

Exam 3 Practice Sheet
Palmer Graves, Instructor

MULTIPLE CHOICE

1. What is the pOH of a 0.015 M solution of barium hydroxide?
 - a) 12.18
 - b) 12.48
 - c) 1.52
 - d) 1.82
 - e) 10.35
2. What is the concentration (in M) of hydronium ions in a solution at 25°C with a hydroxide ion concentration of 2.31×10^{-4} M?
 - a) 4.33×10^{-11}
 - b) 2.31×10^{10}
 - c) 9.72×10^{-9}
 - d) 1.01×10^{-5}
 - e) 2.31×10^{-18}
3. The pH of a 0.025 M HI solution at 25°C is _____.
 - a) 1.06
 - b) 1.60
 - c) 3.69
 - d) 4.12
 - e) 12.40
4. HZ is a weak acid. An aqueous solution of HZ is prepared by dissolving 0.020 mol of HZ in sufficient water to yield 1.00 L of solution. The pH of the solution was 4.93 at 25°C. The K_a of HZ is _____.
 - a) 1.2×10^{-5}
 - b) 7.0×10^{-9}
 - c) 1.4×10^{-10}
 - d) 9.9×10^{-2}
 - e) 2.8×10^{-12}
5. What is the % ionization of hypochlorous acid (HClO) in a 0.015 M aqueous solution of HClO at 25°C? ($K_a = 3.0 \times 10^{-8}$)
 - a) 4.5×10^{-8}
 - b) 14
 - c) 2.1×10^{-5}
 - d) 0.14
 - e) 1.4×10^{-3}
6. The K_a of HClO is 3.0×10^{-8} . What is the pH at 25°C of an aqueous solution that is 0.020 M in HClO?
 - a) +2.45
 - b) -2.45
 - c) -9.22
 - d) +9.22
 - e) +4.61

7. The pH of a 0.10 M solution of a weak base is 9.82. What is the K_b for this base?
- 2.1×10^{-4}
 - 4.3×10^{-8}
 - 8.8×10^{-8}
 - 6.6×10^{-4}
 - 2.0×10^{-5}
8. K_a for HX is 7.5×10^{-12} . What is the pH of a 0.15 M solution of NaX?
- 7.87
 - 1.85
 - 5.97
 - 8.03
 - 12.15
9. The pH of a 0.15 M aqueous solution of NaZ (the sodium salt of HZ) is 10.7. What is the K_a for HZ?
- 1.6×10^{-5}
 - 6.0×10^{-9}
 - 8.9×10^{-4}
 - 1.3×10^{-12}
 - 3.3×10^{-8}
10. The K_a of acetic acid is 1.7×10^{-5} . The pH of a buffer prepared by combining 50.0 mL of 1.00 M potassium acetate and 50.0 mL of 1.00 M acetic acid is _____.
- 1.70
 - 0.85
 - 3.40
 - 4.77
 - 2.38
11. Calculate the pH of a solution prepared by dissolving 0.37 mol of formic acid (HCO_2H) and 0.23 mol of sodium formate (NaCO_2H) in 1.00 L of solution. $K_a = 1.8 \times 10^{-4}$ for formic acid.
- 2.09
 - 10.46
 - 3.54
 - 2.30
 - 3.95
12. Consider the titration of 25.00 mL of 0.723 M HClO_4 with 0.273 M KOH. The H_3O^+ concentration after addition of 10.0 mL of KOH is _____ M.
- 0.438
 - 1.00×10^{-7}
 - 0.723
 - 2.81×10^{-13}
 - 0.273
13. Consider the titration of 25.0 mL of 0.723 M HClO_4 with 0.273 M KOH. The H_3O^+ concentration after addition of 66.2 mL of KOH is _____ M.
- 0.439
 - 1.00×10^{-7}
 - 0.723
 - 2.81×10^{-13}
 - 0.273

14. An initial pH of 13.00, an equivalence point at pH 7.0, and a relatively long, nearly vertical middle section correspond to a titration curve for _____.
- strong acid titrated by strong base
 - strong base titrated by strong acid
 - weak acid titrated by strong acid
 - weak base titrated by strong acid
 - weak base titrated by weak acid
15. The pH of a solution prepared by mixing 45 mL of 0.183 M KOH with 65 mL of 0.145 M HCl is _____.
- 1.31
 - 2.92
 - 0.74
 - 1.97
 - 70.145
16. Consider an experiment where 35.0 mL of 0.175 HOAc is titrated with 0.25 M NaOH. What is the pH at the equivalence point of this titration? The K_a for HOAc is 1.8×10^{-5} .
- 5.12
 - 2.87
 - 11.13
 - 8.88
 - 4.74
17. 50.50 mL of 0.116 M HF is titrated with 0.1200 M NaOH. How many mL of the base are required to reach the equivalence point? (K_a for HF is 6.8×10^{-4})
- 101
 - 50.5
 - 52.7
 - 24.2
 - 48.8
18. 50.50 mL of 0.116 M HF is titrated with 0.1200 M NaOH. What is the pH when 25.00 mL of base have been added? (K_a for HF is 6.8×10^{-4})
- 5.118
 - 3.146
 - 6.168
 - 3.547
 - 3.189
19. 50.50 mL of 0.116 M HF is titrated with 0.1200 M NaOH. What is the pH at the equivalence point? (K_a for HF is 6.8×10^{-4})
- 13.064
 - 7.000
 - 7.969
 - 12.771
 - 1.229
20. 50.50 mL of 0.116 M HF is titrated with 0.1200 M NaOH. What is the pH after 50.50 mL of base have been added? (K_a for HF is 6.8×10^{-4})
- 7.000
 - 11.300
 - 12.778
 - 8.119
 - 4.631

21. 65.50 mL of 0.161 M HF is titrated with 0.1200 M NaOH. What is the pH when 25.00 mL of base have been added? (K_a for HF is 6.8×10^{-4})
- a) 3.547
 - b) 7.131
 - c) 6.168
 - d) 2.767
 - e) 5.118
22. 65.50 mL of 0.161 M HF is titrated with 0.1200 M NaOH. What is the pH at the equivalence point? (K_a for HF is 6.8×10^{-4})
- a) 7.229
 - b) 7.000
 - c) 13.064
 - d) 12.771
 - e) 8.002
23. 65.50 mL of 0.161 M HF is titrated with 0.1200 M NaOH. What is the pH after 65.50 mL of base have been added? (K_a for HF is 6.8×10^{-4})
- a) 12.778
 - b) 7.000
 - c) 3.634
 - d) 8.119
 - e) 4.631

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