

SUMMARY OF TOPICS FOR FINAL EXAMINATION

Gravimetric Analysis: Chap 27: from 27-1 to 27-3

Properties of a product and initial sample relevant to gravimetric analysis

Digestion, Impurities, Reprecipitation, Peptization

Chemical Equilibrium: Chap 6: 6-1, 6-2

Solubility Product: Chap 6: from 6-3 to 6-5

Equilibrium constant, Gibbs free energy, enthalpy, entropy

Solubility product, common ion effect, separation by precipitation

Titration: Chap 7: 7-1, 7-2, from 7-4 to 7-7

Systematic treatment of equilibrium: Chap 9: from 9-1 to 9-3

Titration, equivalence point, end point, indicators

Direct and back titrations

Fajans titration and Fajans indicator

Volhard titration and Volhard indicator

Systematic treatment of equilibrium

Mass balance, Charge balance

Acid-Base Equilibria: Chap 6: from 6-7 to 6-9; Chap 10: from 10-1 to 10-5; Chap 11: from 11-1 to 11-6; Chap 12: from 12-1 to 12-9

Solubility vs pH: Chap 9: 9-4

Acid-base equilibria, autoprotolysis, pH, strong acids and bases, weak acids and bases

Fractional composition, polyprotic acids

Solubility vs pH, Carbonate equilibrium and total carbonate,

Acid base titrations, Acid base indicators

Determination of pH, finding principal species

amphiprotic systems, isoionic and isoelectric point, buffers

Complex formation, EDTA: Chap 6: 6-6; Chap 13: from 13-1 to 13-7

Complex formation, formation constants, fractional composition,

effect of solubility on complex formation,

chelating ligands, EDTA complexes, EDTA acid-base properties,

conditional formation constant

auxiliary agents, metal ion indicators, EDTA titrations techniques

Electrochemistry: Chap 14: from 14-1 to 14-6

Redox reaction, Nernst equation, standard potential and equilibrium constant,

Finding standard potentials from known standard potentials

Galvanic Cells as chemical probes

FINAL TEST (100 points)

Six Questions (worth 25 points) (two of them involve computations)
(point subdivision: 4,3,3,3,4,8)

Problem #1: Gravimetric problem or solubility product application (common ion effect, separation by precipitation) (worth 25 points) (see Test#1)

Problem #2: pH determination (solubility, carbonate or complexation may be included) (worth 25 points) (see Test#2)

Problem #3: metal-ligands or metal-EDTA and/or Electrochemistry (Cells as chemical probes) (worth 25 points) (see HW09 and HW10)