecule acts as an acid when the molecule
(1) donates an H^+ ion (3) donates an OH^- ion
(2) accepts an H^+ ion (4) accepts an OH^- ion

14 Which statement describes one acid-base theory?
(1) An acid is an H^+ acceptor, and a base is an H^+ donor.
(2) An acid is an H^+ donor, and a base is an H^+ acceptor.
(3) An acid is an H^- acceptor, and a base is an H^- donor.
(4) An acid is an H^- donor, and a base is an H^- acceptor.

15 Given the balanced equation representing a reaction:

$H_2O(\ell) + HCl(g) \rightarrow H_3O^+(aq) + Cl^-(aq)$

According to one acid-base theory, the $H_2O(\ell)$ molecules
(1) accept H^+ ions (3) donate H^+ ions
(2) accept OH^- ions (4) donate OH^- ions

Answer Keys

1 3

2 2

3 2

4 3

5 2

6 1

7 1

8 1

9 4

10 1

11 2

12 1

13 1

14 2

15 1