Solutions:

Solution – homogeneous mixture of two or more substances in a single physical state

Solute – what is being dissolved (smaller quantity)

Solvent – substance that does the dissolving (most common is water)

aqueous – solution that has water as its solvent (aq)

tincture – solution that has alcohol as its solvent

amalgams – alloy that contains mercury (old dental fillings)

alloy – a solid solution of two or metals

electrolytes – aqueous solution that has dissolved ions – which result in the ability to carry an electrical charge

miscible – Substance can dissolve in the solvent

immiscible – Substance can not dissolve in the solvent

Stability – solute stays dissolved

equilibrium – amount of solute leaving soln. = amt of solute dissolving

How can we control dissolving:

1. Temperature – Solids + liquids – increase temp
gases – lower temp.

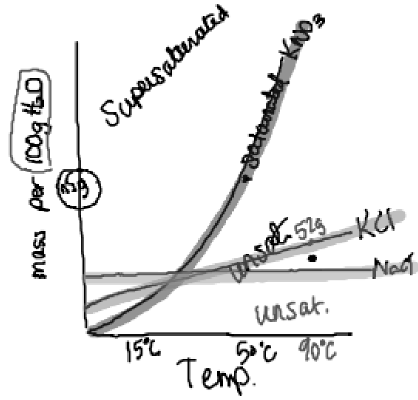
2. Stirring – Constant motion evens out the concentration

3. Surface area –  more surface area – quicker dissolving

4. Pressure – increase pressure forces mixing

Hmwk:

1. saturated
2. concentration
3. supersaturated
4. alloy
5. effervesence
6. d
7. c
8. a
9. d
10. b
11. c
12. d
13. b
14. b
15. a



13. $\frac{125g}{100g} = \frac{x}{14.3g}$ $x = 18g$

11. $\frac{75g_{KNO_3}}{100g_{H_2O}} = \frac{x}{50g}$ $x = 37.5g$

12. $\frac{30g}{100g} = \frac{x}{200g}$ $x = 60g$

Molarity & Molality

M — liquids (gases)

m — solids

$M = \frac{n}{\text{Liters of soln.}}$ (n = # of moles of solute)

$m = \frac{n}{\text{Kilograms of solvent}}$

n ← small mass → moles

Kilograms of solvent ← large mass → kg

#2

moles =

grams = (change to moles)

volume = (change to liters) 0.750L

M (molarity) = 1.50M

$M = \frac{n}{L}$ $1.50M = \frac{n}{0.750L}$

$n = 1.125 \text{ mol KCl}$

$1.125 \text{ mol} \times \frac{74.55g}{1 \text{ mol}} =$ **83.9g KCl**

#10 $m = \frac{n}{Kg}$

* small mass → moles
* lg mass → Kg

$0.125g\ Cr \times \frac{1 \text{ mol}}{52.00g} = 0.00240 \text{ mol}$

$m = \frac{0.00240 \text{ mol}}{0.0813 Kg} =$ **0.0296m**

Practice:

#2 ? g KCl 0.750 L 1.50 M

$$M = \frac{n}{vol\,(L)} \qquad 1.50\,M = \frac{n}{0.750\,L} = 1.125\,mol \times \frac{74.55\,g}{1\,mol} =$$

$$= \boxed{83.9\,g\,KCl}$$

#4 ? g NaOH 3.00 L 1.90 M

$$M = \frac{n}{vol\,(L)} \qquad 1.90\,M = \frac{n}{3.00\,L} = 5.7\,mol \times \frac{40.01\,g}{1\,mol} = \boxed{228\,g\,NaOH}$$

#10 0.125 g Cr (solute → moles) 81.3 g Fe (solvent → kg)

$$0.125\,g \times \frac{1\,mol}{52.00\,g} = 0.00240\,mol \qquad \frac{0.00240\,mol}{0.0813\,kg} = \boxed{0.0296\,m}$$

$$81.3\,g \times \frac{1\,kg}{1000\,g} = 0.0813\,kg$$

Concentration of a Solution

M = molarity   m = molality

$$M = \frac{\text{\# of moles } (n)}{\text{volume of soln. } (L)}$$ liquids/gases

$$m = \frac{\text{\# of moles } (n)}{\text{kilograms of solvent}}$$ Solids*

* Small mass → moles
large mass → kilograms

#2 ?g KCl   0.750 L   1.50M
(moles 1st)

$$M = \frac{n}{L} = \boxed{\frac{n}{0.750L} = 1.50M}$$ $$n = 1.125\,\text{mol} \times \frac{74.55\,g}{1\,\text{mol}} = \boxed{83.9\,g\,KCl}$$ (molar mass)

#10 ?m   0.125g Cr   81.3g Fe
↑ Solute → moles   ↑ solvent → grams

$$0.125g \times \frac{1\,\text{mol}}{52.00g} = 0.00240\,\text{mol}$$ $$81.3g \times \frac{1\,kg}{1000g} = 0.0813\,kg$$

$$m = \frac{0.00240\,\text{mol}}{0.0813\,kg} = \boxed{0.0296\,m}$$