

Molarity Practice Problems

- 1) How many grams of potassium carbonate are needed to make 200 mL of a 2.5 M solution?
- 2) How many liters of 4 M solution can be made using 100 grams of lithium bromide?
- 3) What is the concentration of an aqueous solution with a volume of 450 mL that contains 200 grams of iron (II) chloride?
- 4) How many grams of ammonium sulfate are needed to make a 0.25 M solution at a concentration of 6 M?
- 5) What is the concentration of a solution with a volume of 2.5 liters containing 660 grams of calcium phosphate?
- 6) How many grams of copper (II) fluoride are needed to make 6.7 liters of a 1.2 M solution?

- 7) How many liters of a 0.88 M solution can be made with 25.5 grams of lithium fluoride?

- 8) What is the concentration of a solution with a volume of 660 mL that contains 33.4 grams of aluminum acetate?

- 9) How many liters of a 0.75 M solution can be made with 75 grams of lead (II) oxide?

- 10) How many grams of manganese (IV) oxide are needed to make 5.6 liters of a 2.1 M solution?

- 11) What is the concentration of a solution with a volume of 9 mL that contains 2 grams of iron (III) hydroxide?

- 12) How many liters of a 3.4 M isopropanol solution can be made with 78 grams of isopropanol (C₃H₈O)?

- 13) What is the concentration of a solution with a volume 3.3 mL that contains 12 grams of ammonium sulfite?

1. Get moles if given mass
2. From moles use molar mass to get grams

1. If given mass, you will need to get moles so you can plug in the needed value

$$M = \frac{\text{moles}}{L}$$

* If given mL you need to convert to L (move decimal 3 places to left)

Molarity Practice Problems - Answer Key

- START b/c of single unit (ml)
200 mL = .2 L
- 1) How many grams of potassium carbonate are needed to make 200 mL of a 2.5 M solution? **69.1 grams**

$$.2L \left| \frac{2.5 \text{ moles}}{1L} \right| \frac{138.21g}{1 \text{ mole}} = 69.1g$$
molar mass 138.21 g/mole
 - 2) How many liters of 4 M solution can be made using 100 grams of lithium bromide? **3.47 L**

$$100g \left| \frac{1 \text{ mole}}{86.85g} \right| \frac{1L}{4 \text{ moles}} = 3.47L$$
LiBr = 86.85 g/mole
 - 3) What is the concentration of an aqueous solution with a volume of 450 mL that contains 200 grams of iron (II) chloride? **3.51 M**

$$200g \text{ FeCl}_2 \left| \frac{1 \text{ mole}}{126.75g} \right| \frac{1}{.450L} = 3.51 \frac{\text{mole}}{L} \text{ or } M$$
Get moles FeCl₂ = 126.75g/mole
 - 4) How many grams of ammonium sulfate are needed to make a 0.25 M solution at a concentration of 6 M? **198.6**

$$.25L \left| \frac{6 \text{ mole}}{1L} \right| 132.14 = 198.6$$
M₁ V₁ = M₂ V₂ = 132.14g
 - 5) What is the concentration of a solution with a volume of 2.5 liters containing 660 grams of calcium phosphate? **0.85 M**

$$660g \text{ Ca}_3(\text{PO}_4)_2 \left| \frac{1 \text{ mole}}{310.18g} \right| \frac{1}{2.5L} = .85M$$
Ca₃(PO₄)₂ 310.18g/mole
 - 6) How many grams of copper (II) fluoride are needed to make 6.7 liters of a 1.2 M solution? **816.38**

$$6.7L \left| \frac{1.2 \text{ moles}}{1L} \right| \frac{101.54g}{1 \text{ mole}} = 816.38g$$
CuF₂ = 101.54g/mole
 - 7) How many liters of a 0.88 M solution can be made with 25.5 grams of lithium fluoride? **1.11 L**

$$25.5g \left| \frac{1 \text{ mole}}{25.94g} \right| \frac{1L}{.88 \text{ mole}} = 1.12L$$
LiF = 25.94g/mole
 - 8) What is the concentration of a solution with a volume of 660 mL that contains 33.4 grams of aluminum acetate? **0.25 M**

$$33.4g \left| \frac{1 \text{ mole}}{204.11g} \right| \frac{1}{.660L} = .25M$$
Al(C₂H₃O₂)₃ = 204.11g/mole
 - 9) How many liters of a 0.75 M solution can be made with 75 grams of lead (II) oxide? **.217 L**

$$75g \left| \frac{1 \text{ mole}}{461.01g} \right| \frac{1L}{.75 \text{ mole}} = .217L$$
PbO = 461.01g/mole
 - 10) How many grams of manganese (IV) oxide are needed to make 5.6 liters of a 2.1 M solution? **1021.9 grams**

$$5.6L \left| \frac{2.1 \text{ moles}}{1L} \right| \frac{86.94g}{1 \text{ mole}} = 1022g$$
MnO₂ = 86.94g/mole
 - 11) What is the concentration of a solution with a volume of 9 mL that contains 2 grams of iron (III) hydroxide? **2.08 M**

$$2g \left| \frac{1 \text{ mole}}{106.87} \right| \frac{1}{.009} = 2.08M$$
Fe(OH)₃ = 106.87
 - 12) How many liters of a 3.4 M isopropanol solution can be made with 78 grams of isopropanol (C₃H₈O)? **.38 L**

$$78g \left| \frac{1 \text{ mole}}{60.1g} \right| \frac{1L}{3.4 \text{ moles}} = .38L$$
Isopropanol = 60.1g/mole
 - 13) What is the concentration of a solution with a volume 3.3 mL that contains 12 grams of ammonium sulfite? **31.3 M**

$$12g \left| \frac{1 \text{ mole}}{116.15g} \right| \frac{1}{.0033L} = 31.3M$$
ammonium sulfite = 116.15g/mole

Looking for M