

HW02

Question 1

1 pts

Select all seven strong acids below:

- HF
- HCl
- HI
- HBr
- H₂SO₄
- HAT
- HClO₄
- HNO₃
- NaOH
- HClO
- HClO₃

Question 2

1 pts

What is the pH of a 0.044 M HI solution?

Note: HI is a strong acid. Report your answer to two sig figs (pH = X.XX)

Question 3

1 pts

What is the [OH⁻] when 0.0023 moles of Ca(OH)₂ are placed in 654 mL water? Assume complete dissociation of Ca(OH)₂.

- 0.0035 M
- .0070 M
- 2.15 M
- 3.5 x 10⁻⁶ M
- 12.0 M

Question 4

1 pts

Use the data [here](https://gchem.cm.utexas.edu/data/section2.php?target=ka-kb-constants.php) (<https://gchem.cm.utexas.edu/data/section2.php?target=ka-kb-constants.php>) to rank the following weak acids from **weakest to strongest**.

HIO

CH₃COOH

HCN

HF

HNO₂

HIO < HCN < CH₃COOH < HNO₂ < HF

HCN < HIO < CH₃COOH < HNO₂ < HF

HNO₂ < HF < HIO < HCN < CH₃COOH

HF < HNO₂ < CH₃COOH < HCN < HIO

Question 5

1 pts

A 0.5 M sample of a weak acid, HA₁, has a pH = 4.24. A 0.5 M sample of another weak acid, HA₂, has a pH = 5.66. Which weak acid has the larger K_a value?

- HA₂
- HA₁
- Both will have the same value of K_a

Question 6

1 pts

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)

Question 7

1 pts

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

Question 8

1 pts

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

Question 9

1 pts

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

Question 10

1 pts

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)₂ solution?

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

Question 11

1 pts

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

Question 12

1 pts

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

Question 13

1 pts

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

Question 14

1 pts

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.

Question 15

1 pts

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

- Carbon dioxide
- Sulfuric acid
- Ozone
- Oxygen

Question 16

1 pts

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

- distillation
- osmosis
- reverse osmosis
- flocculation

Question 17

1 pts

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

- 4.8
- 5.4
- 7.0
- 8.7

Question 18

1 pts

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

- 5
- 7
- 8
- 14

Question 19

1 pts

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

- CaCO₃
- HNO₃
- NaOH
- H₃O⁺

Question 20

1 pts

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⁺ are present in the lake?
1 gal = 3.785 L

- 1.40 x 10⁵ moles
- 3.69 x 10⁴ moles
- 3.69 x 10⁹ moles
- 1.39 x 10⁸ moles
- 138 moles
- 4.65 x 10⁸ moles
- 1.00 x 10⁻⁷ moles