

Acid Base HW #1 name:

Svante Arrhenius explained how acids and bases might exist in 1887 with his theory. His idea was that when there is an excess of H^{+1} ions in solution, the solution is acid. He said that when there is an excess of OH^{-1} ions in solution that solution is a base.

Further, he stated that when an acid is combined to a base (in proper ratio) that a special kind reaction, called an acid base neutralization reaction occurs, which ALWAYS forms a salt plus water.

These ARE NOT double replacement reactions.

Salt, in chemistry, as you remember surely, is any ionic compound (a metallic cation plus a nonmetal anion). Water is always a liquid; water can't be dissolved in water. BALANCE THE EQUATIONS.

ex	Acid _(AQ) + Base _(AQ) → Salt _(AQ) + Water _(L)
1	$H_3PO_{4(AQ)} + Ca(OH)_{2(AQ)} \rightarrow$
2	$H_2SO_{3(AQ)} + NaOH_{(AQ)} \rightarrow$
3	$H_2CO_{3(AQ)} + \quad \quad \quad (AQ) \rightarrow Rb_2CO_{3(AQ)} +$
4	$HC_2H_3O_{2(AQ)} + NaOH_{(AQ)} \rightarrow$
5	$HNO_{3(AQ)} + \quad \quad \quad LiOH_{(AQ)} \rightarrow$
6	$H_2SO_{4(AQ)} + KOH_{(AQ)} \rightarrow$
7	$H_3PO_{4(AQ)} + Sr(OH)_{2(AQ)} \rightarrow$
8	$HNO_{2(AQ)} + NH_4OH_{(AQ)} \rightarrow$
9	$H_2CO_{3(AQ)} + KOH_{(AQ)} \rightarrow$
10	$HCl_{(AQ)} + NaOH_{(AQ)} \rightarrow$



Acid Base HW #2

Name

SHOW WORK including a formula. These are old regents exam questions.

Both sides.

When 50. milliliters of an HNO_3 solution is exactly neutralized by 150 milliliters of a 0.50 M solution of KOH , what is the concentration of HNO_3 ?

During a laboratory activity, 15.0 mL of hydrochloric acid $\text{HCl}_{(\text{AQ})}$ is exactly neutralized by 18.2 mL of 0.11 M sodium hydroxide $\text{NaOH}_{(\text{AQ})}$. Calculate the molarity of the $\text{HCl}_{(\text{AQ})}$ solution

A titration set up was used to determine the unknown molar concentration of a solution of NaOH. The acid is a 1.20 M HCl solution was used as the titration standard. The following data were collected.

	trial 1	trial 2	trial 3	trial 4
Amount of HCl used	10.0 mL	10.0 mL	10.0 mL	10.0 mL
Initial NaOH Buret Reading	10.0 mL	22.2 mL	33.2 mL	45.2 mL
Final NaOH Buret Reading	22.2 mL	33.2 mL	45.2 mL	57.7 mL

3. Calculate the Molarity of the unknown NaOH solution for all 4 trials. Proper SF & units!

Write the formula ONCE HERE →

do the math below (no formula needed below)

Trial 1	Trial 2
Trial 3	Trial 4

What is your average molarity for all 4 trials?

If the actual molarity is 1.05 M, what is your percent error (use a formula!)

Acid Base HW #3 name _____

two sides to this HW

Fill in this chart, carefully read Table M in your reference tables. In each box, write the color that the solution would be with that indicator. The first box is an example.

#	Solution pH	thymol blue	litmus	phenolphthalein	methyl orange
ex	1.5	yellow	red	colorless	red
1	3.1				
2	6.0				
3	9.4				
4	12.1				

5. At what pH would methyl orange, bromthymol blue, AND thymol blue all appear YELLOW?

- A. 1.9 B. 2.9 C. 4.7 D. 8.7

6. Which of these solutions could have a pH of 5.0?

- A. $\text{KOH}_{(\text{AQ})}$ B. $\text{CH}_3\text{COOH}_{(\text{AQ})}$ C. $\text{Ca}(\text{OH})_{2(\text{AQ})}$ D. $\text{NH}_3_{(\text{AQ})}$

7. A student finds that an unknown solution conducts electricity and turns litmus RED. It could be

- A. $\text{HNO}_3_{(\text{AQ})}$ B. $\text{NaOH}_{(\text{AQ})}$ C. $\text{Ca}(\text{OH})_{2(\text{AQ})}$ D. $\text{NH}_3_{(\text{AQ})}$

8. How many liters of 2.47 M HCl will neutralize 1.24 Liters of 3.33 M $\text{Mg}(\text{OH})_{2(\text{AQ})}$?

9. If 3.66 mL of H_2SO_4 neutralizes 2.11 mL of 0.95 M NaOH, what is molarity of the acid?

10. When you neutralize 1.95 L of 1.00 M nitric acid with 3.56 L of calcium hydroxide solution, what is the molarity of the base?

name

Acids Bases HW #4

1. Explain what an Arrhenius acid and Arrhenius Base is.
2. Write the chemical equation that explains why ammonia is a base, including the "arrows" that explains what happens to each species.
3. What is $\text{CH}_3\text{COOH}_{(\text{AQ})}$?
4. What is $\text{HC}_2\text{H}_3\text{O}_2_{(\text{AQ})}$?
5. What is the difference between $\text{CH}_3\text{COOH}_{(\text{AQ})}$ and $\text{HC}_2\text{H}_3\text{O}_2_{(\text{AQ})}$?
6. Your solution has a 12.0 pH. What indicators turn the right color? "A" is true. B is not true. X out the wrong colors with their indicator.

- A. litmus turns blue
- B. phenolphthalein turns colorless
- C. methyl orange turns red
- D. bromcresol green turns yellow
- E. thymol blue turns blue
- F. litmus turns blue
- G. methyl orange turns blue
- H. methyl orange turns yellow
- I. bromcresol green turns blue
- J. phenolphthalein turns pink
- K. bromthymol blue turns blue
- L. litmus turns blue

A	B	C	D
E	D	G	H
I	J	K	L

7. What are the four ways to describe an acid?

