

淡江大學九十學年度日間部轉學生招生考試試題

系別：化學工程學系三年級

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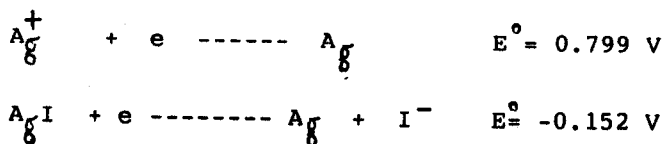
科目：物理化學

本試題共 15 頁

- 20% 1. Determine the degree of degeneracy of the $n=2$ level of the hydrogen atom (omitting spin). List the quantum numbers for each of the wave functions involved.
- 20% 2. Use partition functions to find an expression for the internal energy E in terms of temperature T for a system consisting of 1 mole of an ideal monatomic gas. The molecules are not distinguishable. All atoms are in the ground state and ignore electronic transitions.
- 20% 3. A chemist reported the following data for the following reaction at 25°C :

Experimental Run	A $\xrightarrow{\hspace{1cm}}$ B Initial Concentration of A (M)	Half-life (minute)
1	0.50	7.5
2	0.30	12.5

- 7% (a) Calculate the order of the reaction.
6% (b) Calculate the rate constant of the reaction.
7% (c) If a temperature increase of 10°C will double the reaction rate, determine the activation energy for the reaction.
- 20% 4. If one mole of an ideal gas at 273 K and 10 atm is allowed to expand isothermally against a constant pressure of 1 atm until the gas pressure is 1 atm, what are the values of q , ΔE , ΔS , ΔA , and ΔG ?
- 20% 5. From a handbook we found the following standard electrode potentials at 298 K



Calculate the solubility product constant of AgI .