

Time:50 min.

Chemistry 102
Laboratory Final

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June. 8, 1998

Name: _____

I.D. #: _____

Lab. Instructor: _____

Score :

I _____ /20

II _____ /25

III _____ /21

IV _____ /21

V _____ /13

Grade _____ /100



Good Luck

I- (20%) Circle the letter preceding the best answer:

In the experiment on the determination of an equilibrium constant K:

- a- K is determined using the initial concentrations of ferric ion and thiocyanate ion
- b- The product of the reaction is the red complex $\text{Fe}(\text{CN})_6^{4-}$
- c- The equilibrium concentrations are determined from the difference between the initial concentrations and the concentration of the product at equilibrium
- d- The equilibrium concentrations are determined using the equilibrium constant
- e- All of the above statements are correct
- f- None of the above is true

Which of the following aqueous solutions would you expect to be the best conductor of electricity at 25°C:

- a- 0.20M NaCl
- b- 0.60M CH_3COOH
- c- 0.25M HCl
- d- 0.20M $\text{Mg}(\text{NO}_3)_2$
- e- 0.25M NaCl

In electrochemistry:

- a- A powerful oxidizing agent can be easily reduced
- b- An electrochemical series is an arrangement of the elements in increasing order of their ability to be reduced
- c- A reducing agent is oxidized in a half reaction called reduction
- d- (a) and (b)
- e- All of the above are true statements

Which of the following statement (s) is (are) true:

- a- The conduction of electric charge results from the free motion of charged particles
- b- Solid NaCl will conduct electricity because it contains ions
- c- Molten NaCl can not conduct electricity because the ions can not move
- d- (a) and (b)
- e- (a) and (c)
- f- All of the above

Concerning the reaction of zinc with copper:

- a- Zinc metal can oxidize cupric ion because it has a higher reduction potential
- b- Zinc metal can reduce cupric ion because it has a lower reduction potential
- c- Copper metal can oxidize zinc ion because it has a higher reduction potential
- d- Copper metal can reduce zinc ion because it has a higher reduction potential
- e- None of the above is true

II- A (13%)

Some metal hydroxides redissolve in an excess of hydroxide ion to yield hydroxy complex ions. What do you call this property?

Name 4 cations that have this property:

Give the formula of their hydroxides:

Give the formula of their complexes:

B- (12%)

Give the formula of a reagent that will :

- Dissolve PbS but not HgS: _____

- Precipitate Bi³⁺ but not Cu²⁺: _____

- Dissolve PbSO₄ but not PbS: _____

- Precipitate Bi³⁺ and Cu²⁺: _____

- Dissolve Al(OH)₃ but not Fe(OH)₃: _____

- Precipitate Hg²⁺ but not Ni²⁺: _____

IV- (21%) Suggest one method by which you might separate the following species; Write chemical reactions:

K^+ from Ag^+

Ag^+ from Pb^{2+}

NH_4^+ from Ca^{2+}

Ba^{2+} from Cu^{2+}

Mg^{2+} from K^+

$C_2O_4^{2-}$ from Cl^-

Na^+ from NH_4^+

V- (13%) Complete the following separation chart by filling in the blanks the appropriate compound (s):

