

國立成功大學

111學年度碩士班招生考試試題

編 號： 283

系 所： 環境醫學研究所

科 目： 環境化學

日 期： 0220

節 次： 第 3 節

備 註： 不可使用計算機

編號：283

國立成功大學 111 學年度碩士班招生考試試題

系 所：環境醫學研究所

考試科目：環境化學

考試日期：0220，節次：3

第1頁，共1頁

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. Balance the following equations: (25%, 5% for each)
 - a. $\text{MnO}_2 + \text{NaCl} + \text{H}_2\text{SO}_4 \rightarrow \text{MnSO}_4 + \text{H}_2\text{O} + \text{Cl}_2 + \text{Na}_2\text{SO}_4$
 - b. $\text{FeSO}_4 + \text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + \text{Cr}_2(\text{SO}_4)_3 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
 - c. $\text{Al}_2(\text{SO}_4)_3 \cdot 14 \text{H}_2\text{O} + \text{Ca}(\text{HCO}_3)_2 \rightarrow \text{Al}(\text{OH})_3 + \text{CaSO}_4 + \text{H}_2\text{O} + \text{CO}_2$
 - d. $\text{HClO} \rightarrow \text{HClO}_3 + \text{HCl}$
 - e. $\text{H}_2\text{C}_2\text{O}_4 + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{CO}_2 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
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. Please use reactive equation and methane as example to interpret the role of hydrocarbons in the photochemical smog (10%) and the productive mechanism of PAN (Peroxyacetyl nitrate) (10%)
4. Please describe the nitrogen cycle in the ecosystem and describe the role of organism in the nitrogen cycle. (15%)
5. Please explain why the results of BOD and COD for the same sample are always different? (10%)
6. Please explain the formation mechanism of "Crown corrosion" in the public sewage system ? (10%)