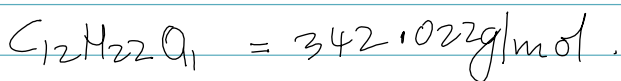


Molarity (2) & Dilution.

- ① * How many grams of sucrose, $C_{12}H_{22}O_{11}$, are in a 250ml of 3.2M solution? $M = \frac{\text{mol}}{L}$ find mol then mass.



$$M = \frac{\text{mol}}{L}, \text{ mol} = M \times L = 3.2 \frac{\text{mol}}{L} \times 0.250L = 0.8 \text{ mol}.$$

$$0.8 \text{ mol} \times \frac{342.022g}{1 \text{ mol}} = \boxed{273.6g} = \boxed{270g}$$

- ② * How many ml of 0.0886M solution of sucrose, $C_{12}H_{22}O_{11}$, has 35.4mg of sucrose? $M = \frac{\text{mol}}{L}$

$$M = \frac{\text{mol}}{L}, L = \frac{\text{mol}}{M} \text{ ① } 35.4 \text{ mg} \times \frac{1g}{1000 \text{ mg}} \times \frac{1 \text{ mol}}{342.022g} = 1.035 \times 10^{-4}$$

$$\text{② } L = \frac{1.035 \times 10^{-4} \text{ mol}}{0.0886 \text{ mol/L}} = 0.001168L = \boxed{0.00117L} = \boxed{1.17 \text{ mL}}$$

- ③ * How many ml of 1-butanol ($C_4H_{10}O$, density = 0.810g/ml), are required to make 725ml of 0.350M solution? find mols → convert to g → convert ml (using density)

$$M = \frac{\text{mol}}{L}, \text{ mol} = M \times L = 0.350 \frac{\text{mol}}{L} \times 0.725L = 0.25375 \text{ mol}.$$

$$\text{④ } 0.25375 \text{ mol} \times \frac{74.034g}{1 \text{ mol } C_4H_{10}O} = 18.786g \text{ butanol}.$$

Dilution = ⑤ $d = \frac{m}{V}, V = \frac{m}{d} = \frac{18.786g}{0.810g/mL} = \boxed{23.2 \text{ mL butanol}}$

- ④ * How many ml of 2.00M $CuSO_4$ stock solution are needed to make 0.250L of 0.400M $CuSO_4$ solution?

$$? \text{ mL} \times 2.00M = 0.250L \times 0.400M$$

$$? L = \frac{0.250L \times 0.400M}{2.00M}$$

$$= 0.050L \times \frac{1000 \text{ mL}}{1L} = \boxed{50.00 \text{ mL}}$$

take 50.00ml of 2.00M $CuSO_4$ & add enough water to make up to 0.250L.