

國立中央大學 109 學年度碩士班考試入學試題

所別： 大氣科學學系大氣物理碩士班 不分組(一般生)
大氣科學學系大氣物理碩士班 不分組(在職生)

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科目： 普通化學

本科考試禁用計算器

*請在答案卷(卡)內作答

1. As shown in Table 1, the data were recorded for the pseudo-first-order decomposition of nitromethane in the presence of excess base. Answer the following questions. (a) Write down the kinetic equation of this reaction. (b) What is the expression of reaction rate? (c) Find the initial concentration (A_0) of nitromethane and the rate constant (k). (35%)

Table 1. Data for the decomposition of nitromethane.

Time, s	$[\text{CH}_3\text{NO}_2]$, M	$\ln [\text{CH}_3\text{NO}_2]$
0.25	3.86×10^{-3}	-5.557
0.50	2.59×10^{-3}	-5.956
0.75	1.84×10^{-3}	-6.298
1.00	1.21×10^{-3}	-6.717
1.25	0.74×10^{-3}	-7.206

2. List the types of chemical bond and tell the difference. Also give some examples for each type of chemical bond. (25%)
3. A 40.0 ml sample of 0.1 M acetic acid (CH_3COOH) solution was titrated with 0.1 M NaOH. Calculate the pH of the solution under the following conditions. (40%)

Given $K_a = 1.754 \times 10^{-5}$ for CH_3COOH .

- (a) Before the addition of NaOH
- (b) After the addition of 50.0 ml of NaOH

參考用