

國立臺北科技大學

九十三學年度有機高分子研究所入學考試

分析化學試題

填准考證號碼

第一頁 共一頁

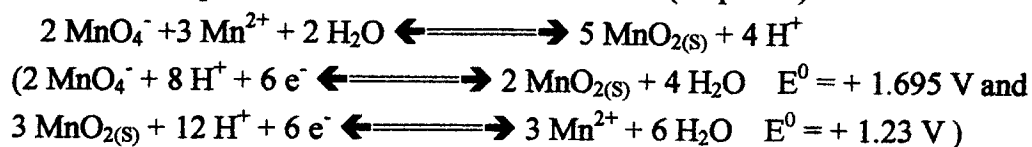
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**注意事項：**

1. 本試題共 8 題，配分共 100 分。
2. 請按順序標明題號作答，不必抄題。
3. 全部答案均須答在答案卷之答案欄內，否則不予計分。

1. Define the following terms (25 points)
  - (a) gel permeation chromatography
  - (b) supercritical fluid
  - (c) chelate
  - (d) reference electrode
  - (e) fast atom bombardment
2. The following results were obtained in the replicate analysis of a blood sample for its lead content: 0.752, 0.756, 0.752, 0.751, and 0.760 ppm Pb. Calculate (a) mean (b) standard deviation (c) the coefficient of variation. (15 points)
3. What is the pH of a solution that is 0.400 M in formic acid and 1.00 M in sodium formate. (10 points)
4. The logarithm of the molar absorptivity for acetone in ethanol is 2.75 at 366 nm. Calculate the range of acetone concentrations that can be used if the transmittance is to be greater than 10.0 % and less than 90.0% with a 1.50-cm cell. (10 points)

5. Calculate the equilibrium constant for the reaction. (10 points)



6. Calculate the relative number of protons in the higher and lower magnetic states when a sample is placed in a 4.69 T field at 20°C. (10 points)

(magnetogyric ratio =  $2.68 \times 10^8 \text{ T}^{-1} \text{ S}^{-1}$ ,  $h = 6.63 \times 10^{-34} \text{ J.S}$ ,  $k = 1.38 \times 10^{-23} \text{ J. K}^{-1}$ )

7. Describe how it is possible to distinguish between XPS peaks and Auger electron peaks.

(10 points)

8. Calculate the frequency range of a modulated signal from a Michelson interferometer with a mirror velocity of 0.2 cm/s, for visible radiation of 700 nm and infrared radiation of 16  $\mu\text{m}$  (10 points)