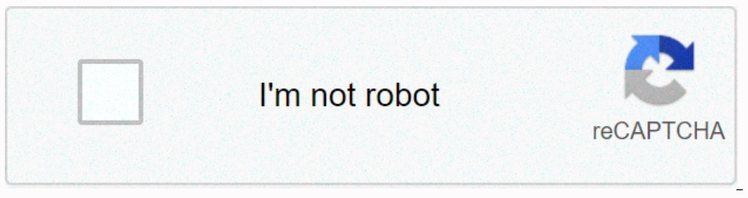


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# Solution concentration worksheet practice problems

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PROBLEM \(\PageIndex{1}\) Explain what changes and what remains the same when 1.00 L NaCl solution is diluted to 1.80 L. Response The number of moles always remains the same during dilution. Concentration and volumes change during dilution. PROBLEM \(\PageIndex{2}\) What does it mean when we say that a 200 ml sample and a 400 ml salt solution sample have the same mollusity? In what ways are both samples identical? What are the different ways between these two samples? Answer Two samples contain the same proportion of salt moles up to liters of solution, but their number of actual moles varies. PROBLEM \(\PageIndex{3}\) Determine the molarity of each of the following solutions: 0,444 mol CoCl2 0,654 L solution 98,0 g phosphoric acid, H3PO4, 1,00 L solution 0,2074 g calcium hydroxide, Ca(OH)2, 40,00 ml 10,5 kg Na2SO4·10H2O solution 18,60 L solution 7,0 × 10-3 mol I2 100,0 ml solution 1,8 × 104 mg HCl in 0 L-solution Reply to 0.679 M Reply b 1.00 M Reply c 0.06998 M Reply d 1.75 M Reply e 0.070 M Reply f 6.6 M Click here to see the solution PROBLEM video \(\PageIndex{4}\) Set the molarity of each of the following solutions: 1457 mol KCl to 1.1.0 500 L solution 0,515 g H2SO4 1,00 L solution 20,54 g Al (NO3)3 1575 ml solution 2,76 kg CuSO4·5H2O solution 1,45 L solution 0,005653 mol Br2 10,00 ml solution 0,000889 g of glincin glycine, C2H5NO2, to 1,05 ml of solution Answer to 0,9713 M Reply b 5,25 × 10-3 M Reply c 6,122 × 10-2 M Reply d 7,062 M Reply e 0.5653 M Answer f 1.13 × 10-2 M PROBLEM \(\PageIndex{5}\) Calculate the number of moles and solubility mass in each of the following solutions : a) 2,00 L 18,5 M H2SO4, concentrated sulphuric acid (b) 100,0 ml 3,8 ml × 10-5 M NaCN, minimum lethal serum sodium cyanide concentration (c) 5,50 L 13,3 M H2CO, formaldehyde used to attach tissue samples (d) 325 ml 1,8 ml 10-6 M feSO4× minimum concentration of iron sulphate , found to taste in drinking water Answer at 37.00. 0 mol H2SO4 3.63 × 103 g H2SO4 Answer b 3.8 × 10-6 mol NaCN 1,9 × 10-4 g NaCN Reply c 73,2 mol H2CO 2,20 kg H2CO Response d 5.9 × 10-7 mol FeSO4 8.9 × 10-5 g FeSO4 Click here to see the solution PROBLEM video \(\PageIndex{6}\) Calculate the molarity of each of these solutions : (a) 0,195 g cholesterol, C27H46O, serum 0,100 L mean human serum cholesterol (b) 4,25 g NH3 0,500 L solution, NH3 concentration in domestic ammonia (c) 1,49 kg isopropyl alcohol (C3H7OH) solution 2,50 L, isopropyl alcoholic strength by alcohol (d) 0,029 g I2 0,100 L solution, I2 water solubility at 20 °C Answer to 5,04 × 10-3 M response b 0,499 M Answer c 9,92 M Reply d 1.1 × 10-3 PROBLEM \(\PageIndex{7}\) There is about 1.0 g of calcium, like Ca2+, 1.0 L of milk. What is Ca2+ molarity in milk? Answer 0.025 M Click here to see the problem solution video \(\PageIndex{8}\) What volume of 1,00 M Fe(NO3)3 solution can be diluted to prepare a 1,00 L solution at a concentration of 0,250 M? Answer 0.250 L PROBLEM \(\PageIndex{9}\) If 0,1718 L from 0,3556-M C3H7OH solution is diluted to a concentration of 0,1222 M, what is the volume of the solution obtained? Answer 0.5000 L Click here to see the problem solution video \(\PageIndex{10}\) What volume of 0,33 M C12H22O11 solution can be diluted to prepare 25 ml of solution at a concentration of 0,025 M? Answer 1.9 ml PROBLEM \(\PageIndex{11}\) What is the concentration of the NaCl solution that occurs when 0,150 L 0,556-M solution is allowed to evaporate until the volume drops to 0,105 L? Answer 0.794 M Click here to see the problem solution video \(\PageIndex{12}\) What is the molarity of the diluted solution when each of these solutions is diluted to the final volume? Dilute 1,00 L 0,250-M Fe (NO3)3 to a final volume of 2,00 L 0,5000 L 0,1222-M C3H7OH solution. the final volume of H3PO4 0,350 M solution 1,250 L is diluted to a final volume of 4,00 L 22,50 ml 0,025 ml-M solution C12H22O11 diluted to 100,0 ml Answer 0,125 M Answer b 0.04888 M Answer c 0.206 M Answer d 0.0056 M PROBLEM \((\PageIndex{13}\) What is the final concentration of the manufactured solution when 225,5 ml of Na2CO3 0,09988 M solution is allowed to evaporate, until the volume of the solution is reduced to 45,00 ml? Answer 0.5005 M Click here to see the problem solution video \(\PageIndex{14}\) 2.00 L bottle of concentrated HCl solution was purchased for a joint chemical laboratory. The solution contained 868.8 g HCl. What is the molarity of the solution? Answer 11.9 M PROBLEM \(\PageIndex{15}\) The General Chemistry Laboratory experiment requires a 2.00 M HCl solution. How many ml of 11.9 M HCl will need to make 250 ml of 2,00 M HCl? Answer 42.0 ml Click here to see the problem solution video \(\PageIndex{16}\) What volume of 0,20 M K2SO4 solution contains 57 g K2SO4? Answer 1.6 L PROBLEM \(\PageIndex{17}\) The U.S. Environmental Protection Agency (EPA) sets limits on toxic substances that can be discharged into the sewer system. Limit values have been set for various substances, including hexavalent chromium, which do not exceed 0,50 mg/l. If the industry unloads hexavalent chromium as potassium dichromate (K2Cr2O7), what is the maximum molar tolerance of that substance? Answer 4.8 × 10-6 M Click here to see the video of the decision contributors go to: page content | links on this page | Site | footer (site information) Practice Questions 2.2: Calculations related to resolution concentration This worksheet is also available in the following formats: Word | RTF | PDF 1. 0,750 L aqueous solution contains 90,0 g ethanol C2H5OH. Calculate the molar concentration of the solution in clay· L-1. Solution: 1. The question raises the question of concentration, which means that it is necessary to find molar fortitude, or: mole dissolving liter solution 2. To convert the mass of ethanol to moles, we need to find the molar mass of C2H5OH using a periodic table. The molar mass is 46,1 g·mol-1 3. Molarity also requires volume; question tells us we have 0750 L. Add the following information to solve the problem by organizing the information to obtain it with the desired unit: mol L = 90,0 g × 1 mol 46,1 g × 1 0,750 L = 2,60 mol L Our final answer: [C2H5OH ] = 2.60M 2. What mass of NaCl is dissolved in 152 ml of solution at a concentration of 0,364 M? Solution: 1. The question asks for mass, so we want to calculate the grams 2. We are given concentration. I suggest rewriting the concentration, as shown on the right, it is better to see how the units will be canceled. 0,364 mol L 3. Since the question relates to mass, we will need to know the molar mass of NaCl Using a periodic table, the molar mass of naCl is 58,5 g·mol-1 4. The question gives us volume in ml. Our concentration unit uses L, so we convert 152 ml to 0,152 L. Add this information to solve the problem by handling the information so that it ends up with the desired unit: g = × × 0,152 L = 3,24 g response 3. What is the mass of dextrose in C6H12O6 dissolved in 325 ml of 0,258 M solution? Solution: 1. The question asks for mass, so we want to calculate the grams 2. We are given a concentration (0.258 M). I suggest rewriting the concentration, as shown on the right, it is better to see how the units will be canceled. 0,258 mol L 3. As the issue relates to mass, we will need to know the molar mass of C6H12O6 Using the periodic table we believe that the molar mass of C6H12O6 is 180,1 g·mol-1 4. The question gives us volume in ml. Our concentration unit uses L, so we convert 325 ml to 0,325 L × × = 15,1 g response 4. Dissolve 98 g of sulphuric acid H2SO4 in water to prepare a solution of 0,500 M. What is the volume of the solution? Solution: 1. The question asks for volume, so we want to calculate liters L (or ml) 2. The concentration of the solution is: 0,500 mol L 3. As the issue is related to mass, we will need to know the molar mass of H2SO4 Using a periodic table we find that the molar mass of H2SO4 is 98.1 g·mol-1 Add this information to solve the problem by ordering after all with the desired unit: L = × × = 2,00 L answer 5. Sodium carbonate In Na2CO3 solution contains 53.0 g of soluble solution of 215 ml. What is his molarity? Solution: 1. The question raises the question of mollusity: molar soluble liter solution 2. To convert the mass of ethanol to moles, we need to find the clay mass of Na2CO3 using a periodic table. The molar mass of Na2CO3 is 106,0 g·mol-1 3. Molarity also requires volume; question tells us we have 215 ml, or 0,215 L. Add this information to solve the problem by handling the information to obtain it with the desired unit: mol L = 53,0 g × 1 mol 106,0 g × 1 0,215 L = 2,33 mol L Our final answer: [Na2CO3 ] = 2,33 M 6. What is the molar molar of the solution HNO3 containing 12,6 g of solubility solution 5,00 L? Solution: 1. The question raises the question of mollusity: molar soluble liter solution 2. To convert the mass of ethanol to moles, we need to find the clay mass of HNO3 using a periodic table. The molar mass is 64,0 g·mol-1 3. Molarity also requires volume; question tells us we have 5.00 L. Add this information to solve the problem by organizing the information to obtain it with the desired unit: mol L = 12,6 g × 1 mol 64,0 g × 1 5,00 L = 0,0393 mol L Final answer: [HNO3] = 3,93 × 10-2 M 7. What is the mass of copper (II) nitrate in Cu(NO3)2 in 50,00 ml of 4,55 × 10-3 M aqueous solution? Solution: 1. The question asks for mass, so we need to calculate the grams 2. We are given concentration. I suggest rewriting the concentration, as shown on the right, it is better to see how the units will be canceled. 4.55 × 10-3 mol L 3. As the question relates to mass, we will need to know the molar mass of Cu(NO3)2 Using the periodic table, we can see that the molar mass of Cu(NO3)2 is 187,6 g·mol-1 4. The question gives us volume in ml. Our concentration unit uses L, so we convert 50.00 ml to 0.0.05000 L. Add the following information to solve the problem by organizing the information to provide it with the desired unit: g = × × 0,0500 L = 4,27 × 10-2 g answer Final answer: 4,27 × contains 10-2 g of copper (II) nitrate. Go back to notes