YUKON CHEMISTRY 12 (MCH--12) · UNIT C · 25 QUESTIONS

Solubility and Acid-Base Equilibria — Practice Test

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 **A saturated solution is one in which**

- A. no solute has dissolved
- B. the solute will never dissolve, no matter how long you stir it or how much you heat the mixture
- C. the solution is boiling
- D. the maximum amount of solute is dissolved at that temperature

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2 **In a saturated solution with excess solid present, the solid is**

- **A** no longer dissolving at all
- **B** dissolving and precipitating at equal rates
- **C** only precipitating
- **D** only dissolving

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3 **The solubility product constant, K_{sp}, for**
$AgCl(s) \rightleftharpoons Ag^+(aq) + Cl^-(aq)$
is

- **A** $K_{sp} = \underline{[Ag^+]}$
- **B** $K_{sp} = [AgCl]$
- **C** $K_{sp} = [Ag^+][Cl^-]$
- **D** $K_{sp} = \underline{1}$

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4 **For $PbI_2(s) \rightleftharpoons Pb^{2+}(aq) + 2I^-(aq)$, the K_{sp} expression is**

- **A** $K_{sp} = [Pb^{2+}][I^-]^2$
- **B** $K_{sp} = [Pb^{2+}][I^-]$
- **C** $K_{sp} = \underline{[Pb^{2+}]}$
- **D** $K_{sp} = [Pb^{2+}][I^-]^3$

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5 **If the molar solubility of AgCl is 1.3×10^{-5} mol/L, then $[Ag^+]$ in a saturated solution, in mol/L, is**

- **A** 1.3×10^{-5}
- **B** 2.6×10^{-5}
- **C** 6.5×10^{-6}
- **D** 1.7×10^{-10}

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6 The K_{sp} of AgCl is 1.8×10^{-10}. Its molar solubility, in mol/L, is about

- **A** 1.8×10^{-10}
- **B** 3.6×10^{-10}
- **C** 9.0×10^{-11}
- **D** 1.3×10^{-5}

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7 A salt MX_2 has $K_{sp} = 4.0 \times 10^{-12}$. Its molar solubility, in mol/L, is

- **A** 2.0×10^{-6}
- **B** 4.0×10^{-12}
- **C** 1.0×10^{-4}
- **D** 1.6×10^{-11}

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8 **Adding NaCl to a saturated solution of AgCl will**

A increase the solubility of AgCl

B decrease the solubility of AgCl by the common ion effect

C have no effect on the solubility of AgCl

D change the K_{sp} of AgCl

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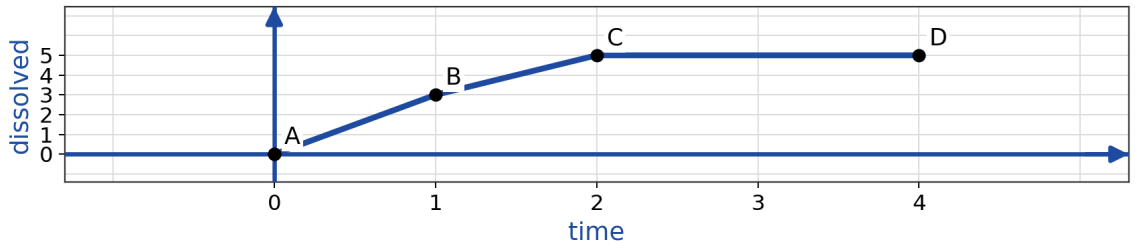
9 **The graph shows the amount of solid dissolved against time. Points are (0, 0), (1, 3), (2, 5), and (4, 5). The flat section shows the solution has become**



- **A** dilute
- **B** saturated
- **C** unsaturated
- **D** boiling

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10 **A strong acid differs from a weak acid in that a strong acid**

A ionizes almost completely in water

B ionizes only slightly in water

C always has a pH above 7

D never conducts electricity

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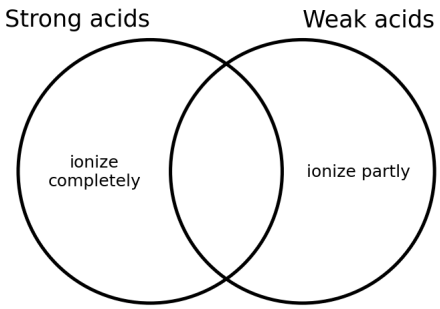
11 **The diagram shows two sets: strong acids and weak acids. Which property belongs in the overlap of both sets**



- **A** ionize completely
- **B** ionize only slightly
- **C** have a pH above 7
- **D** donate hydrogen ions in water

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12 **A solution with $[H_3O^+] = 1.0 \times 10^{-4}$ mol/L has a pH of**

- **A** 2
- **B** 10
- **C** 4
- **D** 12

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13 **A solution with pH 4 has a pOH of**

- **A** 4
- **B** 7
- **C** 14
- **D** 10

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14 **A solution with $[OH^-] = 0.010$ mol/L has a pH of**

- **A** 2
- **B** 12
- **C** 7
- **D** 10

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15 **The pH of a 0.0010 mol/L HCl(aq) solution is**

- **A** 1
- **B** 11
- **C** 3
- **D** 13

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16 **The pH of a 0.020 mol/L NaOH(aq) solution, to the nearest hundredth, is**

A 12.30

B 11.30

C 12.70

D 13.30

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17 **If the pH of a solution falls by 2, its hydronium ion concentration**

A decreases by a factor of 100

B increases by a factor of 100

C increases by a factor of 2

D decreases by a factor of 2

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18 **The acid ionization constant, K_a, is larger for**

- **A** a stronger weak acid
- **B** a weaker weak acid
- **C** a stronger weak base
- **D** a solution with a higher pH

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19 **A 0.10 mol/L solution of a weak acid, HX, has a pH of 3.00. The K_a of HX is approximately**

- **A** 1.0×10^{-3}
- **B** 1.0×10^{-7}
- **C** 1.0×10^{-2}
- **D** 1.0×10^{-5}

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20 **Ethanoic acid has $K_a = 1.8 \times 10^{-5}$. The pH of a 0.10 mol/L solution, to the nearest hundredth, is**

- A 1.87
- B 3.87
- C 2.87
- D 4.87

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21 **Ammonia, NH_3, has Kb = 1.8×10^{-5}. The pH of a 0.10 mol/L solution, to the nearest hundredth, is**

- A 9.13
- B 10.13
- C 12.13
- D 11.13

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22 For a conjugate acid-base pair, $K_a \times Kb$ equals

- A $Kw = 1.0 \times 10^{-7}$
- B $Kw = 1.0 \times 10^{-14}$
- C 14.00
- D 7.00

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23 The K_a of $NH_4^+(aq)$ is 5.6×10^{-10}. The Kb of $NH_3(aq)$ is approximately

- A 5.6×10^{-10}
- B 1.0×10^{-14}
- C 1.8×10^{-5}
- D 5.6×10^{-4}

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24 **A buffer solution resists changes in pH because it contains**

- **A** a weak acid and its conjugate base in comparable amounts
- **B** a strong acid and a strong base in equal amounts
- **C** only a weak acid
- **D** only a salt of a strong acid

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25 **A buffer contains 0.30 mol/L HF and 0.30 mol/L NaF. With $K_a = 3.5 \times 10^{-4}$ for HF, its pH is about**

- **A** 2.46
- **B** 3.46
- **C** 4.46
- **D** 5.46

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ANSWER KEY

1. D
2. B
3. C
4. A
5. A
6. D
7. C
8. B
9. B
10. A
11. D
12. C
13. D
14. B
15. C
16. A
17. B
18. A
19. D
20. C
21. D
22. B
23. C
24. A
25. B

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