

淡江大學 107 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

31-1

考試日期 1月13日(星期日) 第2節

本試題共 2 大題 2 頁

本試題雙面印刷

A. Multiple choice Questions (5 points per question)

1. The pH and HCO_3^- concentration of an idea solution is 8.33 and 61 mg/L, respectively. What is the concentration of CO_3^{2-} ? (A) 10^{-5} M (B) 10^{-3} M (C) 6 mg/L (D) 60 mg/L. ($\text{pK}_{a1}=6.35$; $\text{pK}_{a2}=10.33$)
2. $\text{Cr}_2\text{O}_7^{2-}$ is a strong oxidant used for chemical oxygen demand (COD) analysis. What is the equivalent weight (E.W.) of $\text{Cr}_2\text{O}_7^{2-}$? (A) 216 (B) 72 (C) 36 (D) 18. (Atomic weight: Cr: 52)
3. A water sample contains 246 mg/L of sodium acetate ($\text{C}_2\text{H}_3\text{NaO}_2$). What is the Total organic concentration (TOC) of the sample? (A) 246 mg/L (B) 123 mg/L (C) 92 mg/L (D) 72 mg/L.
4. Which is the most appropriate ionic exchange resin for treating Cr(VI) wastewater with pH of higher than 10.5? (A) weak-acid cation resin (B) weak-base anion exchange resin (C) strong-acid cation exchange (D) strong-base anion exchange.
5. What is the substance in drinking water that could cause blue baby syndrome? (A) Hardness (B) Nitrate (C) Trihalomethanes (D) Color.
6. What's the possible functional groups for the exchange sites of a weak-acid cation exchange resin? (A) Amino group (B) Amine group (C) carboxylic group (D) sulfonic group.
7. For the electrolysis of a hydrochloric acid solution, which of the following statement is correct? (A) $\text{H}_2(\text{g})$ produced in anode (B) $\text{Cl}_2(\text{g})$ produced in anode (C) $\text{N}_2(\text{g})$ produced in cathode (D) $\text{O}_2(\text{g})$ produced in cathode.
8. A water sample contains 10 mg/L of nitrate ions. Express the nitrate concentration as nitrate-nitrogen? (A) 2.26 mg/L (B) 5.46 mg/L (C) 10 mg/L (D) 14 mg/L. (Atomic weight: N: 14)
9. Which of the following is not the water quality parameter for calculating river pollution index (RPI)? (A) Nitrate (B) Dissolved oxygen (C) BOD (D) SS.
10. What is Total Kjeldahl Nitrogen (TKN)? (A) Nitrate + Nitrite (B) Nitrate + Nitrite + total ammonia (C) total organic nitrogen + Nitrate + Nitrite (D) total organic nitrogen + Total ammonia

背面尚有試題

淡江大學 107 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

31-2

考試日期：1月13日(星期日) 第2節

本試題共 2 大題 2 頁

B. Computational Questions (50 points total)

1. A 100-mL sample was titrated to determine its alkalinity. The sample requires 8.5 mL of 0.01 M H_2SO_4 to reach phenolphthalein end point and requires **additional** 12 mL to reach bromocresol green end point. What are the **hydroxide, carbonate, and bicarbonate alkalinity** of the sample (mg/L as CaCO_3)? (10 points for each answer, 30 points total)
2. Following table shows the anions and cations contained in a water sample. What's the concentration of sulfate ions in this water due to the charge neutralization? (10 points) What is the hardness of the sample in the unit of mg/L as CaCO_3 ? (10 points) Assume H^+ and OH^- concentrations are negligible. (Atomic weight: Cl=35.5; S=32, Na =23; Ca=40; Mg=24.3; Fe=55.8)

Ions	Concentration (mg/L)	Ions	Concentration (mg/L)
Cl^-	90	Na^+	23
SO_4^{2-}	?	Ca^{2+}	60
		Mg^{2+}	10
		Fe^{2+}	7