Buffers in household products prelab answers

Enter the definition of a bufferbuffer are solutions that resist changes in pH when acids or bases are added. To achieve this, a buffer must contain both an acidic and a base component. These two components should not neutralize each other, but should be available to neutralize hydrogen ions or hydroxide ions from other sources. One way to do this is to combine a weak acid-base conjugate pair such as acetic acid and acetations or ammonium ions and ammonia. If you titrate acetic acid (CH3COOH) with sodium hydroxide (NaOH), the resulting products are acetate ion (CH3COO), sodium ion and water (see Figure 1). At some point, the reaction mixture contains acetic acid (the weak acid) and acetation (its conjugate base) in solution, thereby designing a buffer effect. If you continued to add naOH to this reaction, what would happen to this buffer effect? Explain.NaOH is added to the system, but there is limited acetic acid in the solution. Once all sodium hydroxide has reacted, the buffering stops and the pH begins to rise. Which titration curve (see Figure 2) represents the titration of a strong acid with a strong base? Does one of these curves show a buffer effect? Explain. Curve B represents the titration of strong acid with a strong base, as it starts flat, shoots up and ends flat again. Curve A shows the buffer effect, the pH changes slowly at a rate, not all at once. What should be done under the term equivalence point? What are the approximate equivalence points for curves A and B in Figure 2? The equivalence point is when the moles of the standard solution are equal to the moles of the analyte. The equivalence point for both curves is pH of 7. At what point along a titration curve is pK=pH for a weak acid? In the middle, that is half of the equivalence point. On the titration curve (Figure 2, Curve A), identify the location where you can estimate the pKa of acid. What is your best estimate? What is the difference in terms of buffer region and equivalence point between acid iced and basic buffers? The buffer range of acids in lower pH than in base buffers. Basic buffers have the buffer ranges above the equivalence point and lower for acidic buffers. Write the neutralization reaction (in arectonic form) for a titration of acetic acid (CH3COOH) with sodium hydroxide (NaOH). If you had 1 mole buffer that was exactly 50 percent acetic acid and 50 percent acetate, how much NaOH would it take to neutralize the entire buffer? CH3COOH+NaOH--> CH3COO- + Na + H2O. Describe how the titration curve for a polyprotinic acid would look different from a monoprociic acid. It would have had a larger because it is able to give more hydrogen to react with the titrant. Do all polyprotic acids act as a buffer in aqueous solution? What determines the buffer activity of a polyprotinic acid? Explain.Yes because they donate protons. The buffer activity is determined by how the protonen, the acid is ready to donate. Why flat titration curves of strong acids and strong bases around pH 1 and around pH 13Because this is the limit value and they cannot reach too high values of the pH value, since there are acids or bases that prevent it from reaching the maximum. When can a salt act as a buffer? Provide an example. If the salt contains the acidic part, which will be a conjugate to the base. Nacl. Enter a definition of a buffer: A buffer is a solution that contains either a weak acid and its salt, or a weak base and its salt that is resistant to changes in pH. (chemistry.about.com) If you titrate acetic acid (CH3COOH) with sodium hydroxide (NaOH), the resulting products are acetate ion (CH3COO), sodium ion and water (see Figure 1). At some point, the reaction mixture contains acetic acid (the weak acid) and the acetate ion (its conjugate base) in solution, which creates a buffer effect. If you continued to add naOH to this reaction, what would happen to this buffer effect? Explain. It would neutralize the solution and so the buffer effect would stop because you no longer have acetic acid. Which titration curve (see Figure 2) represents the titration of a strong acid with a strong base? What curve represents the titration of a weak acid with a strong base? Does one of these curves show a buffer effect? Explain: Titration curve B represents the titration of a strong acid with a strong base and titration curve A represents the titration of a weak acid with a strong base, since a buffer must have a weak acid and its conjugate base. The only buffer due to the fact that it fits the appropriate definition and properties of a buffer by having a weak acid with a conjugate base is A. What should be done under the term equivalence point? What are the approximate equivalence points for curves A and B in Figure 2? The equivalence point is the point in a titration where the amount of titrant is added to completely neutralize the analyte solution (chemistry.about.com). The approximate equivalence point for A would be 8 and for B it would be 6.At which point is pKa= pH in a weak acid along a titration curve? The mean equivalence point is where pKa is equal to pH because this is when the amount of acid is equal to the amount of conjugate base present. On the titration curve (Figure 2 curve A), identify the location where you can estimate the pKa of acid. What is your best estimate? I would estimate that there is about 4.What is the difference, in terms of buffer region and the equivalence point, between acid iced and basic buffers? The buffer area and equivalence point for an acid is less than 7 and for a base they are greater than 7.Write the (in anetzionic form) for titration of acetic acid (CH3COOH) with sodium hydroxide (NaOH). If you had 1 mole buffer that was exactly 50 percent acetic acid and 50 percent acetate, how much NaOH would it take to all the buffer? CH3COOH(aq) + OH----> CH3COO- + H2O. You would need 0.5 mol. Describe how the titration curve for a polyprotinic acid would look different from a monoprociic acid. There are several equivalence points for a polyprotic, so it looks like a conductor and the monoprotic looks like an S because it has only one equivalence point. Do all polyprotic acids act as buffers in aqueous solutions? What determines the buffer activity of a polyprotinic acid? Explain. Yes, they all have the ability to do this because they all have an extra proton to share. The amount of hydrogen ions it has given away determines its buffer activity. Why do titration curves of strong acids and strong bases flatten around pH 1 and pH 13? Since the saturation of H+at pH 1 and OH-at-pH 13 is at its maximum, and adding more of either at their respective pH flattening points no longer affects the solution. When can salt serve as a buffer? Provide an example. A salt can act as a buffer if it is the conjugateic acid or base in a reaction. Example: NH4 + OH ---> NH3 + H2OSources:Investigation 15- To what extent do ordinary household objects have buffering Activity Item No.: AP7665 Price: 67.30 USD In stock. The Buffers in Household Products Inquiry Lab Solution for AP® Chemistry involves identifying regions in the neutralization of a polyprotic weak acid. The test results are used to identify buffering agents in eight household products. Includes access to exclusive FlinnPREP™ digital content to combine the benefits of classroom, lab and digital learning. Each Blended Learning Lab solution includes prelab videos of concepts, techniques, and procedures, summary videos that relate the experiment to the AP® exam, integrated safety training for student labs with assessments, and standards-based, tested study labs with real sample data. FlinnPREP™ Inquiry Lab Solutions are customizable to you and teach you how to access and run your AP® labs. More product details Product details Resource specifications This item can only be shipped to schools, Museums and Science Centers Resources Articles- EL6030 AP7665 Type Digital Content Only Lab Kit & Digital Content Price 14.95 x 67.30 Enter the number of items Big Idea 6, Investigation 15, Primary Learning Objective 6.20 Many household products contain buffer chemicals, such as citric acid, sodium carbonate, sodium benzoate and phosphates or phosphoric acid, to protect their activity. Students discover the wide range of buffer actions using this advanced query lab activity. The laboratory begins with an introductory activity to control the buffer areas in the neutralization of a weak acidity. The results provide a model for the conceptual study of a method for determining buffers in eight different household products, including food and drink and over-the-counter medicines. The procedures include creating titration curves, calculating pKa values, and Buffer capacity and composition. Students can recommend additional consumer goods for further examinations. Complete for 24 students working in pairs. Materials included in the kit: Alka-Seltzer® tablets, pkg/2, 3Citric acid, 3 ghydrochloric acid solution, 0.1 M, 500 mL, 4sodium hydroxide solution, 0.1 M, 500 mL, 4strength, liquid, 50 mGatorade®, G2 series®, red (strawberry), 12 ozLactaid®, tablets pkg/4Lemon Limeol-Aid®, Package, 3Pineapple juice, can, 6 oz, 2tomato paste, can, 6 ozTonic water, bottle, 1 LAdditional materials required (for each laboratory group): Distilled or deionized water, cup, pH 7 buffer (for calibration pH meter), Buret, Buret clamp, magnetic stirrer and stirring rod, pH sensor or pH meter, support level, washing bottle, 0.01-g *AP is a registered trademark of the College Board that was not involved in the manufacture of this product and does not endorse it. Development and use of modelsPlanning and execution of investigationsAnalysis and interpretation of dataUse of mathematics and arithmeticReceive, evaluate and communicate information Disciplinary Core Ideas HS-PS1. A: Structure and properties of MatterHS-PS1.B: Chemical Reactions PatternsCause and effectScale, Proportion and Quantity HS-PS1-1. Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons at the extreme energy level of atoms. HS-PS1-2. Construct and revise an explanation for the result of a simple chemical reaction based on the extreme electron states of atoms, trends in the periodic table, and knowledge of patterns of chemical properties. HS-PS1-3. Plan and perform an investigation to gather evidence to compare the structure of substances on the mass scale to derive the strength of electrical forces between particles. Particles.

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