

東吳大學 100 學年度碩士班研究生招生考試試題

第 1 頁，共 2 頁

系級	化學系碩士班	考試時間	100 分鐘
科目	物理化學暨分析化學	本科總分	100 分

物理化學部分

每題 5 分，共 10 題。

請於答案卷依序並標明題號作答，否則不予記分。

1. Which of the following is not a state function?
(A) Enthalpy (B) Entropy (C) Work (D) Free energy (E) Helmholtz energy
2. The area under a plot of heat capacity at constant pressure vs. the absolute temperature is directly related to
(A) ΔW (B) ΔU (C) ΔH (D) ΔA (E) ΔG
3. One emission line in the spectrum of hydrogen atom occurs at 23032 cm^{-1} . Assuming the Rydberg constant is 109678 cm^{-1} , the line represents a transition between which two quantum levels?
4. What is the term symbol ($^{2s+1}L_J$) for the N atom in the ground state?
5. For a reaction $A \rightarrow B$, a plot of $1/[A]$ versus time (t) is a straight line of slope k and intercept $1/[A]_0$. What is the rate law for this reaction?
6. What is the degree of freedom for a system having N_2O_4 in equilibrium with NO_2 in the gas phase?
7. What is the point group for H_2O_2 ?
8. What is the electronic partition function of H_2 at room temperature?
9. Describe the four processes in a Carnot cycle.
10. What is the ratio of C_p/C_v for an ideal ozone gas if it is a nonlinear molecule?

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第 2 頁，共 2 頁

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科目	物理化學暨分析化學	本科總分	100 分

分析化學部分

依題號作答

11. Calculate the pH of a solution preparing by dissolving 2.00 g of NaHA (mol. wt.=200 g/mole) and 2.22 g Na₂A (mol. wt.=222 g/mole)?

(H₂A: K_{a1}= 1.1x10⁻³ and K_{a2}= 9.1x10⁻⁶) (10 分)

12. An acidic solution containing 0.001M La³⁺ is treated with NaOH.

Calculate at what pH La(OH)₃ will begin to precipitate?

(K_{sp} of La(OH)₃ is 1x10⁻²²) (10 分)

13. Describe the theory and application of reversed phase LC. (10 分)

14. Define the following term:

(A) glass membrane pH electrode

(B) FTIR

(C) random error

(D) tandem mass spectrometry. (20 分)