

## HW02 - Water, Acids & Bases II

1 7 points

Select all seven strong acids below:

- HF
- HCl
- HI
- HBr
- H<sub>2</sub>SO<sub>4</sub>
- HAt
- HClO<sub>4</sub>
- HNO<sub>3</sub>
- NaOH
- HClO
- HClO<sub>3</sub>

2 5 points

What is the pH of a 0.044 M HI solution?

Note: Report your answer to two sig figs (pH = X.XX)

Type your answer...

3 5 points

What is the [OH<sup>-</sup>] when 0.0023 moles of Ca(OH)<sub>2</sub> are placed in 654 mL water? Assume complete dissociation of Ca(OH)<sub>2</sub>.

- 0.0035 M
- .0070 M
- 2.15 M
- 3.5 × 10<sup>-6</sup> M
- 12.0 M

4 5 points

Use the data [here](#) to rank the following weak acids from **weakest** to **strongest**.

HIO  
CH<sub>3</sub>COOH  
HCN  
HF  
HNO<sub>2</sub>

- HIO < HCN < CH<sub>3</sub>COOH < HNO<sub>2</sub> < HF
- HCN < HIO < CH<sub>3</sub>COOH < HNO<sub>2</sub> < HF
- HNO<sub>2</sub> < HF < HIO < HCN < CH<sub>3</sub>COOH
- HF < HNO<sub>2</sub> < CH<sub>3</sub>COOH < HCN < HIO

5 5 points

A 0.5 M sample of a weak acid, HA<sub>1</sub>, has a pH = 4.24. A 0.5 M sample of another weak acid, HA<sub>2</sub>, has a pH = 5.66. Which weak acid has the larger K<sub>a</sub> value?

- HA<sub>2</sub>
- HA<sub>1</sub>
- Both will have the same value of K<sub>a</sub>

6 5 points

The generic weak acid HA has a percent ionization equal to 10.8% at a 0.025 M concentration. What is the pH?

Note: Report your answer to two sig figs (pH = X.XX)

Type your answer...

7 2 points

Which of the following represents a generic neutralization reaction of a strong acid and strong base?

- Acid + Base → Salt + Water
- Acid + Base → Weak Base + Water
- Acid + Base → Weak Acid + Water
- Acid + Base → Acid + Water
- Acid + Water → Base + Salt
- Base + Water → Acid + Salt

8 5 points

Consider the classic strong acid/base neutralization reaction of hydrochloric acid (HCl) and sodium hydroxide (NaOH) from HW 01.



How many mL of 0.0448 M NaOH are needed to neutralize 32.0 mL of 0.0291 M HCl?

- 36.3 mL
- 20.8 mL
- 24.8 mL
- 33.7 mL
- 27.1 mL
- 49.3 mL

9 5 points

A titration experiment is set up to fully neutralize a strong acid (HCl) using a strong base (NaOH). The HCl has a concentration of 0.01 M and a volume of 100 mL. The NaOH also has a concentration of 0.01 M. What volume of NaOH is needed to fully neutralize the HCl?

- 50 mL
- 200 mL
- 100 mL
- 250 mL
- 20 mL
- 500 mL

10 5 points

Barium hydroxide is a strong base that dissociates based on the following reaction:



What volume of 0.005 M HCl (strong acid) is needed to fully neutralize a 500 mL 0.005 M Ba(OH)<sub>2</sub> solution?

- 1.00 L
- 500 mL
- 1.00 mL
- 750 mL
- 250 mL
- 2.50 L

11 2 points

What is the pH at the equivalence point of a titration involving a strong acid titrant and strong base analyte?

- pH = 7  
 pH < 7  
 pH > 7

12 2 points

What is the pH at the equivalence point of a titration involving a strong acid titrant and a weak base analyte?

- pH = 7  
 pH < 7  
 pH > 7

13 2 points

What is the pH at the equivalence point of a titration involving a strong base titrant and a weak acid analyte?

- pH > 7  
 pH = 7  
 pH < 7

14 5 points

A titration is performed to determine the concentration of a HClO weak acid solution. It takes 12.84 mL 0.1205 M LiOH to neutralize 56.84 mL HClO. What is the concentration (in M) of the original HClO solution? **Report your answer to 4 decimal places.**

Type your answer...

15 5 points

Neutralizing an olympic size swimming pool is conceptually very similar to performing a massive titration experiment. Suppose a 700 thousand gallon swimming pool has a pH = 9.33 which is a bit too high for swimming. Calculate how many gallons of 10 M HCl (strong acid) it will take to neutralize the swimming pool to pH = 7. Report your answer to exactly 2 significant figures.

Type your answer...

16 5 points

What atmospheric component is responsible for the natural acidity of rain?

- Carbon dioxide  
 Sulfuric acid  
 Ozone  
 Oxygen

17 5 points

Which two methods can be used to make sea water drinkable?

- distillation  
 osmosis  
 reverse osmosis  
 flocculation

18 5 points

The pH of rain water falling through an unpolluted atmosphere is closest to...

- 4.8  
 5.4  
 7.0  
 8.7

19 5 points

Most aquatic life in lakes cannot survive in water with a pH less than...

- 5  
 7  
 8  
 14

20 5 points

The acid neutralizing capacity of a lake or stream most often derives from the presence of \_\_\_\_\_ in the surrounding soil or rock.

- CaCO<sub>3</sub>  
 HNO<sub>3</sub>  
 NaOH  
 H<sub>3</sub>O<sup>+</sup>

21 5 points

It takes 13.7 mL 1.50 M NaOH to neutralize a 150 mL weak acid solution. How many moles of weak acid were in the original weak acid solution?

- 0.137 moles  
 109 moles  
 1.37 moles  
 0.225 moles  
 3.08 moles  
 0.0206 moles

22 5 points

When Lake Travis is full, it holds about 369 billion gallons. If we pretend that Lake Travis has a neutral pH (pH = 7), approximately how many moles of H<sup>+</sup> are present in the lake? 1 gal = 3.785 L

- 1.40 x 10<sup>5</sup> moles  
 3.69 x 10<sup>4</sup> moles  
 3.69 x 10<sup>9</sup> moles  
 1.39 x 10<sup>8</sup> moles  
 138 moles  
 4.65 x 10<sup>8</sup> moles  
 1.00 x 10<sup>7</sup> moles