

Concentration and Dilution Practice Questions

(Answers are written in the brackets at the end of the worksheet)

Section 1: Calculating concentration, mass or volume ($C = m/v$)

1. What concentration will result if you combine the following:

a) 20 g of solute, 100 mL of solvent $\frac{20}{100} = 0.2 \text{ g/mL}$

b) 200 mL of solvent, 46 g of solute $\frac{46}{200} = 0.23 \text{ g/mL}$

c) 36 g of solute, 1.2 L $\frac{36}{1.2} = 30 \text{ g/mL}$

2. Solve

a) What volume of solvent would you need to create a solution with a concentration of 2g/mL given that you have 20g of solute? $2 \text{ g/mL} = \frac{20}{x} \quad 10 \text{ mL}$

b) What mass of solute has added to 200 mL of water if the resulting solution has a concentration of 0.3 g/mL? $0.3 \text{ g/mL} = \frac{x}{200} \quad 60 \text{ g}$

c) You are asked to create a solution with a concentration of 7g/L. If you have 250 mL of solvent, how much solute will you need to add? $7 \text{ g/L} = \frac{x}{0.25} \quad = 1.75 \text{ g}$

Section 2: Dilution Calculations ($C_1V_1 = C_2V_2$)

1. You have 500 mL of a 14 g/L solution. You want to have 900 mL of the solution. What is the concentration of the diluted solution? $C_1V_1 = C_2V_2$

$$(14 \text{ g/L})(0.5) = x (0.9) \quad - 7.78 \text{ g/L}$$

2. You have 300 mL of a 22 g/L solution. You want to have 4 L of the solution. What is the concentration of the diluted solution? $C_1V_1 = C_2V_2$

$$(22 \text{ g/L})(0.3) = x (4) \quad 1.65 \text{ g/L}$$

3. A diluted solution has a concentration of 35g/L with a volume of 2L. What was the initial concentration if you added 500mL of solvent to dilute it? $C_1V_1 = C_2V_2$

$$2 - 0.5 = 1.5$$

$$(x)(1.5) = (35)(2) \quad = 46.67 \text{ g/L}$$

4. To create a solution with a concentration of 17 g/L you use a concentrated solution of 100 g/L and only have 1L of solvent available to you. How much of the initial solution must you use? $C_1V_1 = C_2V_2$

$$(100)(x) = (17)(1) \quad 0.17 \text{ L}$$

5. You have 1.3 L of a 37% solution. You want to dilute it and have 3 L of the solution. What is the concentration of the diluted solution?

$$\frac{37}{100} = \frac{(0.37)(1.3)}{x} = 0.168 \text{ L}$$

(ANSWERS: Section 1: 1a) 0.2 g/mL, 1b) 0.23 g/mL, 1c) 30 g/L,
2a) 10 mL, 2b) 60 g, 2c) 1.75 g

Section 2: 1) 7.78 g/L, 2) 1.65 g/L, 3) 46.67 g/L, 4) 0.17 L, 5) 0.16 g/mL)

$$46.67 \text{ g/L}$$