Chemistry 11

Mole Conversion Practice

Avogadro's Number, Molar Mass, Molar Volume

Name: Key
Date:
Block:

1. How many atoms are in 2 molecules of $Hg(IO_3)_2$?

$$2 \text{ molecules } Hg(IO_3)_2 \times \frac{9 \text{ atoms}}{1 \text{ molecule}} = 18 \text{ atoms } Hg(IO_3)_2$$

2. What volume at STP is occupied by 1.45×10^{30} molecules of COF_2 gas?

$$1.45 \times 10^{30} \text{ molecules } COF_2 \times \frac{1 \text{ mol}}{6.022 \times 10^{23} \text{ molecules}} \times \frac{22.4 \text{ L}}{1 \text{ mol}} = 5.39 \times 10^{7} \text{ L } COF_2$$

3. How many molecules are there in 64.0 g of FeS? $FeS = 87.92 \text{ g/mol}$

$$64.0 \text{ g FeS} \times \frac{1 \text{ mol}}{87.92 \text{ g}} \times \frac{6.022 \times 10^{23} \text{ molecules}}{1 \text{ mol}} = 4.38 \times 10^{23} \text{ molecules FeS}$$

4. How many moles are in 25.0 mL of HCN at STP?

$$25.0 \text{ mL} \times \frac{1 \text{ L}}{1000 \text{ mL}} \times \frac{1 \text{ mol}}{22.4 \text{ L}} = 1.12 \times 10^{-3} \text{ mol HCN}$$

5. What volume at STP is occupied by 43.5 g of ClF_3? $ClF_3 = 92.45 \text{ g/mol}$

$$43.5 \text{ g } ClF_3 \times \frac{1 \text{ mol}}{92.45 \text{ g}} \times \frac{22.4 \text{ L}}{1 \text{ mol}} = 10.5 \text{ L } ClF_3$$

6. How many moles are in 2.75×10^{23} atoms of Fe?

$$2.75 \times 10^{23} \text{ atoms Fe} \times \frac{1 \text{ mol}}{6.022 \times 10^{23} \text{ atoms}} = 0.457 \text{ mol Fe}$$

7. How many molecules are there in 125 mL of NOCl at STP?

$$125 \text{ mL NOCl} \times \frac{1 \text{ L}}{1000 \text{ mL}} \times \frac{1 \text{ mol}}{22.4 \text{ L}} \times \frac{6.022 \times 10^{23} \text{ molecules}}{1 \text{ mol}} = 3.36 \times 10^{21} \text{ molecules NOCl}$$

1. 18 atoms 2. 5.39×10^{7} L 3. 4.38×10^{23} molecules 4. 1.12×10^{-3} mol 5. 10.5 L 6. 0.457 moles 7. 3.36×10^{21} molecules

Chemistry 11

Molarity Practice

Name:
Date:
Block:

1. **How many grams of magnesium cyanide** are needed to make 275 mL of a 0.075 M solution?

$Mg(CN)_2 = 76.35\ g/mol$

$$275\ mL \times \frac{1\ L}{1000\ mL} \times \frac{0.075\ mol}{1\ L} \times \frac{76.35\ g}{mol} = 1.6\ g\ Mg(CN)_2$$

2. What is the molarity of a solution made when 52 grams of potassium sulfate is added to 4100 mL of water?

$K_2SO_4 = 174.27\ g/mol$

$$\frac{52\ g}{4100\ mL} \times \frac{1\ mol}{174.27\ g} \times \frac{1000\ mL}{1\ L} = 0.073\ M\ K_2SO_4$$

3. ***Find the volume*** of a 0.75 M solution if it contains 39 grams of potassium hydroxide.

$KOH = 56.11\ g/mol$

$$39\ g \times \frac{1\ mol}{56.11\ g} \times \frac{1\ L}{0.75\ mol} = 0.93\ L\ KOH$$

4. **How many grams** of hydrochloric acid are present in 3.0 L of a 0.750 M solution?

$HCl = 36.46\ g/mol$

$$3.0\ L \times \frac{0.750\ mol}{1\ L} \times \frac{36.46\ g}{1\ mol} = 82\ g\ HCl$$

5. **Explain how you would make** 675 mL of a 0.400 M barium iodide solution.

$BaI_2 = 391.13\ g/mol$

$$675\ mL \times \frac{1\ L}{1000\ mL} \times \frac{0.400\ mol}{1\ L} \times \frac{391.13\ g}{1\ mol} = 106\ g\ BaI_2 \text{ in } 675\ mL \text{ of water}$$

6. 200.0 g of NaCl are dissolved in 100. mL of water. Calculate the molarity of the solution.

$NaCl = 58.44\ g/mol$

$$\frac{200.0\ g}{100.\ mL} \times \frac{1000\ mL}{1\ L} \times \frac{1\ mol}{58.44\ g} = 34.2\ M\ NaCl$$

7. How many grams of AgCl are required to prepare 150.0 mL of 0.200 M solution?

$AgCl = 4.30\ g/mol$

$$150.0\ mL \times \frac{1\ L}{1000\ mL} \times \frac{0.200\ mol}{1\ L} \times \frac{143.32\ g}{1\ mol} = 4.30\ g\ AgCl$$

8. What is the concentration that results when 184.7 g of potassium chromate is dissolved in enough water to make a 500.0 mL solution?

$K_2CrO_4 = 194.20\ g/mol$

$$\frac{184.7\ g}{500.0\ mL} \times \frac{1000\ mL}{1\ L} \times \frac{1\ mol}{194.20\ g} = 1.902\ M\ K_2CrO_4$$

1. 1.6 g 2. 0.073 M 3. 0.93 L 4. 82 g 5. Dissolve 106 g BaI_2 in 675mL water 6. 34.2 M 7. 4.30 g 8. 1.902 M