Big-Picture Exam Topics

- **Ch 7 (~20-25 %)**
  - Solution Properties, **Like-Dissolves-Like**, Types of Electrolytes, Solubility & Factors Affecting Solubility, Concentrations & Dilution, Solutions vs. Mixtures, Osmosis & Dialysis

- **Ch 8 (~20-25 %)**
  - Acids vs. Bases, Strong vs. Weak, Buffers & Conjugated Acids & Bases, pH scale & $[\text{H}_3\text{O}^+]$, Moles and A/B Reactions

- **Ch 10 (~20-25 %)**

- **Ch 11 (~20-25 %)**
  - Unsaturated vs. Saturated, Alkene (& yne) Reactions, Alkene Properties, cis vs. Trans, Polymer and Aromatic Properties

- **Ch 12 (~20-25 %)**
  - Recognizing Alcohols, Ethers, Thiols, Aldehydes, and Ketones; Properties of these Functional Groups
  - Reactions of these Functional Groups (See Next Slides!)

Know These 4 Ways to Represent the Structures of Organic Compounds

<table>
<thead>
<tr>
<th>Alkane</th>
<th>Methane</th>
<th>Ethane</th>
<th>Propane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular formula</td>
<td>$\text{CH}_4$</td>
<td>$\text{C}_2\text{H}_6$</td>
<td>$\text{C}_3\text{H}_8$</td>
</tr>
<tr>
<td>Structural formulas</td>
<td>$\text{H}$</td>
<td>$\text{H} - \text{H}$</td>
<td>$\text{H} - \text{H} - \text{H}$</td>
</tr>
</tbody>
</table>

Help with Geometric (Line) Structures

1. All bonds except C-H bonds are shown as lines.
2. C-H bonds are **NOT SHOWN** on the line structure.
3. Single bonds are shown as single lines; double bonds are shown as 2 lines; triple bonds are shown as 3 lines.
4. Carbon atoms are not labeled.
5. **ALL** atoms EXCEPT carbon and hydrogen are labeled with their elemental symbols.
6. H atoms are labeled when they are attached to any atom other than carbon.

Example: $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$

Common Names to Know

In addition to the standard naming schemes covered in lecture & in your book, these are the common names that you need to know for the test next week. *You should be able to (i) write the names of these molecules if given structures OR (ii) draw structures of these molecules if given names.*

- **Alkanes**
  - Substituents that have common names:
    - the *isopropyl* group: $\text{CH}_3\text{CH}(-\text{CH}_3)$
    - the *tert-butyl* (a.k.a. *t-butyl*) group: $\text{CH}_3\text{C}(-\text{CH}_3)$

- **Alkenes & Alkynes**
  - Ethylene (IUPAC = ethene)
  - Benzene
Common Names to Know (Continued)

• Alcohols
  – methyl alcohol (IUPAC = methanol)
  – ethyl alcohol (IUPAC = ethanol)
  – propyl alcohol (IUPAC = propanol)
  – isopropyl alcohol (rubbing alcohol) (IUPAC = isopropanol)
  – glycerol (a.k.a. glycerine) (IUPAC = 1,2,3-propanetriol)
  – ethylene glycol (IUPAC = 1,2-ethanediol)
  – phenol (IUPAC = phenol or hydroxybenzene)

• Thiols and Ethers
  – no common names to memorize

Common Names to Know (Continued)

• Aldehydes and Ketones
  – formaldehyde (IUPAC = methanal)
  – acetone (A.K.A. dimethyl ketone) (IUPAC = propanone)

• Carboxylic acids & Esters
  – formic acid (IUPAC = methanoic acid)
  – acetic acid (IUPAC = ethanoic acid)

Reactions to Know

As it turns out, your book does a fairly nice job of providing a summary of the organic reactions at the end of each chapter. Below, I list these reactions along with additional comments. On the test, you need to be able to predict the products formed when given SPECIFIC reactants and conditions.

• Alkanes
  – combustion to produce CO2 and H2O (only know need to know the products of complete combustion)

• Alkenes & Alkynes (see Summary on pg. 379)
  – combustion (same products as for alkanes)
  – addition reactions
    • hydrogenation (organic product = alkane)
    • OH group goes on C that is attached to more other C
    • hydration (organic product = alcohol)

• Thiols (see Summary on pg. 418)
  – oxidation (organic product = disulfide)

Reactions to Know (Continued)

• Alcohols (see Summary on pg. 418)
  – combustion (similar to alkanes above)
  – dehydration (organic product = alkene)
  – remember the reaction requires heat (Δ) and acid (H+)
  – oxidation (will usually represent oxidant as [O])
    • of primary alcohols (organic product = aldehyde)
    • of secondary alcohols (organic product = ketone)
    • no oxidation of tertiary alcohols

• Aldehydes and Ketones (see Summary on pg. 418)
  – oxidation of aldehydes (organic product = carboxylic acid)
    • specifically know Tollens reagents given on pg. 407
    • ketones do not undergo oxidation
  – BUT know iodoform Test that was done in LAB CLASS