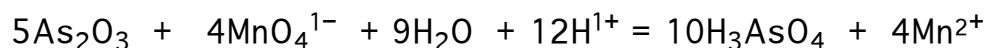
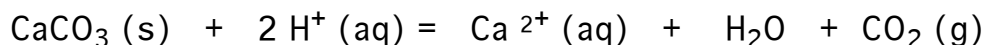


- 1) Write net ionic equations for the reaction which occurs (if any) when aqueous solutions of the following are mixed:
  - a) potassium chloride and lead (II) nitrate
  - b) perchloric acid and potassium hydroxide
  - c) sodium hydroxide and acetic acid
  - d) methyl amine and hydrobromic acid
  - e) sodium hydroxide and ferric nitrate
  
- 2) Dibutyl succinate is an insect repellent used against household ants and roaches. Its composition is 62.58% C; 9.63% H and 27.79% O and the compound has a molecular weight of 230 g/mol. What is the molecular formula of dibutyl succinate?

- 3) An aqueous  $\text{KMnO}_4$  solution is to be standardized against  $\text{As}_2\text{O}_3$ . A 0.1156 g sample of  $\text{As}_2\text{O}_3$  requires 27.08 mL of the  $\text{KMnO}_4$  solution for its titration. What is the molar concentration of the  $\text{KMnO}_4$ ?



- 4) A piece of marble (assume it to be pure  $\text{CaCO}_3$ ) reacts with 2.00 L of 2.52 M HCl. After dissolution of the marble, a 10.00 mL sample of the remaining HCl is withdrawn, added to some water, and titrated with 24.87 mL of 0.9987 M NaOH. What was the mass of the piece of marble?



- 5) Draw the Lewis structure for the carbonate anion ( $\text{CO}_3^{2-}$ )