Name:

Chapter 6 Review Quiz

Multiple Choice

Identify the choice that best completes the statement or answers the question.

▼ 1. The process when an acid reacts with water is known as:
   a. dissociation.
   b. acidification.
   c. ionisation.
   d. neutralisation.

▼ 2. The process when a base reacts with water is known as:
   a. dissociation.
   b. acidification.
   c. ionisation.
   d. neutralisation.

▼ 3. Which of the following acids are weak acids?

$$HCl \quad CH_3COOH \quad HF \quad H_2SO_4$$

   a. HCl, CH_3COOH and H_2SO_4
   b. HCl and H_2SO_4
   c. CH_3COOH and HF.
   d. CH_3COOH and H_2SO_4

▼ 4. Which of the following statements is correct?
   a. All molecules in strong acids will dissociate.
   b. All molecules in a strong base will dissociate.
   c. All molecules in a strong base will ionise.
   d. All molecules in a weak base will dissociate.

▼ 5. Which of the following statements regarding the concentration and strength of solutions is correct?
   a. A weak acid will produce more ions than a strong acid of the same concentration.
   b. A dilute solution has more solute than solvent.
   c. A concentrated strong acid will contain more ions than a dilute strong acid.
   d. Weak acids are more dilute than strong acids.

▼ 6. In the reaction:

$$NH_3 + H_2O \; f NH_4^+ + OH^-$$

   a. NH_3 is an acid.
   b. H_2O is an acid.
   c. NH_4^+ is a base.
   d. neither NH_3 nor H_2O are bases.

▼ 7. In the reaction:

$$CO_3^{2-} + H_2O \; f OH^- + HCO_3^-$$

   a. CO_3^{2-} is an acid.
   b. OH^- is a conjugate base.
   c. H_2O is a base.
   d. HCO_3^- is a conjugate base.

▼ 8. Which acid–conjugate base pair is correct?
   a. H_3O^+, H_2O
   b. HSO_4^-, H_2SO_4
   c. OH^-, H_2O
   d. SO_4^{2-}, H_2SO_4

▼ 9. Which of the following is not a polyprotic acid?
   a. H_2SO_4
   b. CH_3COOH
   c. H_2CO_3
   d. H_3PO_4

▼ 10. In pure water, the value of the ionic product, K_w is numerically equal to:
   a. $[H_3O^+]\,[OH^-]/[H_2O]$
   b. $[H_2O] / [OH^-]\,[H_3O^+]$
   c. $[H_3O^+]^2$
   d. $[H_3O^+]\,[OH^-]^2$

▼ 11. The concentration of hydrogen ions in a 2 mol L^{-1} solution of NaOH is:
   a. 2 mol L^{-1}
   b. 5 mol L^{-1}
   c. 2×10^{-15} mol L^{-1}
   d. 5×10^{-15} mol L^{-1}

▼ 12. What is the pH of a 1.2 mol L^{-1} solution of HNO_3?
   a. 1.2
   b. 0.079
   c. –0.079
   d. –1.2

▼ 13. The concentration of hydroxide ions in a solution of pH 5.4 is:
   a. 2.51×10^{-9} mol L^{-1}
   b. 3.98×10^{-6} mol L^{-1}
   c. 5.4×10^{-6} mol L^{-1}
   d. 2.51×10^{5} mol L^{-1}

▼ 14. The percentage ionisation of a 0.1 mol L^{-1} solution of acetic acid that has a pH of 2.876 is:
   a. 1.33%
   b. 3.4%
   c. 10.0%
   d. 28.76%

▼ 15. Which of the following statements regarding the ionisation of acids is true?
   a. A weak acid will have a large magnitude of K_a because a high percentage of the molecules will ionise.
   b. A strong acid will have a large magnitude of K_a because a high percentage of the molecules will ionise.
   c. A weak acid will have a small magnitude of K_a because a high percentage of the molecules will ionise.
   d. A strong acid will have a small magnitude of K_a because a low percentage of the molecules will ionise.

16.

Which of the following is not true when determining the K_a of monoprotic weak acids?

a. The concentration of H_3O^+ from the self-ionisation of water must be included.
b. The amount of acid that ionises is so small that it is ignored.
c. The concentration of the cation and anion formed in the ionisation are the same.
d. The concentration of the acid is on the bottom of the fraction.

17. In an experiment, 0.100 mol L^{-1} solutions of each of the following acids were prepared. Which acid solution would have the highest pH?

a. HF $K_a = 7.6 \times 10^{-4}$
b. CH_3COOH $K_a = 1.7 \times 10^{-5}$
c. HCN $K_a = 6.3 \times 10^{-10}$
d. HCOOH $K_a = 2 \times 10^{-4}$

18. In an experiment, 50 mL of 1.0 mol L^{-1} solutions of each of the following acids were prepared.

$HClO_2$ $pK_a = 1.95$
HCOOH $pK_a = 3.74$
HOI $pK_a = 10.64$

Which acid would require the greatest volume of 1.0 mol L^{-1} to neutralise it?

a. $HClO_2$
b. HCOOH
c. HOI
d. The four acids would require the same volume of NaOH.

19. Listed below are the K_b of four organic bases.

$C_2H_5NH_2$ $K_b = 4.3 \times 10^{-4}$
C_9H_7N $K_b = 2.5 \times 10^{-9}$
$(C_2H_5)_3N$ $K_b = 5.2 \times 10^{-4}$
$C_{18}H_{21}O_3N$ $K_b = 8.9 \times 10^{-7}$

The strongest acid in the list below is:

a. $C_2H_5NH_3^+$
b. $C_9H_7NH^+$
c. $(C_2H_5)_3NH^+$
d. $C_{18}H_{21}O_3NH^+$

20. Which of the following compounds is a basic salt?

a. NaOH
b. CH_3COONa
c. NH_4Cl
d. $NaNO_3$

Check Your Work Start Over