

系所組別: 化學系

考試科目: 分析化學

考試日期: 0224, 節次: 4

※ 考生請注意: 本試題不可使用計算機

Part A Choice Questions 5% for each question

- Calculate the pH of a solution of sodium acetate ($K_a = 1.8 \times 10^{-5}$)
 - 6.88
 - 7.88
 - 8.88
 - 9.88
 - non of the above
- The silver in a solution is precipitated by addition of chloride ion. The final volume of the solution is 500 mL. What should be the concentration of Cl^- if no more than 0.10 mg of Ag^+ remains unprecipitated? (Mw of Ag is 107.9)
 - 4.9×10^{-5}
 - 5.3×10^{-5}
 - 2.6×10^{-4}
 - 6.2×10^{-4}
 - 4.9×10^{-4}
- A bottle, which contains 200 mL of 0.100 M NaOH, absorbs 1.00 mmol of CO_2 from the air. If the solution is then titrated with standard acid using phenolphthalein indicator, and if methyl orange indicator had been employed, what normality will be found?
 - 0.105, 0.110
 - 0.100, 0.105
 - 0.095, 0.100
 - 0.092, 0.095
 - 0.090, 0.100
- Suppose the activity of some ion, a_{ion} , really happens to be 1.0000×10^{-4} , but a researcher who doesn't know this want to determine it potentiometrically. If the Nernst equation for one electron process at the indicator electrode is $E = E^\circ - 0.0592 \log a_{\text{ion}}^{-1}$. What percent error in a_{ion} results from a 0.1 mV error in measuring the cell voltage?
 - 1.4%
 - 1.0%
 - 0.8%
 - 0.4%
 - 0.2%
- The equilibrium constant of the reaction $2\text{AgI}_{(s)} + \text{H}_{2(g)} \rightleftharpoons 2\text{Ag}_{(s)} + 2\text{H}^+_{(aq)} + 2\text{I}^-_{(aq)}$ is 8.2×10^{-6} at 25°C . Calculate the hydrogen ion concentration in a system at equilibrium if the pressure of H_2 gas is 0.50 atm and the concentration of I^- is 0.10 M.
 - 0.018 M
 - 0.020 M
 - 0.022 M
 - 0.024 M
 - 0.026 M
- Corrected retention times for ethyl, n-propyl and n-butyl alcohols on a column are 0.69, 1.51, and 3.57 respectively. Predict retention times for the next two members of the homologous series.
 - 7.5, 15.5
 - 8.0, 18.2
 - 8.5, 16.7
 - 9.0, 16.7
 - 9.0, 18.
- A buffer solution for $\text{Cu}^{2+}_{(aq)}$ is being made using EDTA as ligand. The pH of the solution must be 4.0. What concentration of $\text{Cu}^{2+}_{(aq)}$ will present if the solution has $C_{\text{edta}} = 0.0020 \text{ M}$ and $C_{\text{Cu}} = 0.0010 \text{ M}$? The stoichiometry of the C_{edta} reaction is 1:1. $K_f = 7.9 \times 10^{18}$, $\alpha_4 = 3.6 \times 10^{-9}$ at $\text{pH} = 4$.
 - $3.5 \times 10^{-10} \text{ M}$
 - $3.5 \times 10^{-11} \text{ M}$
 - $3.0 \times 10^{-10} \text{ M}$
 - $3.0 \times 10^{-11} \text{ M}$
 - $0.7 \times 10^{-10} \text{ M}$
- Which of the following inlet devices can be used for solid and liquid samples introduced into the ionization region for analysis with mass spectrometer?
 - Batch inlet system
 - Direct probe inlet
 - Chromatographic inlet system
 - Fast atom bombard inlet system
 - Liquid secondary ionization inlet system

(背面仍有題目, 請繼續作答)

系所組別：化學系

考試科目：分析化學

考試日期：0224，節次：4

※ 考生請注意：本試題不可使用計算機

9. Which of the following techniques is/are not used for quantization of analytes in sample?
- a) Standard curve
b) Internal standard curve
c) Standard addition
d) standard spiking recovery
e) Isotope dilution and/or isotope addition in mass spectrometry method
10. Which of the following techniques is/are using for extracting of volatile compounds from samples?
- a) Liquid-liquid extraction
b) Soxhlet extraction
c) Micro wave extraction
d) Purge and trap
e) Solid phase extraction and Solid phase micro extraction
11. The most widely used interface/ionization device for modern High Performance Liquid Chromatography and mass spectrometer is/are
- a) Thermo sprayed ionization
b) Moving belt/electro impact
c) Jet separated/chemical ionization
d) Dynamic Fast atom bombard
e) electro sprayed ionization
12. Which of the following detectors are commonly applied to detection of phosphoric organic compounds?
- a) Mass spectrometer
b) Flame ionization detector
c) Electron capture detector
d) Flame photometric detector
e) Thermo-ionization detector

Part B 10% for each question

13. An unknown concentration lead solution yields a diffusion current of $1.00 \mu\text{A}$. Then, to 10.0 mL of this solution is added 0.500 mL of a lead standard solution whose concentration is 0.0400 M. The diffusion current with the spiked solution is $1.50 \mu\text{A}$. Calculate the lead concentration of the unknown solution.
14. Why Flame atomization method is commonly used in absorption method? Why is inductively coupled plasma atomization always used in emission method?
15. What are the sources of interference in atomic absorption spectroscopy's methods? And please explain in detail how we correct them?
16. Please compare their advantages and disadvantage of spectroscopic instruments of single beam, double beam in space and double in time.

編號：49

國立成功大學 102 學年度碩士班招生考試試題

共 3 頁，第 3 頁

系所組別：化學系

考試科目：分析化學

考試日期：0224，節次：4

※ 考生請注意：本試題不可使用計算機

| log | 底數10 | ln | 底數e |
|-----|--------|----|--------|
| 2 | 0.301 | 2 | 0.6931 |
| 3 | 0.4771 | 3 | 1.0986 |
| 4 | 0.6021 | 4 | 1.3863 |
| 5 | 0.699 | 5 | 1.6094 |
| 6 | 0.7782 | 6 | 1.7918 |
| 7 | 0.8451 | 7 | 1.9459 |
| 8 | 0.9031 | 8 | 2.0794 |
| 9 | 0.9542 | 9 | 2.1972 |
| 10 | 1 | 10 | 2.3026 |
| 11 | 1.0414 | 11 | 2.3979 |
| 12 | 1.0792 | 12 | 2.4849 |
| 13 | 1.1139 | 13 | 2.5649 |
| 14 | 1.1461 | 14 | 2.6391 |