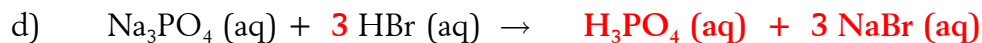
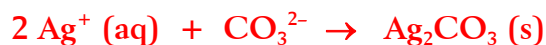
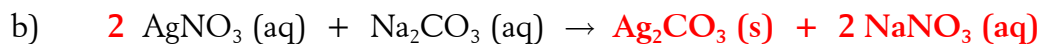
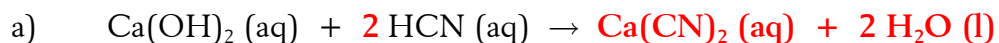


4. For each reaction shown below, determine if a reaction occurs. If so, write a balanced net ionic equation. If not, write "No Rxn".

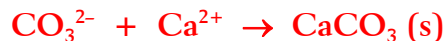


5. Write balanced net ionic equations for each reaction described below:

a) Solid sodium hydroxide pellets are dropped in solution of sulfuric acid.



b) Aqueous solutions of ammonium carbonate and calcium chloride are mixed together.



6. How many grams of solute are present in 50.0 mL of 1.33 M CuSO₄ solution?

$$50.0 \text{ mL} \times \frac{1.33 \text{ mol CuSO}_4}{1000 \text{ mL}} \times \frac{159.55 \text{ g}}{1 \text{ mol}} = 10.6 \text{ g CuSO}_4$$

7. How many mL of 1.50 M Na₃PO₄ solution contains 5.00 g of solute?

$$5.00 \text{ g} \times \frac{1 \text{ mol}}{164.0 \text{ g}} \times \frac{1000 \text{ mL}}{1.50 \text{ mol}} = 20.3 \text{ mL}$$

8. What volume of 1.50 M solution of sucrose solution is required to prepare 425 mL of 0.100 M solution?

$$V_2 = \frac{M_1 V_1}{M_2} = \frac{(0.100 \text{ M})(425 \text{ mL})}{1.50 \text{ M}} = 28.3 \text{ mL}$$

9. Glacial acetic acid has a density of 1.049 g/mL at 25°C. What is the molarity of a solution of acetic acid prepared by dissolving 10.00 mL of glacial acetic acid at 25°C in enough water to make 100.0 mL of solution?

$$10.00 \text{ mL} \times \frac{1.049 \text{ g}}{1 \text{ mL}} \times \frac{1 \text{ mol}}{60.04 \text{ g}} \times \frac{1}{0.1000 \text{ L}} = 1.747 \text{ M}$$

10. How many mL of 2.15 M KOH are required to titrate 25.0 mL of 0.300 M HC₂H₃O₂?



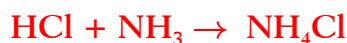
$$25.0 \text{ mL HC}_2\text{H}_3\text{O}_2 \times \frac{0.300 \text{ mol}}{1000 \text{ mL}} \times \frac{1 \text{ mol KOH}}{1 \text{ mol HC}_2\text{H}_3\text{O}_2} \times \frac{1000 \text{ mL}}{2.15 \text{ mol}} = 3.49 \text{ mL KOH}$$

11. Determine the concentration of a Ba(OH)₂ solution, if 15.0 mL of the base are required to titrate 25.0 mL of 0.525 M HNO₃ to an end point.



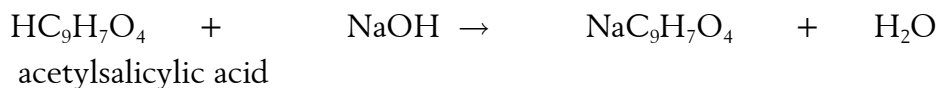
$$25.0 \text{ mL HNO}_3 \times \frac{0.525 \text{ mol}}{1000 \text{ mL}} \times \frac{1 \text{ mol Ba(OH)}_2}{2 \text{ mol HNO}_3} \times \frac{1}{0.0150 \text{ L}} = 0.438 \text{ M}$$

12. A 28.7 mL sample of 1.02 M HCl is required to neutralize the NH₃ present in a 5.00 mL sample of window cleaner solution. What is the molarity of NH₃ in this solution?



$$28.7 \text{ mL HCl} \times \frac{1.02 \text{ mol}}{1000 \text{ mL}} \times \frac{1 \text{ mol NH}_3}{1 \text{ mol HCl}} \times \frac{1}{5.00 \times 10^{-3} \text{ L}} = 5.85 \text{ M}$$

13. The acetylsalicylic content of aspirin can be determined by titration of the acid with base as shown below:



- 23.0 mL of 0.0770 M NaOH solution was used to neutralize the acid in a 500-mg aspirin tablet. What is the percent of acetylsalicylic acid in the aspirin tablet?



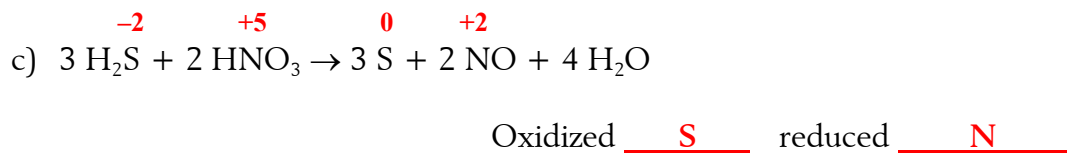
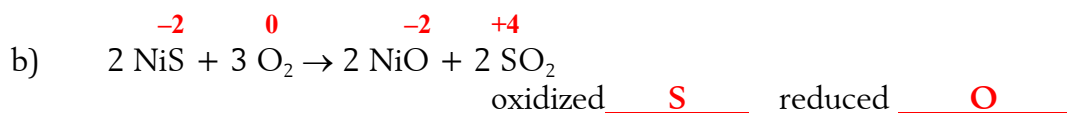
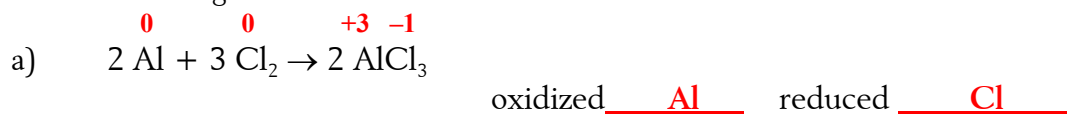
$$23.0 \text{ mL NaOH} \times \frac{0.0770 \text{ mol}}{1000 \text{ mL}} \times \frac{1 \text{ mol HC}_9\text{H}_7\text{O}_4}{1 \text{ mol NaOH}} \times \frac{180.1 \text{ g}}{1 \text{ mol}} \times \frac{10^3 \text{ mg}}{1 \text{ g}} = 319 \text{ mg HC}_9\text{H}_7\text{O}_4$$

$$\% \text{ Acid} = \frac{319 \text{ mg}}{500 \text{ mg}} \times 100 = 63.8\%$$

14. In the compounds below, assign oxidation numbers to the underlined element:

- a) $\text{H}_3\underline{\text{P}}\text{O}_2$ P : +1 d) $\text{H}_2\underline{\text{C}}\text{O}$ C : 0
- b) $\text{Na}_2\underline{\text{C}}_2\text{O}_4$ C : +3 e) $\underline{\text{Cl}}\text{F}_4^-$ Cl : +3
- c) $\text{Mn}\underline{\text{S}}\text{O}_4$ S : +6 g) $\text{Al}\underline{\text{H}}_3$ H : -1

15. Identify which substance is oxidized and which substance is reduced in each of the following redox reactions.



16. For each reaction shown below, write oxidation and reduction half-reactions.

