CHM 161 Final Examination checklist

I will give you all formulas needed for the exam. You should know how to interconvert millimeters into meters or kcal in cal without any formulas. CH 1 is an introduction and is a general overview. Chapters 2-9 are below:

CH 2 – Measurements in Chemistry

- Metric prefixes (milli, centi, kilo, etc), what they mean and how to interconvert
- Unit conversions using dimensional analysis
- density
- Scientific notation – how to use your calculator

CH 3 – Atoms and the Periodic Table

- Make-up of the atom
  - Nucleus with protons and neutrons
  - Electrons outside the nucleus
- Atomic number (number of protons or electrons in atom)
- Mass number (number of protons and neutrons in nucleus)
- Isotopes
- Electron configurations (p.61-67)

CH 4 – Ionic Compounds

- How periodic table is used to predict ion formation: cations and anions
- Electron configurations of ions (how does the number of electrons change
- Electron-dot symbols, octet rule
- Binary ionic compounds (with two elements)
- Polyatomic ions – names, formulas and charges (p.88)
- Nomenclature (naming) ionic compounds using Roman numeral system and standard system (e.g. gold(III) chloride and ammonium carbonate)

CH 5 – Molecular Compounds

Covalent bonding

- Octet rule
- bonding tendencies of different atoms
- similarities between elements in the same group
- Lewis structures
- Be able to draw Lewis structures from molecular formulas or from partially drawn structures
- geometries of compounds based on the structure
- Naming covalent compounds (P_2O_5 e.g.)

CH 6 – Chemical Reactions – Classification and Mass Relationships

- Balancing chemical equations (crucial)
- Molecular weight
- Mole concept; number of atoms/molecules in a mole (Avogadro)
- Mole to mole conversions (using balanced equations)
- Mole to gram conversions (using molecular weights)
- Gram to gram conversions (using both)
    - g reactant -> mol reactant -> mol product -> g product
- classes of chemical reactions:
    - acid-base neutralization
    - precipitation
        - net ionic equation
    - oxidation-reduction
        - oxidation numbers of atoms within molecules
        - what is oxidized, what is reduced
        - oxidizing agent, reducing agent

CH 7 – Chemical Reactions - Energy, Rates and Equilibrium
There will be nothing from chapter 7 ☺

CH 8 – Gases, Liquids and Solids

- P, V, T problems using combined gas law 8.4, 8.5, 8.6, 8.7
- Ideal gas law PV=nRT (solving for missing variable) 8.9
- Avogadro's molar volume (1 mol of any gas = 22.4 L at **S**tandard **T**emp and **P**ressure (STP)) 8.8
- Dalton's partial pressure law 8.10
- Intermolecular forces 8.11
- Changes of State – heating curves 8.15

CH 9 – Solutions (sections 1-5,7)

- Mixtures, homogeneous vs. heterogeneous, examples
- Hydrates, unique formulas, names
- Concentration units:
    - Volume/volume (volume solute/volume solution, volume unites are the same)
    - Weight/volume (mass solute g/volume solution in mL)
    - Molarity (M, moles solute/liter solution)
- $C_1V_1 = C_2V_2$ (solve for missing variable)