

HW 01

Question 1

1 pts

Which of the following accurately explains a reason why water is so important for biology and chemistry?

- Water is a very large organic molecule capable of dissolving many other organic molecules
- The polar hydrogen bonds of water cause it to be a stable solid at room temperature
- Water is a nonpolar molecule with a low molecular weight, causing it to be easily vaporized at room temperature
- The polar hydrogen bonds of water cause it to be a liquid capable of dissolving many other polar solutes at room temperature

Question 2

1 pts

Which of the following explains why water is a liquid at room temperature?

- Water is a large organic molecule
- Water has a relatively small molecular weight
- Water is nonpolar
- Water contains hydrogen bonds

Question 3

1 pts

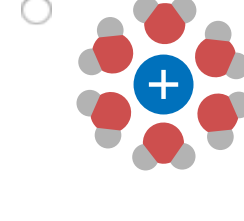
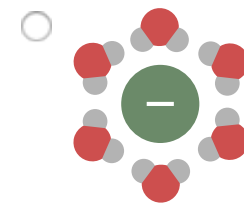
Which of the following best classifies pure water and pure sodium chloride (NaCl)?

- Pure Water: nonpolar covalent molecule
NaCl: ionic compound
- Pure Water: ionic compound
NaCl: ionic compound
- Pure Water: nonpolar covalent molecule
NaCl: polar covalent molecule
- Pure Water: polar covalent molecule
NaCl: ionic compound

Question 4

1 pts

Which of the following images represents a hydrated anion?



Question 5

1 pts

Which ions are produced by a base in an aqueous solution?

- OH⁻
- Na⁺
- SO₄²⁻
- Cl⁻

Question 6

1 pts

A solution is known to have a pH that is equal to 8.32. Which statement best describes this solution?

- the solution is slightly acidic
- the solution is very acidic
- the solution is very basic
- the solution is slightly basic

Question 7

1 pts

Which of the following concentrations represents a basic solution at room temperature?

- [OH⁻] = 1 x 10⁻⁷ M
- [OH⁻] = 1.8 x 10⁻⁴ M
- [OH⁻] = 1.8 x 10⁻⁹ M
- [OH⁻] = 1.8 x 10⁻¹¹ M

Question 8

1 pts

Rank the following solutions in order of increasing acidity:

Solution A: pH = 1.54

Solution B: pH = 7.00

Solution C: pH = 9.42

Solution D: pH = 5.31

- Solution C < Solution B < Solution D < Solution A
- Solution A < Solution D < Solution B < Solution C
- Solution A < Solution B < Solution C < Solution D
- Solution D < Solution A < Solution B < Solution C
- Solution B < Solution A < Solution D < Solution C

Question 9

1 pts

What is [H₃O⁺] when [OH⁻] = 3.3 x 10⁻⁹ M?

- 3.3 x 10⁻⁹ M
- 3.0 x 10⁻⁶ M
- 1.0 x 10⁻⁷ M
- 3.3 x 10⁻⁵ M

Question 10

1 pts

Every increase of one pH unit means...

- there are 10 times fewer H⁺ ions in solution
- the acidity is slightly increased
- there are 10 times more H⁺ ions in solution
- there are 10 fewer H⁺ ions in solution

Question 11

1 pts

The pH of lemon juice is approximately 2.40. At this pH, the hydronium (H₃O⁺) ion concentration is closest to which concentration?

- 0.38 M
- 2.5 x 10⁻¹² M
- 5.6 x 10⁻⁴ M
- 4.0 x 10⁻³ M

Question 12

1 pts

What is the pH of 0.023 M HCl? Note: 2 sig-figs in a logarithmic scale would be X.XX.

Question 13

1 pts

What is the pH of a 0.0156 M NaOH solution?

Note: Report 3 digits after the decimal.

Question 14

1 pts

The hydronium ion (H₃O⁺) concentration in a solution with pH 10 is _____ than the hydronium ion concentration in a solution with pH 13.

- 3 times more
- 300 times less
- 1000 times less
- 1000 times more
- 30 times more

Question 15

1 pts

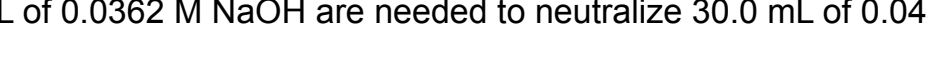
0.15 moles of strong acid are added to 0.15 moles weak base in aqueous solution. How would you describe the resulting solution?

- A weakly acidic salt
- A strongly acidic solution
- A weakly basic salt
- A strongly basic solution

Question 16

1 pts

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



How many mL of 0.0362 M NaOH are needed to neutralize 30.0 mL of 0.0438 M HCl ?

- 41.8 mL
- 36.3 mL
- 30.0 mL
- 27.1 mL
- 24.8 mL
- 33.7 mL