

淡江大學 106 學年度日間部轉學生招生考試試題

2-13

系別：化學學系二年級
尖端材料學程二年級

科目：普通化學

13-1

考試日期：7月20日(星期四) 第2節

本試題共 2 大題， 2 頁

一、單選題 (每題 4 分)

- Which of the following compounds is a weak electrolyte?
A) NaF B) HNO₃ C) CH₃COOH D) NaOH E) C₆H₁₂O₆
- Identify the major ionic species present in an aqueous solution of Na₂CO₃.
A) Na²⁺, CO₃²⁻ B) Na²⁺, C²⁻, O₃ C) Na⁺, C⁺, O²⁻ D) Na⁺, C₄⁺, O₃²⁻ E) Na⁺, CO₃²⁻
- The oxidation number of N in NaNO₃ is A) +6. B) +5. C) +3. D) -3. E) None of the above.
- Identify the reducing agent in the following chemical reaction.
 $5\text{Fe}^{2+}(\text{aq}) + \text{MnO}_4^{-}(\text{aq}) + 8\text{H}^{+}(\text{aq}) \rightarrow 5\text{Fe}^{3+}(\text{aq}) + \text{Mn}^{2+}(\text{aq}) + 4\text{H}_2\text{O}(\text{l})$
A) Fe²⁺ B) MnO₄⁻ C) H⁺ D) Mn²⁺ E) Fe³⁺
- Calculate the density, in g/L, of chlorine (Cl₂) gas at STP.
A) 2.13×10^{-2} g/L B) 46.9 g/L C) 1.58 g/L D) 3.16 g/L E) 0.316 kg/L.
- Which one of the following sets of quantum numbers (n, l, m_l, m_s) is not possible?
A) 4, 3, -2, +1/2 B) 3, 0, 1, -1/2 C) 3, 0, 0, +1/2 D) 2, 1, 1, -1/2 E) 2, 0, 0, +1/2
- Which of the following ground-state atoms is diamagnetic?
A) Ca B) As C) Cu D) Fe E) none of these
- The elements in Group 7A are known by what name?
A) transition metals B) halogens C) alkali metals D) alkaline earth metals E) noble gases.
- Which of the following atoms has the largest radius? A) Cl B) I C) P D) Sb E) Se
- Which of the following ions has the largest radius? A) Cl⁻ B) K⁺ C) S²⁻ D) Na⁺ E) O²⁻
- Which of the following elements has the highest first ionization energy?
A) C B) Ge C) P D) O E) Se
- Appropriate units for a first-order rate constant are
A) M/s. B) 1/M·s. C) 1/s. D) 1/M²·s. E) none of these

二、計算及問答題

- Carry out the following arithmetic operations to the correct number of significant figures and unit:
(a) 3.70 g - 2.9133 g (b) 0.01542 kg ÷ 88.3 mL (8 pts)
- Name the following species:
(a) PF₅ (b) HNO₃. (8 pts)

背面尚有試題

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13-2

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15. Write the formulas for these compounds:

(a) chlorite (b) sodium hydroxide. (8 pts)

16. Consider the following unbalanced reaction equation: $\text{MnO}_2 + \text{HCl} \rightarrow \text{MnCl}_2 + \text{Cl}_2 + \text{H}_2\text{O}$

If 75.0 g of MnO_2 and 48.2 g of HCl react, which of the reactants is the limiting reagent?

How many grams of Cl_2 will be produced? (8 pts)

17. How many grams of potassium dichromate ($\text{K}_2\text{Cr}_2\text{O}_7$) are required to prepare a 250-mL solution whose concentration is 2.56 M? (4 pts)

18. Write the ground-state electron configurations for (a) O and (b) Cr. (8 pts)

19. Write the most possible Lewis structure of (a) NF_3 and (b) SF_6 . (8 pts)