Chemistry 12

Acid-Base Part II Practice Test

Name:
Date:
Block:

<u>**Multiple Choice**</u>.

_____ 1. Which term does the following statement best describe? *A mixture of a weak acid and its conjugate base, each with distinguishing colours.*

    A. Buffer
    B. Titration
    C. Indicator
    D. Primary standard

_____ 2. Which of the following properties is true for a solution of KNO_3?

    A. It is neutral
    B. It is basic
    C. It is slightly basic
    D. It is slightly acidic

_____ 3. Which of the following salts will be basic?

    A. KCl
    B. NH_4Cl
    C. $KHSO_4$
    D. K_2HPO_4

_____ 4. A weak acid is titrated with a strong base using the indicator phenolphthalein to detect the end point. What is the approximate pH at the transition point?

    A. 7.0
    B. 8.0
    C. 9.0
    D. 10.0

_____ 5. What volume of 0.100M H_2SO_4 is needed to titrate 25.0 mL of 0.200M $NaOH$?

    A. 12.5 mL
    B. 25.0 mL
    C. 50.0 mL
    D. 100.0 mL

_____ 6. Which of the following titrations always results in pH = 7.0 at the equivalence point?

    A. A weak acid is titrated with a weak base
    B. A weak acid is titrated with a strong base
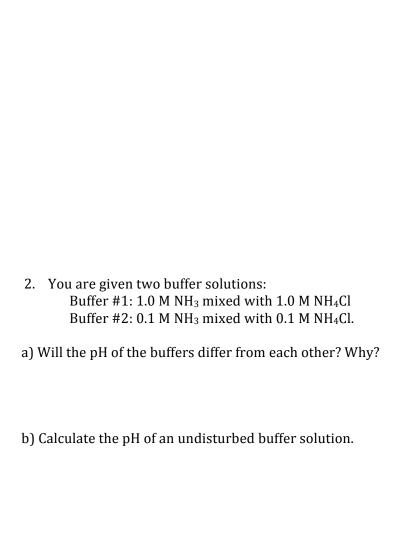   C. A strong acid is titrated with a weak base
    D. A strong acid is titrated with a strong base

_____ 7. Which of the following pairs of chemicals could be used to make a buffer solution?

    A. NH_3 and H_2O
    B. HCl and $NaCl$
    C. NH_3 and NH_4Cl
    D. CH_3COOH and HCl

_____ 8. When performing a titration experiment, the indicator must always have

    A. A distinct colour change at pH = 7.0
    B. The ability to change from colourless to pink
    C. A transition point that is close to the equivalence point
    D. An equivalence point that is close to the stoichiometric point

_____ 9. What is one of the Ka values for thymol blue?

    A. 1.6×10^{-9}
    B. 2.0×10^{-7}
    C. 1.0×10^{-7}
    D. 6.0×10^{-2}

_____ 11. Which of the following describes the net ionic equation for the hydrolysis of a $NaNO_2$ solution?

    A. $NaNO_2 \leftrightharpoons Na^+ + NO_2^-$
    B. $NO_2^- + H_2O \leftrightharpoons HNO_2 + OH^-$
    C. $Na^+ + 2\,H_2O \leftrightharpoons H_3O^+ + NaOH$
    D. $NaNO_2 + H_2O \leftrightharpoons NaOH + HNO_2$

_____ 12. What do a chemical indicator and a buffer solution typically both contain?

    A. A strong acid and its conjugate acid
    B. A strong acid and its conjugate base
    C. A weak acid and its conjugate acid
    D. A weak acid and its conjugate base

_____ 13. What is the approximate pH and K_a at the transition point for phenol red?

A.	pH = 6.6	$K_a = 3.0 \times 10^{-7}$
B.	pH = 7.3	$K_a = 1.0 \times 10^{-14}$
C.	pH = 7.3	$K_a = 5.0 \times 10^{-8}$
D.	pH = 8.0	$K_a = 1.0 \times 10^{-8}$

Problems:
1. Calculate the pH of 0.60M NH₄F.

2. You are given two buffer solutions:
   Buffer #1: 1.0 M NH_3 mixed with 1.0 M NH_4Cl
   Buffer #2: 0.1 M NH_3 mixed with 0.1 M NH_4Cl.

a) Will the pH of the buffers differ from each other? Why?

b) Calculate the pH of an undisturbed buffer solution.

c) Which buffer solution would be more effective? Explain your answer.

3. 40.0 mL of 0.10 M NH_3 is titrated with 0.20 M $HClO_4$. Calculate the pH of the solution produced in the reaction flask at the following points:
   a) At 2.00mL before midpoint.

b) 5.00 mL past equivalence point.

c) What indicator would be most appropriate for this titration? Explain your answer.