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Compiled Exam

Comments & Suggestions?
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1. Identify the origins of ions in the ocean. 2

2. A student is trying to work out the formula of an unknown acid he was given. So far he knows that the formula takes the form H_nXO_3, where n is an unknown positive integer and X is an unknown non-metallic element which can either be Phosphorous (P), Sulfur (S), Carbon (C) or Nitrogen (N). To determine which of the four elements X actually is for the unknown acid, the student performs a series of titrations. 6

The student decides to prepare a secondary standard solution of NaOH by titrating it with a primary standard solution of 0.1064 mol/L of HCI.

The result was that 25.00mL of NaOH required 25.00mL of HCI with concentration 0.1064 mol/L for an end-point with the indicator colour change.

The student then dissolved 2.569 grams of H_nXO_3 in water to make a 250.0mL solution. He performed a titration with the unknown acid H_nXO_3 and the standard NaOH solution.

The result was that 25.00mL of the standard NaOH required 16.31mL of H_nXO_3 solution for an end-point with the indicator colour change.

(a) Explain why the concentration of the NaOH is 0.1064 mol/L.

(b) Write down the complete neutralisation equation between H_nXO_3 and the standard NaOH solution in terms of n.

(c) Determine the identity of X and the value of n using the given choices. Justify your answer.

3. A solution is prepared by using equal volumes and concentrations of acetic acid and sodium acetate. 3

Explain how the pH of this solution would be affect by the addition of a small amount of sodium hydroxide solution. Include an equation in your answer.

4. Describe the uses PS in terms of its properties. 2

5. Explain how the structure and chemistry of ONE of the following cells determines its cost and practicality: 4

button cell, fuel cell, vanadium redox cell, lithium cell, liquid junction photovoltaic device (e.g. Gratzel cell).

6. Construct the complete equation of the dehydration of ethanol. 1

7. Throughout history there have been several definitions of acids that have been put forward by scientists. Discuss how these developments in the understanding of acids led to the classification of ammonium (NH_4^+) as an acid. 5

8. Outline strategies that can be used to slow down or stop the process of corrosion of the hull of the ship. 6

9. Using examples, distinguish between active metals and passivating metals. 4