

19. What is the term for a substance that can act as both an acid and a base?

amphoteric

Fill in the table

[H ⁺]	pH	[OH ⁻]	pOH	Acid, base, or neutral
4.1×10^{-3}	2.4	2.4×10^{-12}	11.6	acid
1.9×10^{-11}	10.7	5.3×10^{-4}	3.3	base
1.4×10^{-12}	11.8	7.0×10^{-3}	2.2 2.2	base
1.3×10^{-12}	1.9	7.7×10^{-13}	12.1	acid
1×10^{-7}	7	1×10^{-7}	7	neutral

Solve the following neutralization reaction problems.

SHOW ALL WORK FOR FULL CREDIT

1. If 50.0 ml of 1.00 M KOH are used in titrating 25.0 mL of HCl, what is the molarity of HCl?

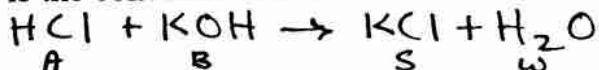


$$n = M \cdot V = (1.00 \text{ M KOH})(.0500 \text{ L KOH}) = .0500 \text{ mol KOH}$$

$$.0500 \text{ mol KOH} \times \frac{1 \text{ mol HCl}}{1 \text{ mol KOH}} = .0500 \text{ mol HCl}$$

$$M = \frac{n}{V} = \frac{.0500 \text{ mol HCl}}{.0250 \text{ L HCl}} = \boxed{2.00 \text{ M HCl}}$$

2. If 25.0 ml of a 0.400 M HCl solution is required to neutralize 55.0 ml of KOH solution, what is the concentration of the KOH solution?

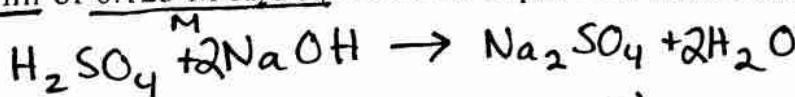


$$n = M \cdot V = (.400 \text{ M HCl})(.0250 \text{ L}) = .01 \text{ mol HCl}$$

$$.01 \text{ mol HCl} \times \frac{1 \text{ mol KOH}}{1 \text{ mol HCl}} = .01 \text{ mol KOH}$$

$$M = \frac{n}{V} = \frac{.01 \text{ mol KOH}}{.0550 \text{ L KOH}} = 0.1818 \text{ M} = \boxed{0.182 \text{ M KOH}}$$

3. How many ml of 0.125 M H₂SO₄ would be required to neutralize 20.0 ml of 0.140 M NaOH?



$$n = M \cdot V = (.140 \text{ M NaOH})(.0200 \text{ L NaOH}) = .0028 \text{ mol NaOH}$$

$$.0028 \text{ mol NaOH} \times \frac{1 \text{ mol H}_2\text{SO}_4}{2 \text{ mol NaOH}} = .0014 \text{ mol H}_2\text{SO}_4$$

$$V = \frac{n}{M} = \frac{.0014 \text{ mol H}_2\text{SO}_4}{.125 \text{ M}} = .0112 \text{ L H}_2\text{SO}_4 = \boxed{11.2 \text{ mL H}_2\text{SO}_4}$$

Name: Key
 Date:
 Period:

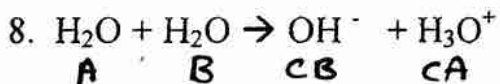
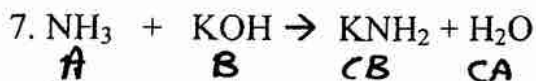
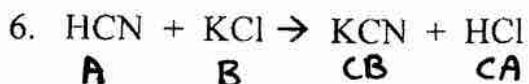
Review-Acids and Bases

Name these acids and bases:

- | | |
|-----------------------------|---------------|
| <u>Carbonic Acid</u> | 1. H_2CO_3 |
| <u>aluminum hydroxide</u> | 2. $Al(OH)_3$ |
| <u>Nitrous acid</u> | 3. HNO_2 |
| <u>hydrofluoric acid</u> | 4. HF |
| <u>hydrophosphoric acid</u> | 5. H_3P |

CO_3 = carbonate
OH = hydroxide
NO_2 = nitrite
F = fluoride
P = phosphide

Label the Acid, Base, Conjugate Acid, Conjugate Base:



What is the conjugate base?

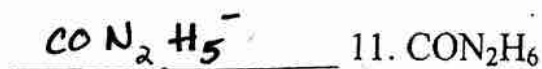
Is it an ACID or a BASE?



acid 14. pH = 4



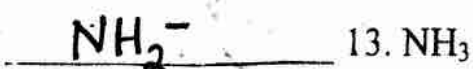
base 15. tastes bitter



acid 16. releases H^{+} ions



neutral 17. pH = 7



base 18. pH = 10