

EXAM PRACTICE QUESTIONS

Chapter 19

1. Calculate the $[\text{H}_3\text{O}^+]$ of a solution that is 0.100 M in HOCl and 0.0300 M in NaOCl?

Answer: 1.17×10^{-8}

2. A solution is made by combining 500 mL of 0.10 M HF with 300 mL of 0.15 M NaF. Calculate the pH of the solution

Answer: 3.10

3. What is the pH of a solution containing aqueous ammonia and ammonium nitrate in a molar ratio of 5.0 to 3.0?

Answer: 9.48

4. Indicate which of the following combinations would produce a buffer.

A) HCN and KCN _____

B) HClO_4 and NH_4ClO_4 _____

C) NH_3 and NH_4Br _____

D) KI and HI _____

Answer: A) yes B) no C) yes D) no

5. If 0.040 moles of solid NaOH is added to 1.0 L of a solution that is 0.1 M NH_3 and 0.20 M NH_4Cl , what will be the pH of the resulting solution? Assume no volume change due to the addition of the NaOH.

Answer: 9.20

6. What is the pH of a solution that is 0.15 M in HOCl and 0.25 M NaOCl after 0.050 mole of HCl has been bubbled into the solution? Assume no volume change.

Answer: 7.46

7. Calculate the mass of solid NaCH_3COO that must be added to 1.0 L of 0.20 M CH_3COOH solution so that the pH of the resulting solution will be 5.00. Assume no volume change due to addition of solid NaCH_3COO .

Answer: 30 g

8. It is desired to buffer a solution at $\text{pH} = 4.30$. What molar ratio of CH_3COOH to NaCH_3COO should be used.

Answer: 2.8

9. Calculate the pH for a buffer solution prepared by mixing 100. mL of 0.60 M NH_3 and 200. mL 0.45 M of NH_4Cl .

Answer: 9.08

10. The nonionized form (HIn) of an acid indicator is yellow, and its anion is blue. The K_a of this indicator is 10^{-5} . What will be the color of the indicator in a solution of pH 3?

Answer: yellow

11. What is the pH of the solution resulting from the addition of 30.0 mL of 0.200 M HClO_4 to 20.0 mL of 0.150 M NaOH ?

Answer: 1.22

12. When a weak base is titrated with a strong acid, the pH at the equivalence point is **always** (< 7 , $= 7$, > 7) _____.

Answer: < 7

13. What is the pH at the equivalence point in the titration of 50.0 mL of 0.100 M hydrofluoric acid with 0.100 M sodium hydroxide?

Answer: 7.92

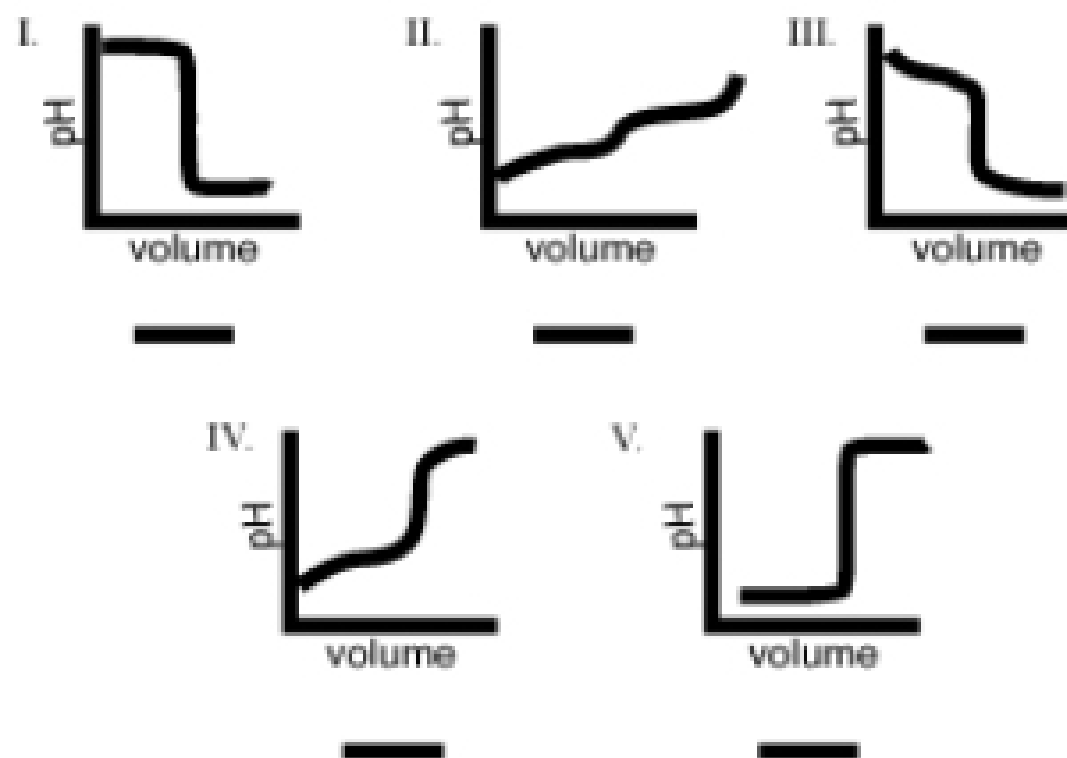
14. At the equivalence point, indicate whether the pH of the resulting solution is acidic, basic or neutral for titrations of each of the following pairs of aqueous acids and bases.

- A) HClO_4 with KOH _____
B) $\text{Ca}(\text{OH})_2$ with HNO_3 _____
C) CH_3COOH with LiOH _____
D) HCN with NH_3 _____
E) HI with NH_3 _____

Answer: A) neutral B) neutral C) basic D) basic E) acidic

15. Match the titrations described below (A-E) to one of the titrations curves depicted below.

- A) NaOH added to HF
B) HCl added to NH_3
C) HNO_3 added to KOH
D) KOH added to HBr
E) NH_3 is added to HNO_2



Answer: I-C, II-E, III-B, IV-A, V-D