

淡江大學 109 學年度日間部寒假轉學生招生考試試題

系別：水環系環工組三年級

科目：環境化學

34 - 34

考試日期：1月18日(星期一) 第2節

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A. Multiple Choice (8 point/question)

1. The pKa value for ammonium is 9.25. What is the ratio of ammonium to ammonia at pH of 8.25? (A) 100 (B) 10 (C) 1 (D) 0.1
2. How many moles of ferrous are required to completely reduce one mole of dichromate ($\text{Cr}_2\text{O}_7^{2-}$) to Cr(III)? (A) 3 (B) 4 (C) 6 (D) 12
3. To neutralize 10 ml of NaOH (concentration = 1 N) (N: normality), what is the volume of H_2SO_4 (concentration = 1 N) required? (A) 2.5 ml (B) 5 ml (C) 10 ml (D) Not enough information to decide
4. Which of the following water quality parameter is not included for the calculation of river pollution index (RPI)? (A) DO (B) $\text{NH}_3\text{-N}$ (C) COD (D) SS
5. Which of the following description about Standard Hydrogen Electrode (S.H.E.) is incorrect? (A) The half-cell reaction is $\text{H}^+ + \text{e}^- \leftrightarrow 0.5 \text{H}_{2(g)}$ (B) activity of H^+ is 1.0 (C) pH of the electrolyte is 1 (D) activity of e^- is 1.0

B. Computational Questions.

1. A water sample contains 150 mg/L of sodium acetate ($\text{C}_2\text{H}_3\text{NaO}_2$). What is the TOC (total organic carbon) of the sample? (15%) (MW: Na = 23)
2. Ammonium can be oxidized to nitrite by ammonium oxidized bacteria (AOB) by nitrification process during wastewater treatment. Write the redox reaction for nitrification and determine the number of moles of oxygen needed for oxidizing a mole of ammonium to nitrite? (15%)
3. Trihalomethanes produced from disinfection process in drinking water treatment are regulated in Taiwan with concentration of $0.08 \mu\text{g/L}$. What are the four trihalomethane species? (15%)
4. Following table shows the ions contained in a water sample. What's the ionic strength of the sample? (15%) (MW: Cl = 35.5, S = 32, Ca = 40, Mg = 24, Fe = 55.8)

Ions	Concentration (mg/L)	Ions	Concentration (mg/L)
Cl^-	71	Ca^{2+}	34
SO_4^{2-}	30	Mg^{2+}	6
Na^+	15	Fe^{2+}	7