

Name: KEY

# Molarity & Dilutions Quiz

1. Given a 4.00 M stock of sodium chloride, NaCl, how would you prepare 100 mL of 1.00 M NaCl?

$$M_1 V_1 = M_2 V_2$$

$$\frac{(4.00M)(V_1)}{4.00M} = \frac{(1.00M)(100\text{ mL})}{4.00M}$$

$$V_1 = 25\text{ mL of } 4.00M$$

2. You dilute 500 mL of a 0.40 M stock of magnesium acetate,  $\text{Mg}(\text{C}_2\text{H}_3\text{O}_2)_2$  to 4.0 L. What is the concentration of the diluted solution?

$$M_1 V_1 = M_2 V_2$$

$$\frac{(0.40M)(500\text{ mL})}{4.0L} = \frac{(M_2)(4.0L)}{4.0L}$$

$$M_2 = 0.05M$$

3. How much of a 2.0 M solution do you need to get 8.0 moles of hydrochloric acid, HCl?

$$\frac{8\text{ mol HCl}}{1} \times \frac{1\text{ L HCl}}{2\text{ mol HCl}} = 4\text{ L HCl}$$

4. You have a 0.15 M solution of iron(II) chloride,  $\text{FeCl}_2$ . What volume of this do you need to get 100 mg of the salt?

$$\frac{100\text{ mg FeCl}_2}{1} \times \frac{1\text{ g FeCl}_2}{1000\text{ mg FeCl}_2} \times \frac{1\text{ mol FeCl}_2}{176.75\text{ g FeCl}_2} \times \frac{1\text{ L FeCl}_2}{0.15\text{ mol FeCl}_2} = 0.00526\text{ L}$$

$$5.26\text{ mL}$$

5. How many moles are present in 250 mL of a 0.25 M solution of  $\text{HNO}_3$ ?

$$\frac{0.250\text{ L HNO}_3}{1} \times \frac{0.25\text{ mol HNO}_3}{1\text{ L HNO}_3} = 0.0625\text{ mol HNO}_3$$

6. How many ml of 6.0 M HBr will provide 46 g of HBr?

$$\frac{46\text{ g HBr}}{1} \times \frac{1\text{ mol HBr}}{80.912\text{ g HBr}} \times \frac{1\text{ L HBr}}{6\text{ mol HBr}} \times \frac{1000\text{ mL}}{1\text{ L}} = 94.75\text{ mL}$$