

The following questions are worth 2 points each:

20. Describe how to dilute a solution.

Add more solvent to the solution.

21. During a dilution process, the AMOUNT of solute... (finish this statement)

does not change.

For the following problems, point values are shown for each.

22. If I dissolve 12.4 moles of potassium chloride in water to make 0.3 liters of solution, what is the molarity of my solution? (3 points)

$$\frac{12.4 \text{ mol}}{0.3 \text{ L}} = 41.3 \text{ M}$$

23. If I dissolve 3.1 moles of lithium iodide in water to make 1.4 liters of solution, what is the molarity of my solution? (3 points)

$$\frac{3.1 \text{ mol}}{1.4 \text{ L}} = 2.21 \text{ M}$$

24. How many grams of NaOH (Molar Mass = 40.0 grams /mole) would be required to produce a 2.7 M (molar) solution with a volume of 14 mL? (3 points)

$$\frac{14 \text{ mL}}{1000 \text{ mL}} = 0.014 \text{ L} \quad 2.7 \text{ M} = \frac{x}{0.014 \text{ L}} = \frac{0.0378 \text{ mol}}{1 \text{ mol}} \times \frac{40 \text{ g}}{1 \text{ mol}} = 1.512 \text{ g NaOH}$$

25. How many grams of NaCl (Molar Mass = 58.44 grams /mole) would be required to produce a 0.3 M (molar) solution with a volume of 4.2 L? (3 points)

$$0.3 \text{ M} = \frac{x}{4.2 \text{ L}} = \frac{1.26 \text{ mol}}{1 \text{ mol}} \times \frac{58.44 \text{ g}}{1 \text{ mol}} = 73.63 \text{ g NaCl}$$

26. If I have 550 mL of a 2.5 M solution of NaOH (Molar Mass = 40.0 grams /mole), how many grams of NaOH do I have? (3 points)

$$\frac{550 \text{ mL}}{1000 \text{ mL}} = 0.55 \text{ L} \quad 2.5 \text{ M} = \frac{x}{0.55 \text{ L}} = \frac{1.375 \text{ mol}}{1 \text{ mol}} \times \frac{40 \text{ g}}{1 \text{ mol}} = 55 \text{ g NaOH}$$

27. If I have 1.56 L of a 0.5 M solution of NaCl (Molar Mass = 58.44 grams /mole), how many grams of NaCl do I have? (3 points)

$$0.5 M = \frac{x}{1.56 L} \quad \frac{.78 \text{ mol} \mid 58.44 \text{ g}}{1 \text{ mol}} = 45.58 \text{ g NaCl}$$

28. If I have 2.80 L of a 12 M solution of HCl, what will my molarity be if I ~~dilute~~ ^{evaporate} this with enough water to create 1.5 liters of solution? (3 points)

$$(12 M)(2.80) = (x M)(1.5)$$

$$22.4 M$$

29. If I have 340 mL of a 5.5 M solution of HCl, what will my molarity be if I dilute this with enough water to create 2.5 liters of solution? (3 points)

$$\frac{340 \text{ mL} \mid 1 L}{1000 \text{ mL}} = .34 L \quad (5.5 M)(.34 L) = (x M)(2.5 L)$$

$$.748 M$$

30. What is the molarity of my final solution if I add 650 mL to 1.34 liters of a 3.5 M solution of NaCl? (4 points)

$$\frac{650 \text{ mL} \mid 1 L}{1000 \text{ mL}} = .65 L \quad \begin{array}{r} 1.34 \\ + .65 \\ \hline 1.99 L \end{array}$$

$$(3.5 M)(1.34 L) = (x M)(1.99 L)$$

$$2.35 M$$

31. What is the molarity of my final solution if I allow 250 mL of solvent to evaporate from 4.25 liters of a 0.75 M solution of NaCl? (4 points)

$$\frac{250 \text{ mL} \mid 1 L}{1000 \text{ mL}} = .25 L \quad \begin{array}{r} 4.25 \\ - .25 \\ \hline 4 L \end{array}$$

$$(0.75 M)(4.25 L) = (x M)(4 L)$$

$$.797 M$$