CHEMISTRY 226
FINAL EXAM
APRIL 30, 2002

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

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

1. _____ Measure of chromatographic columns to separate two analytes.

2. _____ Electrochemical cell that requires an external source of electrical power.

3. _____ Electrode at which reduction takes place.

4. _____ Loss of electrons.

5. _____ Type of HPLC column in which the stationary phase is a second liquid that is immiscible with the liquid mobile phase and is held in place by adsorption or chemical bonding.

6. _____ Prompt emission of photons is measured following absorption.

7. _____ Term used to describe chromatographic column efficiency.

8. _____ Closeness of measured values to one another.

9. _____ Process by which a coagulated colloid returns to its dispersed state.

10. _____ Molecular absorption transition in the IR range.

A. Accuracy
B. Adsorption Column
C.Anode
D.Cathode
E. Digestion
F. Electolytic Cell
G. Fluorescence
H. Galvanic Cell
I. Oxidation
J. Partition Column
K. Peptization
L. Phosphorescence
M. Plate Height
N. Precision
O. Reduction
P. Resolution
Q. Rotational Transition
R. Vibrational Transition

II. For the following cell:

$$Zn \mid Zn^{2+}\ (0.0364\ M) \parallel Tl^{3+}\ (9.06 \times 10^{-3}\ M),\ Tl^{+}\ (0.0620\ M) \mid Pt$$

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.

III. For an x-ray photon with a wavelength of 2.70Å calculate:

1. (3 pts) the frequency in Hz

2. (3 pts) the energy in Joules.

IV. (5 pts) Calculate the potential of a platinum electrode immersed in a solution that is 0.0353 M $VOSO_4$, 0.0586 M $V_2(SO_4)_3$ and 0.100M $HClO_4$.

V. 2.50 mL aliquot of a 3.38 ppm Fe^{3+} solution is treated with excess KSCN and diluted to 500 mL.

1. (5 pts) What is the absorbance of the solution at 580 nm in a 2.50 cm cell? (Molar absorption coefficient = 7.00 X 10^3L/mol cm.)

2. (2 pts) Calculate the % transmittance.

VI. (8 pts) A 0.17989 g sample of an organic compound was burned in a stream of oxygen and the CO_2 produced collected in a solution of barium hydroxide. Calculate the percent carbon in the sample if 0.5613 g $BaCO_3$ (MW = 197.34 g/mol) was formed.