

淡江大學 109 學年度日間部寒假轉學生招生考試試題

系別：理學院尖端材料科學學士學位學程二年級

科目：普通化學

24-1 24

考試日期：1月18日(星期一) 第2節

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本試題雙面印刷

一、單選題 (每題 4 分，共 60 分)

- For which one of the following acids is chlorine in the +5 oxidation state?
A) HCl B) HClO C) HClO₂ D) HClO₃ E) HClO₄.
- What are the major ionic species present in an aqueous solution of Na₂CO₃?
A) K²⁺, S⁶⁺, O₄⁸⁻ B) K²⁺, S⁶⁺, 4O²⁻ C) 2K⁺, S⁶⁺, O₄⁸⁻ D) 2K⁺, S⁶⁺, 4O²⁻ E) 2K⁺, SO₄²⁻
- In the following chemical reaction the oxidizing agent is:
$$5\text{H}_2\text{O}_2 + 2\text{MnO}_4^- + 6\text{H}^+ \rightarrow 2\text{Mn}^{2+} + 8\text{H}_2\text{O} + 5\text{O}_2$$

A) H₂O₂ B) MnO₄⁻ C) H⁺ D) Mn²⁺ E) O₂
- Which gas has molecules with the greatest average molecular speed at 25°C?
A) CH₄ B) Kr C) N₂ D) CO₂ E) Ar.
- Electrons in an orbital with $l = 3$ are in a/an
A) d orbital. B) f orbital. C) g orbital. D) p orbital. E) s orbital.
- How many unpaired electrons does a ground-state atom of sulfur have?
A) 0 B) 1 C) 2 D) 3 E) 4.
- The elements in Group 2A are known by what name?
A) transition metals B) halogens C) alkali metals D) alkaline earth metals E) noble gases.
- Which one of the following ionic solids would have the largest lattice energy?
A) NaCl B) NaF C) CaBr₂ D) CsI E) CaCl₂
- Which of the elements listed below has the greatest electronegativity?
A) Na B) As C) Ga D) Cs E) Sb
- Which of the following elements has the highest first ionization energy?
A) C B) Ge C) P D) O E) Se
- What type of chemical bond holds the atoms together within a water molecule?
A) ionic bond B) nonpolar covalent bond C) polar covalent bond D) coordinate covalent bond E) none of these
- What is the number of lone electron pairs in the N₂ molecule?
A) 1 B) 2 C) 3 D) 4 E) 5
- Use VSEPR theory to predict the geometry of the PCl₃ molecule.
A) linear B) bent C) trigonal planar D) trigonal pyramidal E) tetrahedral
- The bond angle in SCl₂ is expected to be
A) a little less than 109.5°. B) 109.5°. C) a little more than 109.5°. D) 120°. E) 180°.
- What is the hybridization of As in the AsF₄⁻ ion?
A) sp B) sp^2 C) sp^3 D) sp^3d E) sp^3d^2

背面尚有試題

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二、計算及問答題 (共 40 分)

16. Bromine is a red liquid at 25°C. Its density is 3.12 g/cm³. What is the volume of 28.1 g of liquid bromine? (5 分)
17. What is the formula for the ionic compound formed by (a) magnesium and iodine; (b) aluminum and oxygen? (10 分)
18. Write the formulas for these compounds:
(a) potassium carbonate (b) sodium nitrite. (10 分)
19. Ammonia (NH₃) is a principal nitrogen fertilizer. It is prepared by the following reaction between hydrogen and nitrogen. (15 分)
 - (a) Write the balance chemical equation for the formation of ammonia.
 - (b) If the theoretical yield of NH₃ is 102.2 g, how many grams of H₂ and how many grams of N₂ are reacted to produce this amount of NH₃?
 - (c) If the actual yield of the above reaction is 88.2 g, what is the percent yield of the reaction?