Molarity / Molality Worksheet Name: KEY

Molarity (M)

$$M = \frac{\text{moles of solute}}{\text{liters of solution}}$$

Molality (m)

$$m = \frac{\text{moles of solute}}{\text{mass of solvent (kg)}}$$

$mol = M \times L$ $L = \frac{mol}{M}$

1) Define molarity.

mol of solute dissolved per one liter of solution

2) How is molality different?

mol of solute dissolved in one Kg of solvent

3) 3 moles $C_6H_{12}O_6$ in 0.1 L equals what molarity?

$M = \frac{mol}{L} = \frac{3\ mol}{0.1\ L} = 30\ M$

4) Calculate the molarity of a 0.25 in 0.250 L solution.

$M = \frac{mol}{L} = \frac{0.25\ mol}{0.250\ L} = 1\ M$

5) How many moles of KI are present in 0.500 L of a 0.2 M solution?

$mol = M \times L = 0.2\ mol/L \times 0.500\ L = 0.1\ mol$

6) What volume of 0.5 M $BaCl_2$ is needed to have 0.1 moles of $BaCl_2$?

$L = \frac{mol}{M} = \frac{0.1\ mol}{0.5\ mol/L} = 0.2\ L$

7) How many L of 0.5 M $BaCl_2$ are needed to have 0.36 mol of $BaCl_2$?

$L = \frac{mol}{M} = \frac{0.36\ mol}{0.5\ mol/L} = 0.72\ L$

8) 3 moles KI in 0.500 kg of H_2O equals what molality?

$m = \frac{mol}{kg} = \frac{3\ mol}{0.5\ kg} = 6\ m$

9) What is the molality of 0.3 mol NaCl in 0.200 kg of H_2O?

$m = \frac{mol}{kg} = \frac{0.3\ mol}{0.2\ kg} = 1.5\ m$

10) How many moles of BaI_2 are in 0.300 kg of H_2O if the molality is 0.2 m ?

$mol = m \times kg = 0.2\ mol/kg \times 0.3\ kg = 0.06\ mol$

How many moles of BaI_2 are present in 0.150 kg of H_2O if the concentration is 0.3 m?

$mol = m \times kg = 0.3\ mol/kg \times 0.15\ kg = 0.045\ mol$