

CHEMISTRY 226
FINAL EXAM
DECEMBER 20, 2002

Name: _____ **Student ID No:** _____

I. (2 pts each) Match the following terms and definitions.

1. _____ Measure of chromatographic columns ability to separate two analytes.
2. _____ Spontaneous electrochemical cell.
3. _____ Electrode at which oxidation takes place.
4. _____ Gain of electrons.
5. _____ Type of chromatography in which the stationary phase is non-polar and the mobile phase is polar.
6. _____ Delayed emission of photons is measured following absorption.
7. _____ Term used to describe chromatographic column efficiency.
8. _____ Closeness of measured value to accepted value.
9. _____ Process by which a coagulated colloid returns to its dispersed state.
10. _____ $pK_a \pm 1$

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|--------------------------------|----------------------------------|
| A. Accuracy | J. Oxidation |
| B. Anode | K. Peptization |
| C. Cathode | L. Phosphorescence |
| D. Digestion | M. Plate Height |
| E. Electrolytic Cell | N. Precision |
| F. Fluorescence | O. Reduction |
| G. Galvanic Cell | P. Resolution |
| H. Indicator pH range | Q. Reversed Phase Chromatography |
| I. Normal Phase Chromatography | |

II. (3 pts). EDTA has six binding sites. Name them.

III. For the following cell:



1. (2 pts) Write each half reaction as a reduction.
2. (5 pts) Calculate the theoretical potential of the cell.
3. (3 pts) Calculate the change in free energy.

IV. For a wavelength of 3000 nm calculate:

1. (3 pts) the frequency in Hz
2. (3 pts) the energy in Joules.

- V. (5 pts) Calculate the potential of a platinum electrode immersed in a solution that is 0.0750 M $\text{Sn}(\text{SO}_4)_2$ and 2.5×10^{-3} M SnSO_4 .
- VI. A solution containing the complex formed between Bi (III) and thiourea has a molar absorptivity = 9.32×10^3 .
1. (5 pts) Calculate the absorbance of a 6.24×10^{-5} M solution at 470 nm in a 2.50 cm cell.
 2. (2 pts) Calculate the % transmittance.
- VII. (7 pts) A 5.00 g sample of pesticide (DDT; $\text{C}_{14}\text{H}_9\text{Cl}_5$; 354.5 g/mol) was decomposed with metallic sodium in alcohol and the liberated chloride ion precipitated as AgCl (143.3 g/mol). Calculate the %DDT in the original sample based on recovery of 0.1606 g AgCl .