345. What mass of anhydrous cobalt(II) chloride would be needed in order to make 650.00 mL of a 4.00 M cobalt(II) chloride solution?

346. A student wants to make a 0.150 M aqueous solution of silver nitrate, $AgNO_3$, and has a bottle containing 11.27 g of silver nitrate. What should be the final volume of the solution?

347. What mass of urea, NH_2CONH_2, must be dissolved in 2250 g of water in order to prepare a 1.50 m solution?

348. What mass of barium nitrate is dissolved in 21.29 mL of a 3.38 M solution?

349. Describe what you would do to prepare 100.0 g of a 3.5% solution of ammonium sulfate in water.

350. What mass of anhydrous calcium chloride should be dissolved in 590.0 g of water in order to produce a 0.82 m solution?

351. How many moles of ammonia are in 0.250 L of a 5.00 M aqueous ammonia solution? If this solution were diluted to 1.000 L, what would be the molarity of the resulting solution?

352. What is the molar mass of a solute if 62.0 g of the solute in 125 g of water produce a 5.3 m solution?

353. A saline solution is 0.9% NaCl. What masses of NaCl and water would be required to prepare 50. L of this saline solution? Assume that the density of water is 1.000 g/mL and that the NaCl does not add to the volume of the solution.

354. A student weighs an empty beaker on a balance and finds its mass to be 68.60 g. The student weighs the beaker again after adding water and finds the new mass to be 115.12 g. A mass of 4.08 g of glucose is then dissolved in the water. What is the percentage concentration of glucose in the solution?

355. The density of ethyl acetate at 20°C is 0.902 g/mL. What volume of ethyl acetate at 20°C would be required to prepare a 2.0% solution of cellulose nitrate using 25 g of cellulose nitrate?

356. Aqueous cadmium chloride reacts with sodium sulfide to produce bright-yellow cadmium sulfide. Write the balanced equation for this reaction and answer the following questions.
   a. How many moles of $CdCl_2$ are in 50.00 mL of a 3.91 M solution?
   b. If the solution in (a) reacted with excess sodium sulfide, how many moles of CdS would be formed?
   c. What mass of CdS would be formed?

357. What mass of H_2SO_4 is contained in 60.00 mL of a 5.85 M solution of sulfuric acid?

358. A truck carrying 22.5 kL of 6.83 M aqueous hydrochloric acid used to clean brick and masonry has overturned. The authorities plan to neutralize the acid with sodium carbonate. How many moles of HCl will have to be neutralized?

359. A chemist wants to produce 12.00 g of barium sulfate by reacting a 0.600 M $BaCl_2$ solution with excess H_2SO_4, as shown in the reaction below. What volume of the $BaCl_2$ solution should be used?

$$BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCl$$

360. Many substances are hydrates. Whenever you make a solution, it is important to know whether or not the solute you are using is a hydrate and, if it is a hydrate, how many molecules of water are present per formula unit of the substance. This water must be taken into account when weighing out the solute. Something else to remember when making aqueous solutions from hydrates is that once the hydrate is dissolved, the water of hydration is considered to be part of the solvent. A common hydrate used in the chemistry laboratory is copper sulfate pentahydrate, $CuSO_4 \cdot 5H_2O$. Describe how you would make each of the following solutions using $CuSO_4 \cdot 5H_2O$. Specify masses and volumes as needed.
   a. 100. g of a 6.00% solution of $CuSO_4$
   b. 1.00 L of a 0.800 M solution of $CuSO_4$
   c. a 3.5 m solution of $CuSO_4$ in 1.0 kg of water

361. What mass of calcium chloride hexahydrate is required in order to make 700.0 mL of a 2.50 M solution?

362. What mass of the amino acid arginine, $C_6H_{14}N_4O_2$, would be required to make 1.250 L of a 0.00205 M solution?

363. How much water would you have to add to 2.402 kg of nickel(II) sulfate hexahydrate in order to prepare a 25.00% solution?

364. What mass of potassium aluminum sulfate dodecahydrate, $KAl(SO_4)_2 \cdot 12H_2O$, would be needed to prepare 35.00 g of a 15.00% $KAl(SO_4)_2$ solution? What mass of water would be added to make this solution?

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365. Complete the table below by calculating the missing value in each row.

Molarity of Stock Solution	Volume of Stock Solution	Molarity of Dilute Solution	Volume of Dilute Solution
a. 0.500 M KBr	20.00 mL	? M KBr	100.00 mL
b. 1.00 M LiOH	? mL	0.075 M LiOH	500.00 mL
c. ? M HI	5.00 mL	0.0493 M HI	100.00 mL
d. 12.0 M HCl	0.250 L	1.8 M HCl	? L
e. 7.44 M NH_3	? mL	0.093 M NH_3	4.00 L

366. What volume of water would be added to 16.5 mL of a 0.0813 M solution of sodium borate in order to get a 0.0200 M solution?

Mixed Review

367. What is the molarity of a solution of ammonium chloride prepared by diluting 50.00 mL of a 3.79 M NH_4Cl solution to 2.00 L?