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# Solutions Work Sheet

- 1- What is the mass percent of sodium chloride in a solution prepared by adding 15 g of sodium chloride to 75 g of water?  
a) 20 % b) 17 % c) 18 % d) None of the above answer
- 2- How much sodium hydroxide is needed to make 225 g of a 15% NaOH solution?  
a) 119 g b)  $1.5 \times 10^3$  g c) 34 g d) None of the above answer
- 3- What is the molarity of a solution prepared by dilution of 0.125 moles of sodium chloride to  $2.50 \times 10^2$  mL with water?  
a) 0.500 M b)  $5.00 \times 10^{-4}$   
c) 2.00 M d) None of the above
- 4- 7.5 g of acetic acid are diluted to 150 mL with water. What is the molarity of the acetic acid?  
a) 50 M b)  $8.3 \times 10^{-4}$  M c) 0.33 M d) 0.83 M
- 5- How many grams of sodium hydroxide are needed to prepare 250 mL of a 0.20 M sodium hydroxide solution?  
a) 0.50 g b)  $2.0 \times 10^3$  g c) 2.0 g d) None of the above
- 6- 25 mL of 3.0 M sulfuric acid is diluted to 750 mL with water. What is the molarity of the resulting solution?  
a) 90 M b) 0.011 M c) 10 M d) 0.1 M
- 7- How many mL of a 6.0 M HCl solution should be diluted to 1.5 L with water to prepare a 0.20 M HCl solution?  
a) 0.05 mL b)  $5.0 \times 10^1$  mL  
c)  $4.5 \times 10^4$  mL d)  $2.2 \times 10^{-5}$  mL
- 8- 5.0 mL of 0.35 M silver nitrate are diluted to 150 mL with water. What is the molarity of the resulting silver nitrate solution?  
a) 0.35 M b) 10.5 M c) 0.095 M d) None of the above
- 9- How many grams of sodium nitrate are needed to prepare 250 mL of a 0.10 M solution?  
a) 2.1 g b)  $2.1 \times 10^3$  g c)  $2.9 \times 10^{-34}$  g d) 34 g
- 10- How many mL of a 0.400 M sodium hydroxide solution should be diluted to 350 mL with water to prepare a  $5.00 \times 10^{-3}$  M sodium hydroxide solution?  
a)  $2.8 \times 10^4$  mL b)  $3.57 \times 10^5$  mL c) 4.38 mL d) 0.229 mL

11-  $1.00 \times 10^2$  mL of water in equilibrium with air at 1 atm total pressure contains  $9.3 \times 10^{-4}$  g of oxygen. What is the molarity of oxygen in a saturated aqueous solution?

- a)  $2.9 \times 10^{-4}$  mol/L                      b)  $9.3 \times 10^{-3}$  mol/L  
c)  $2.9 \times 10^{-5}$  mol/L                      d)  $2.9 \times 10^{-6}$  mol/L

★ 12- What are the concentrations of calcium and chloride ions respectively in a 0.10 M calcium chloride solution?

- a) 0.10 M, 0.10 M                      b) 0.10 M, 0.20 M  
c) 0.20 M, 0.10 M                      d) Both are 0.00 M

★ 13- What are the concentrations of iron and sulfate ions respectively in a 0.25 M iron(III) sulfate solution?

- a) 0.25 M, 0.25M                      b) 0.10 M, 0.20 M  
c) 0.25 M, 0.75 M                      d) 0.50 M, 0.75 M

★ 14- 100 ml of an aqueous saturated solution of calcium hydroxide contains 0.16 grams of calcium hydroxide at room temperature. What are the concentrations of calcium and hydroxide ions respectively in a saturated calcium hydroxide solution?

- a)  $4.3 \times 10^{-2}$  M,  $2.2 \times 10^{-2}$  M                      b)  $2.2 \times 10^{-2}$  M,  $2.2 \times 10^{-2}$  M  
c)  $2.2 \times 10^{-2}$  M,  $4.3 \times 10^{-2}$  M                      d) None of the previous answers.

15- 14.5 mL of 0.111 M sodium hydroxide are needed to titrate 25.0 mL of an HCl solution to the end point. What is the molarity of the hydrochloric acid solution?

- a) 0.0644 M                      b) 0.191 M  
c) 5.23 M                      d) 15.5 M

16- 14.5 mL of 0.111 M sodium hydroxide are needed to titrate 10.0 mL of a sulfuric acid solution to the end point. What is the molarity of the sulfuric acid solution?

- a) 0.161 M    b) 0.322 M    c) 0.0805 M    d) 0.0383 M

17- 22.7 mL of 0.133 M silver nitrate are needed to titrate 10.0 mL of a calcium chloride solution to the end point. What is the molarity of the calcium chloride solution?

- a) 0.302 M    b) 0.604 M    c) 0.0293 M    d) 0.151 M

18- Calculate the percent by mass of sucrose in a solution made by dissolving 4.00 g of sucrose in 46.0 g of water.

19- What mass of a 15.0 % by mass sucrose solution contains 25.0 g of sucrose?

20 - How many moles of NaOH are present in 50.0 mL of 0.500 M NaOH solution?

★ 21 - What is the concentration of  $\text{Ca}^{2+}$  ions and  $\text{Cl}^-$  ions in 25.0 mL of 0.300 M  $\text{CaCl}_2$ ?

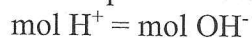
★ 22 - How many moles of  $\text{Cl}^-$  ions are present in 100. mL of 0.300 M  $\text{CaCl}_2$  solution?

23 - What mass of sodium chloride must be added to 50.0 mL of 2.00 M  $\text{Pb}(\text{NO}_3)_2$  solution to precipitate all of the lead ions?

24 - How many mL of 0.100 M  $\text{BaCl}_2$  solution are needed to react with 100. mL of 0.150 M  $\text{Pb}(\text{NO}_3)_2$  solution?

25 - What mass of  $\text{PbCl}_2$  will precipitate when 100. mL of 2.40 M  $\text{NaCl}$  is mixed with 200. mL of 0.900 M  $\text{Pb}(\text{NO}_3)_2$  solution?

In a titration at neutralization (indicated by an indicator), the number of moles of  $\text{H}^+$  is equal to the number of moles of  $\text{OH}^-$ .



26- What volume of 0.250 M  $\text{NaOH}$  is needed to neutralize 30.0 mL of 0.200 M  $\text{HCl}$  solution?

27 - Tums contains solid  $\text{Ca}(\text{OH})_2$ . What mass of  $\text{Ca}(\text{OH})_2$  is needed to neutralize 100. mL of 0.200 M  $\text{HCl}$ ?

28 - What is the molarity of a  $\text{H}_2\text{SO}_4$  solution if 25.0 mL of the acid is neutralized by 40.0 mL of 0.200 M  $\text{NaOH}$ ?