

Time: 15 mins

Chem 203

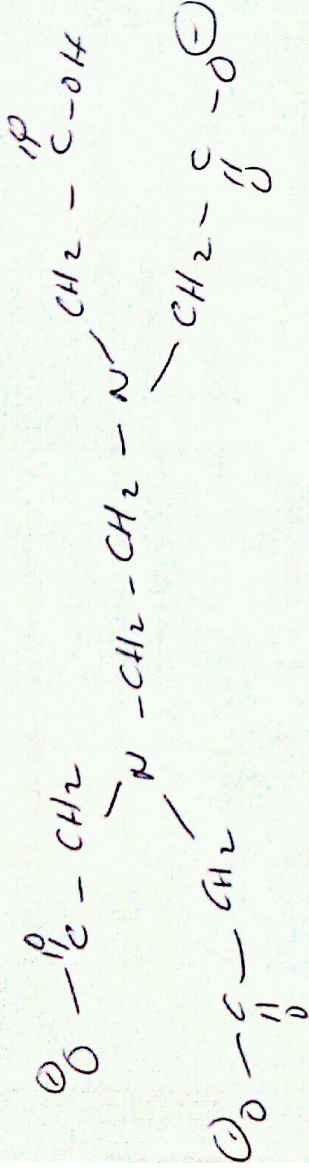
July 6, 2009

Name: _____

Drop Quiz 2

MW Sections

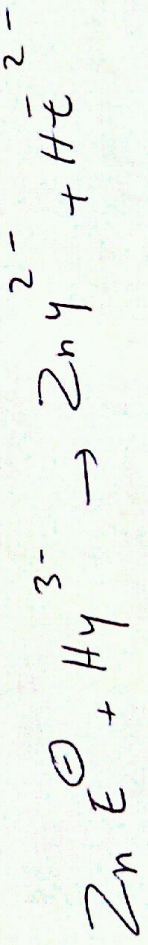
I. Draw the structure of EDTA, in the form that is predominant at pH = 10.0



II. 10.00 ml of a Zn^{2+} solution are titrated with an EDTA solution of molar concentration 0.1011 M, to the Erio-T endpoint. The volume used in the titration was 21.36 ml. Determine the molarity of Zn^{2+} solution. Then express the concentration in grams Zn/liter of solution.

$$\begin{aligned} Zn^{2+} + Y^{4-} &\rightarrow ZnY^{2-} \\ nZn^{2+} = nY^{4-} &\rightarrow M_0 Zn^{2+} V_{Zn^{2+}} = M_{Y^{4-}} \cdot V_{Y^{4-}} \\ &= 0.1011 \times 21.36 \\ M_0 Zn^{2+} &= \frac{0.1011 \times 21.36}{10.00} = 0.2159 M \end{aligned}$$

III. Write a chemical equation for the reaction that occurs during the titration (Take neutral EDTA as H_4Y , and Erio-T as H_3E)



Grade su of 10

Time: 8 min

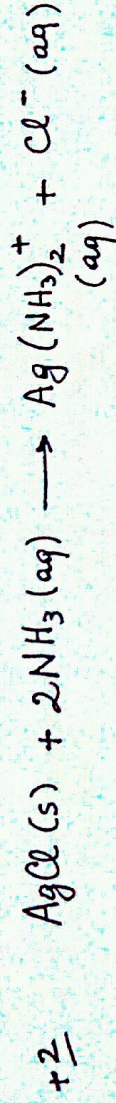
Chem. 203
Drop Quiz 3

July 16, 2003
MW sections

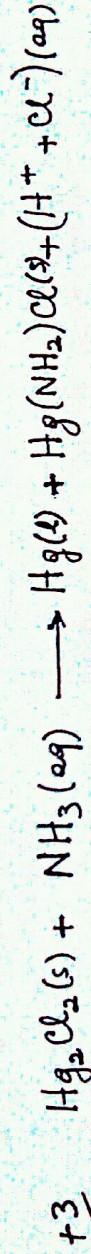
NAME: KEY

1. Write chemical equations representing the following processes:

- Dissolution of the silver chloride salt in aqueous ammonia.



- Reaction of the mercurous chloride salt with aqueous ammonia.



2. Give the name of the part of the spectrophotometer, which corresponds to each of the following descriptions:

- Wavelength selector: monochromator
- Converter of light intensity to an electric signal: detector
- Output display: recorder

3. Give the term corresponding to each of the following definitions:

- +2 • Plot of absorbance versus wavelength: spectrum
- (1 each) • Absorbance of a given substance per unit concentration, per unit path length:
extinction coefficient
OR molar absorptivity

Total out of 12 points

July 7, 2004
MW sections

Chem. 203
Drop Quiz 2

Time: 8 min

NAME: KEY

Indicate whether the following statements are true or false:

- T F EDTA is used as a tetradentate ligand. *hexadentate*
- T F If the fully deprotonated form of EDTA is Y^{4-} , then the fully protonated form is H_4Y . *It is H_6Y^{2+} (at very low pH)*
- T F If the fully deprotonated form of EDTA is Y^{4-} , then the form predominant at pH 10.0 is HY^{3-} .
- T F When Erio-T indicator complexes with Zn^{2+} , the resulting complex has a blue color. *ZnE^{\ominus} is wine red*
- T F The fully protonated form of Erio-T is H_3E , and the form predominant at pH 10.0 is HE^{2-} .
- T F We use an NH_3/NH_4Cl buffer to maintain the pH of the reaction medium at around 10.
- T F The Zn^{2+} - indicator complex has the form ZnE^{2-} . *No! ZnE^{\ominus}*
- T F Any complex ion or coordination compound is called a chelate. *No*
- T F Seven different forms of EDTA can exist depending on the pH.
- T F At the equivalence point of the titration of Zn^{2+} with EDTA at pH 10.0 in the presence of Erio-T indicator, the color of the solution shifts from wine red to blue.
- T F Ethylene diamine is a tridentate ligand X *bidentate*
- T F In the reaction carried out today, EDTA binds to Zn^{2+} through six electron-donating sites.

each

Total out of 12 points

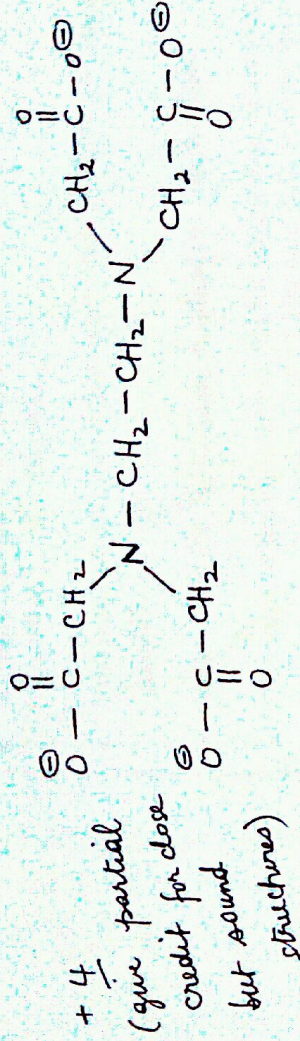
Time: 12 min

Chem. 203
Drop Quiz 2

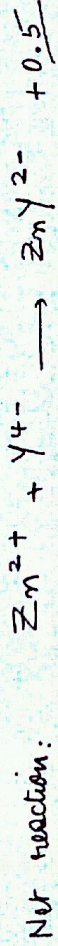
July 8, 2004
TT sections

NAME: KEY

④ 1. Draw the complete structure of EDTA, in the fully deprotonated form.



2. 10.00 mL of a Zn^{2+} solution are titrated with an EDTA solution of molar concentration 0.2106 M, to the Erio-T end-point. The volume used in the titration was 14.35 mL. Determine the molarity of the Zn^{2+} solution. Then express the concentration in grams Zn/liter of solution ($M_{Zn} = 65.39$ g/mol).



$n_{Zn^{2+}} = n_{Y^{4-}}$ at the equivalence point

$M_{0Zn^{2+}} V_{Zn^{2+}} = M_{0EDTA} V_{EDTA}$

+ 4 (-1 for sig. fig., units, etc...)

$$M_{0Zn^{2+}} = \frac{M_{EDTA} V_{EDTA}}{V_{Zn^{2+}}} = \frac{0.2106 \times 14.35}{10.00} = 0.3022M$$

3. Give the color of each of the following chemical species (H_4Y stands for neutral EDTA, and H_3E for Erio-T indicator):

Species	Color
Zn^{2+}	colorless
ZnE^-	wine red
HY^{3-}	colorless
HE^{2-}	blue
ZnY^{2-}	colorless

+ 0.5 each

+ 1

$$0.3022 \frac{mol}{L} \times 65.39 \frac{g}{mol} = 19.76 g Zn/L$$

Total out of 12 points

July 6, 2004
TT sections

Chem. 203
Drop Quiz 1

Time: 8 min

NAME: KEY

1. Complete the following information:

- A volume delivered by means of a 10 mL graduate pipet marked ± 0.04 mL is reported as 10.00 mL.
- Two items of volumetric glassware labeled TD are the pipet and the buret.
- KHP stands for Potassium hydrogen phthalate.
- The value of the equivalence pH for the titration of a strong acid with a strong base is 7.0; and that of a weak acid with a strong base is > 7.0.
- The best indicator to visually detect an acid-base titration whose equivalence pH is 8.5, is a weak acid indicator whose pK_{in} is closest to 8.5.
- We run a blank titration to correct for the presence of traces of acids present in the water, interfering with the titration of the main acid substance, mainly

CO₂ from the air, and the indicator.

•
$$\frac{\overset{10.6}{(15.21 - 4.6)} \times 2.7 \times 10^2}{0.3926} = \underline{7.3 \times 10^3}$$

+3

+1 for showing the result of the subtraction to the first decimal

+2 for the result (two sig. figs.)

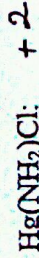
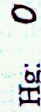
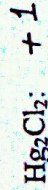
TOTAL out of 13 points -

Chemistry 203
Drop Quiz 3

Wednesday July 24, 2002
Time: 10 minutes

NAME: KEY

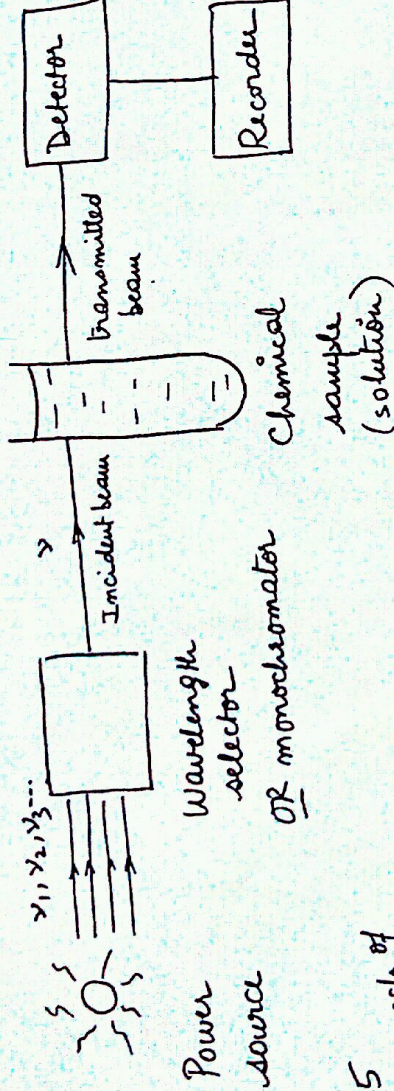
1. Indicate the oxidation state of mercury (Hg) in each of the following compounds:



Hint: the species between brackets is NH₂⁻, called the amide ion.

+3
(+1 each)

2. Sketch a diagram showing the various parts of a spectrophotometer.



+5
(+1 for each of the 5 parts)

M 214
(214)

3. Complete the following information:

A plot of absorbance versus wavelength is known as the spectrum of a substance. From this plot, the best wavelength for absorbance measurements is selected at a maximum of absorption. (or peak)
When a single wavelength is selected for a light beam, that beam is said to be monochromatic. A prism is an example of wavelength selector.

+5
(+1 each)

The intensity of light incident on an absorbing chemical solution is higher than that of light emerging from the solution.

* OR diffraction grating (just in case...)