

科目：分析化學

適用：應化系

編號：372

考生注意：

1. 依次序作答，只要標明題號，不必抄題。
2. 答案必須寫在答案卷上，否則不予計分。
3. 限用藍、黑色筆作答；試題須隨卷繳回。

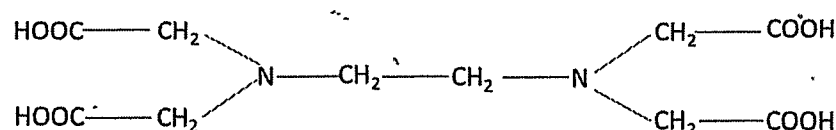
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1. A series of data is shown as: 788, 805, 779, 822, 800.
(a) Calculate the mean value. (5 points)
(b) List an equation with numbers to calculate standard deviation for the data. You don't need to provide the final result. (5 points)

2. Balance the following reaction. (10 points)



3. The chemical structure of complexing agent EDTA is shown below. Please circle the potential sites for bonding a metal ion. (10 points)



4. The organic nitrogen can be determined by the Kjeldahl method.
(a) What is the basic theory of the method? (5 points)
(b) Propose one method error that cause low analytical results. (5 points)
5. The purity of a collected precipitate is very important to get accurate results in gravimetric analysis. Propose two methods to avoid contaminating products during practical treatment of colloidal precipitate. (10 points)
6. The ions in a solution affect the dissociation of an insoluble salt.
(a) Calculate the ionic strength of a 0.05 M Na_2SO_4 . (5 points)
(b) Why the solubility of $\text{Ba}(\text{IO}_3)_2$ is larger in the above electrolyte solution than in water? (5 points)
7. Find the number of millimoles of Na^+ ions in 0.082 g of Na_3PO_4 (163.9 g/mol). (10 points)
8. Explain the working theory of a glass membrane electrode for measuring pH. (10 points)
9. The molar absorptivity of KMnO_4 is $2.3 \times 10^3 \text{ L mol}^{-1} \text{cm}^{-1}$.
(a) Calculate the absorbance of a solution of $5.0 \times 10^{-5} \text{ M}$ in a 1.0 cm cell. (5 points)
(b) List the relationship between transmittance (T) and absorbance (A). (5 points)
10. HPLC is widely used in separation science.
(a) What is the full meaning of HPLC? (5 points)
(b) Give an example to demonstrate the application of HPLC in chemical analysis. (5 points)