

科目：分析化學

系所組：化學系碩士班甲組

- Liquid chromatography (LC) is a very powerful tool for analytical chemistry. Two major types column materials are normal- and reversed-phase. Please answer the following questions:
 - explain reversed-phase and normal-phase column. (10%)
 - Describe a typical LC system with UV/VIS absorbance detector. (5%)
- An electrochemical cell is represented as following:
S. H. E. || Hg(EDTA)²⁻(aq, 0.0050M), EDTA (aq, 0.0150M), pH = 6.0 | Hg(l)
This cell was designed to measure the formation constant (K_f) of Hg(EDTA)²⁻. The voltage is +0.300 V. Please calculate the formation constant for Hg(EDTA)²⁻. (20%)
fraction of EDTA⁴⁻ is 1.8×10^{-5} at pH = 6
$$\text{Hg}^{2+} + 2e^- \leftrightarrow \text{Hg}_{(l)} \quad E^0 = 0.852V$$
- A 0.050M malonic acid ($pK_1=2.847$, $pK_2= 5.696$, MW=104) 50.0 mL aqueous solution is titrated with 0.10M NaOH solution. Please answer following two questions:
 - calculate the pH value at the first equivalence point. (10%)
 - Briefly describe how to determine the equivalence points when titration using with pH electrode. (10%)
- Describe the difference between fluorescence and phosphorescence. (15%)
- Please describe Fourier Transform infrared (FTIR) instrument and its advantages. (15%)
- Flow injection analysis (FIA) is a common skill for chemical sensor measurement. Please explain FIA method briefly and its advantages. (15%)

※ 注意：1. 考生須在「彌封答案卷」上作答。

2. 本試題紙空白部分可當稿紙使用。

3. 考生於作答時可否使用計算機、法典、字典或其他資料或工具，以簡章之規定為準。