

Concentration Pop-Quiz:

Name: SOLUTIONS

MUST SHOW ALL WORK / FORMULAS

1) What is the molar concentration of an 225mL solution that contains 27 g of dissolved potassium sulfide K_2S ?

① $M_{K_2S} = 110 \text{ g/mole}$ ② $n = \frac{m}{M}$
 $n = \frac{27}{110}$
 $n = 0.245 \text{ moles}$ ③ $C = \frac{n}{V}$
 $C = \frac{0.245}{0.225} = 1.09 \text{ mol/L}$

2) What mass must be used to prepare 4.4L of a 60 g/L solution ?

$C = \frac{m}{V}$ $60 = \frac{m}{4.4}$ $m = 264 \text{ g}$
 $60(4.4) = m$

3) Calculate the % concentration of a solution in which 180mL of solute are mixed with 333mL of solvent.

$\% = \frac{180}{(180+333)}$ $= 35.1 \%$

4) What mass of hydrochloric acid HCl must be used in order to make a 6L solution of 0.155mol/L solution?

① $M_{HCl} = 36.5 \text{ g/mole}$ ② $C = \frac{n}{V}$
 $0.155 = \frac{n}{6}$
 $n = 0.93 \text{ moles}$ ③ $n = \frac{m}{M}$
 $0.93 = \frac{m}{36.5}$
 $m = 33.9 \text{ g}$

5) Calculate the concentration (in ppm) if 12 moles of K_2S are dissolved to form a 2.5L solution.

① $M_{K_2S} = 110 \text{ g/mole}$ ② $n = \frac{m}{M}$
 $12 = \frac{m}{110}$
 $m = 132 \text{ g} \rightarrow 132000 \text{ mg}$ ③ $\text{ppm} = \frac{\text{mg}}{\text{L}}$
 $= \frac{132000 \text{ mg}}{2.5 \text{ L}}$
 $= 52800 \text{ ppm}$

6) Convert the following:

370mg / 200mL
 \downarrow
 $\frac{0.37 \text{ g}}{0.2 \text{ L}}$
 \downarrow
1.85 g/L

370mg / 200mL
 \downarrow
 $\frac{0.37 \text{ g}}{200 \text{ mL}} \times 100$
 \downarrow
0.185 % m/v

32.5 % (m/v)
 \downarrow
 $\frac{32.5 \text{ g}}{100 \text{ mL}}$
 \downarrow
 $\frac{32.5 \text{ g}}{0.1 \text{ L}}$
 \downarrow
325 g/L

6300 ppm
 \downarrow
 $\frac{6300 \text{ mg}}{1 \text{ L}}$
 \downarrow
 $\frac{6.3 \text{ g}}{1 \text{ L}}$
 \downarrow
6.3 g/L

4.5 % (m/v)
 \downarrow
 $\frac{4.5 \text{ g}}{100 \text{ mL}}$
 \downarrow
 $\frac{4500 \text{ mg}}{0.1 \text{ L}}$
 \downarrow
45000 ppm