

國立虎尾科技大學九十七學年度研究所（碩士班）入學試題

所別：生物科技系碩士班

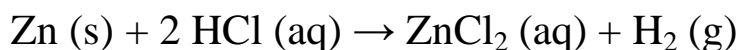
科目：考試科目 2（生物科技概論與普通化學）

注意事項：

- (1) 本試題各五題，每題配分如題目說明，總分共一百分合計分。
(2) 請依序作答在答案卷上並註明題號。

1. 解釋名詞（簡略說明其功能，意義及可應用性） (10%)
 - a. Phagemid
 - b. primer extension
 - c. Antisense RNA
 - d. Transcription
 - e. Polymerase chain reaction
2. Please give at least five functions and examples of microorganism to explain how the microbial / micro-biotechnology were used to improve agriculture, medicine, food, environmental protection and industry in human society? (10%)
3. What is the last results if we use EcoRI first and then use HaeIII to cut DNA fragment "AAGTTGGCCCTTCGCGAATTCGGCCGC". (HaeIII 5'GG ↓ CC 3' ; EcoRI 5'G ↓ AATTC3') (10%)
4. 以大腸桿菌中生產重組蛋白可能會面臨哪些難題？(10%)
5. 何謂 Monoclonal antibody？如何生產 Monoclonal antibody？(10%)
6. Balance the following oxidation-reduction reactions that occur in basic solution.
 - (a) $\text{Al (s)} + \text{MnO}_4^- \text{ (aq)} \star \text{MnO}_2 \text{ (s)} + \text{Al(OH)}_4^- \text{ (aq)}$
 - (b) $\text{Cl}_2 \text{ (g)} \star \text{Cl}^- \text{ (aq)} + \text{OCl}^- \text{ (aq)}$
 - (c) $\text{NO}_2^- \text{ (aq)} + \text{Al (s)} \star \text{NH}_3 \text{ (g)} + \text{AlO}_2^- \text{ (aq)}$(10%)

7. Commercial brass, an alloy of Zn and Cu, reacts with hydrochloric acid as follows:



(Cu does not react with HCl.) When 0.5065 g of a certain brass alloy is reacted with excess HCl, 0.0985 g ZnCl₂ is eventually isolated.

- (a) What is the composition of the brass by mass? (10%)
(b) How could this result be checked without changing the above procedure?
8. Methanol can be manufactured by CO and H₂. If 68.5 kg of CO(g) is reacted with 8.60 kg of H₂(g). Calculate the CH₃OH actually produced (in kg) if the theoretical yield is 52%. (10%)
The balanced equation is $2\text{H}_2(\text{g}) + \text{CO}(\text{g}) \rightarrow \text{CH}_3\text{OH}(\text{l})$.
9. What volume of a 0.100 M HCl solution is needed to neutralize 25.0 mL of 0.200 M KOH solution?
(10%)
10. Using enthalpies of formation (ΔH_f°), calculate the standard change in enthalpy for the termite reaction: $2\text{Al}(\text{s}) + \text{Fe}_2\text{O}_3(\text{s}) \rightarrow \text{Al}_2\text{O}_3(\text{s}) + 2\text{Fe}(\text{s})$
(Fe₂O₃ (s), $\Delta H_f^\circ = -826 \text{ kJ/mol}$) (Al₂O₃(s), $\Delta H_f^\circ = -1676 \text{ kJ/mol}$) (10%)