

Solutions Podcast #5: Dilutions; SC7a



1. 25 mL of 5.6 M hydrochloric acid are placed in a volumetric flask. The flask is filled to 250 mL with water. What is the molarity of the new solution?

2. 5.6 mL of sodium hydroxide are added to a flask and the flask is filled with water to the 200 mL mark. The concentration of the new solution is found to be .098 M. What was the initial molarity of the solution before the dilution was completed?

3. A chemist has 300 mL of a 2.5 M KCl solution. The solution is diluted by adding 1.2 L of water to the original volume. What is the [KCl] of the diluted solution?

4. A chemist has 2 liters of a 3.2 M hydrochloric acid solution. If the solution is left out in the room and enough water evaporates so that there is only 1.2 liters of solution left, what is the final molarity of this concentrated acid?

5. When a chemist adds 1.0 L of water to 3.0 liters of a 0.8 M hydrofluoric acid solution, what is the new concentration of the total HF solution?

6. How much water will a chemist need to add to 200 mL of a 3.3 M potassium chloride solution if they want to make a 1.0 M solution of potassium chloride?

7. You need to make 10.0 L of 1.2 M potassium nitrate. What molarity would the potassium nitrate solution need to be if you were to use only 2.5 L of it?

8. How many milliliters of 5.0 M copper (II) sulfate solution must be added to 160 mL of water to achieve a 0.30 M copper (II) sulfate solution?
9. What volume of 4.50 M HCl can be made by mixing 5.65 M HCl with 250.0 mL of 3.55 M HCl?
10. A 40.0 mL volume of 1.80 M iron (III) nitrate is mixed with 21.5 mL of 0.808M iron (III) nitrate solution. Calculate the molar concentration of the final solution.
11. To 2.00 L of 0.445 M HCl, you add 3.88 L of a second HCl solution of an unknown concentration. The resulting solution is 0.974 M. Assuming the volumes are additive, calculate the molarity of the second HCl solution.
12. To what volume should you dilute 133 mL of an 7.90 M copper (II) chloride solution so that 51.5 mL of the diluted solution contains 4.49 g copper (II) chloride?
13. 1.00 L of a solution is prepared by dissolving 125.6 g of sodium fluoride in it. If I took 180 mL of that solution and diluted it to 500 mL, determine the molarity of the resulting solution.
14. What is the molar concentration of chloride ions in a solution prepared by mixing 100.0 mL of 2.0 M potassium chloride with 50.0 mL of a 1.50 M copper (II) chloride solution?
15. 46.2 mL of a 0.568 M calcium nitrate solution is mixed with 80.5 mL of 1.396 M calcium nitrate solution. What is the nitrate ion concentration?