

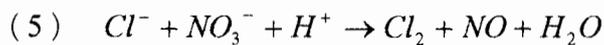
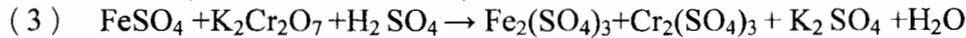
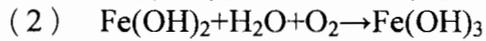
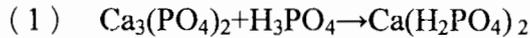
系所組別：環境醫學研究所甲組

考試科目：環境化學

考試日期：0224，節次：3

※ 考生請注意：本試題不可使用計算機

1. Balance the following equations: (25%, 5% for each)

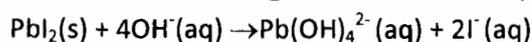


2. Chlorination is the major disinfection method of tap water, please use figure and reactive equation to interpret what are (1) Breakpoint Chlorination ? (2) Free and Combined Chlorine Residuals ? (10%) In addition, please present two analytical methods to measure the Free and Combined Chlorine Residuals in water samples.(10%)

3. What is "Buffer Index" ? (6%) The wastewater from a petrochemical plant contains 0.15 mol/L acetic acid and 0.1 mol/L acetate, and the wastewater was treated with NaOH to make up the pH to 5.0. If you want to adjust the the pH of wastewater to 6.5, how many mol/L NaOH is needed to add to wastewater ? (10%) The K_A of acetic acid is 1.8×10^{-5} .

4. Please use reactive equation and methane as example to interpret the role of hydrocarbons in the photochemical smog (9%) and the productive mechanism of PAN (Peroxyacetyl nitrate) (9%)

5. Consider the following chemical reaction: (21%, 3% for each).

Will the concentration of $\text{Pb}(\text{OH})_4^{2-}(\text{aq})$ be increased, decreased or unaffected by :

- (1) increasing the concentration of $\text{OH}^-(\text{aq})$
- (2) addition of $\text{HNO}_3(\text{aq})$
- (3) decreasing the amount of $\text{PbI}_2(\text{s})$
- (4) decreasing the temperature ($\Delta H^\circ < 0$)
- (5) increasing the total pressure ($\Delta V^\circ > 0$)
- (6) addition of $\text{NaClO}_4(\text{aq})$
- (7) decreasing the $\text{PbI}_2(\text{s})$ particle size