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1. Consider the following situation: Two beakers labeled 1 and 2 are each filled with 50.0ml of neutral water. A chemist has two unknown solution of monoprotic acid dissolved in water. The chemist adds 5 drops of unknown solution A to beaker 1 and 5 drops of unknown solution B to beaker 2. The pH in beaker 1 drops to 6.2 and the pH in beaker 2 drops to 5.9. Classified True or False, explain why?
 - a. Unknown B is a stronger acid than unknown A.
 - b. The hydrogen ion concentration in beaker 1 is higher than the hydrogen ion concentration in beaker 2.
 - c. Unknown A and unknown B are both weak acids.
 - d. Unknown A and unknown B are both diluted solutions.
 - e. The pOH of the solution in beaker 1 is greater than the pOH of the solution in beaker 2.

2. An unknown organic acid is somewhat soluble in water. When 6.25g of the unknown acid is added to 1.20 L of neutral water, the freezing point decrease to -0.0793 and the pH decrease to 2.79.
 - a. compute the molecular weight of the unknown acid
 - b. compute the K_a and pK_a of the unknown acid.
 - c. Find the unknown acid, using table of K_a
 - d. Use an appropriate source to find the molecular weight of the compound for c. does this molecular weight match with what you compute for part a?

3. A mixture of 1.00mmol of H_2 and 5.00mmol of I_2 is placed in a .5L container at a certain temperature and allowed to come to equilibrium. Analysis of the mixture shows that the concentration of HI is .87mM.
 - a. Compute K_c for the reaction $H_2 + I_2 \rightleftharpoons 2HI$

 - b. Compute K_p for the reaction.

 - c. Is the reaction product favored or reaction favored?

 - d. If some HI were added to the flask at equilibrium , would the reaction shift to the left, shift to the right or stay the same.

 - e. If some H_2 were added to the flask at equilibrium , would the reaction shift to the left, shift to the right or stay the same?

 - f. If 1.200mmol of H_2 and 1.200mmol of HI are added to the flask, will the equilibrium shift to the left, right or stay the same? Justify your answer by computing the reaction quotient.

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