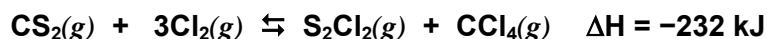


1. What is the conjugate acid of HAsO_4^{2-} ? (2 pt) _____
2. What is the conjugate base of $\text{HC}_3\text{H}_2\text{O}_4^-$? (2 pt) _____
3. Which of the following is not a strong acid? (2 pt)
A. HF B. HNO_3 C. HClO_4 D. H_2SO_4 E. all of these are strong acids
4. Which one of the following statements about strong acids is *true*?
A. All strong acids contain H bonded to an oxygen atom.
B. Strong acids are 100% ionized in water.
C. The conjugate base of a strong acid is itself a strong base.
D. Strong acids produce solutions with a higher pH than weak acids.
5. In the reaction $\text{H}_2\text{CO}_3 + \text{H}_2\text{O} \rightleftharpoons \text{HCO}_3^- + \text{H}_3\text{O}^+$, the Brønsted Lowry acids are
A. H_2CO_3 and H_2O B. H_2O and H_3O^+ C. H_3O^+ and H_2CO_3 D. H_2O and HCO_3^-
6. The pOH of a solution is 10.25.
a) What are the pH, $[\text{H}_3\text{O}^+]$ and $[\text{OH}^-]$ for this solution? Make sure to show the formulas used and express your answers with the proper number of significant figures. (6 pts)

b) Is the solution in question 6a acidic, basic or neutral? (2 pt) _____

7. Consider the following reaction:



For parts a-e, predict the effect of the following changes on the position of equilibrium (left, right, no change), when each of the following changes is made (12 pts):

- a. Adding more $\text{CCl}_4(g)$ _____
- b. Increasing the pressure _____
- c. Removing some $\text{Cl}_2(g)$ _____
- d. Decreasing the temperature _____
- e. Adding a catalyst _____
- f. If the temperature of the reaction is decreased, does the value of K_c increase, decrease or stay the same?
