ROSEDALE ACADEMY

SCH4U Acid Base Practice

1. If a pH meter was placed in a 2.5 mol/L solution of sodium hydroxide the reading would be which of the following?
   a. 0.40
   b. 13.60
   c. 15.40
   d. -0.40
   e. 0.0

2. When equal quantities of nitric acid and methylamine are combined the solution is/has a
   a. neutral
   b. basic
   c. acidic
   d. pH = 7
   e. both a and d

3. If sodium acetate was dissolved in distilled water, which of the following could be added to make a functional buffer?
   a. potassium acetate
   b. acetic acid
   c. ammonia
   d. citric acid
   e. potassium citrate

4. Kw is which of the following?
   a. the equilibrium constant for water which is 1.0×10^{-14} at 25°C
   b. $K_a \times K_b$ for conjugate acid - base partners
   c. $[OH^-][H_3O^+]$ for any solution
   d. both a and b
   e. all of the above

5. When 45 mL of 0.65 mol/L acetic acid is added to 65 mL of 0.45 mol/L sodium hydroxide the resulting mixture is/has a(n)
   a. neutral
   b. basic
   c. acidic
   d. pH < 7
   e. both c and d

6. A small amount of NaOH(aq) is added to this buffer system

   $HCHO_2 + H_2O$ <=====> $H_3O^{1+} + CHO_2^{1-}$

   Which one of the following statements are true?
   a. the pH drops only a little since the equilibrium shifts right
   b. the pH rises only a little since the equilibrium shifts left
   c. the pH drops only a little since the equilibrium shifts left
   d. the pH rises only a little since the equilibrium shifts right
   e. the pH does not change since the buffer uses up all the HCl(aq)

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7. For carbonic acid (H_2CO_3) the Ka_1 =
   a. $[CO_3^{2-}][H_3O^{1+}]^2 / [H_2CO_3]$
   b. $[HCO_4^{2-}[H_3O^{1+}] / [H_2CO_3]$
   c. $[CO_3^{1-}][H_3O^{1+}]^2 / [H_2CO_3]$
   d. $[HCO_3^{1-}][H_3O^{1+}] / [H_2CO_3]$
   e. $[H_2CO_3] / [CO_3^{1-}][H^{1+}]^2$

8. If the Ka of a weak acid is 3.4×10^{-7}, the Ka of its conjugate base partner must be which of the following?
   a. 2.9×10^{-8}
   b. 6.46
   c. 7.54
   d. 3.1×10^{-7}
   e. 3.4×10^{-7}

9. If the pH of a basic solution at 25°C is 12.56, what is the pOH; and the $[H^{1+}]$, $[OH^{1-}]$ in mol/L?

10. If the pH of a solution at 25°C is 5.76, what is the pOH; and the $[H_3O^+]$, $[OH^-]$ in mol/L?

11. What is the initial concentration of a weak base with $K_b = 1.4 \times 10^{-11}$ and pH = 8.75?

12. What is the initial concentration of a weak monoprotic acid with $K_a = 2.7 \times 10^{-7}$ and pH = 5.35?