

## Review of Chemical & Physical Principles

The best way to prepare for Chem 14A is to review all the material below.

Students must view and work through the following four Audio-Visual Focus-Topics available at the Chem 14A class web-site at: <https://lavelle.chem.ucla.edu/>

For each module take the pre-assessment, then watch the video, then take the post-assessment, and then the brief survey.

- Empirical and Molecular Formulas
- Balancing Chemical Equations
- Limiting Reactant Calculations
- Molarity and Dilution of a Solution

In addition read the following sections and topics in your textbook and lecture notes. Also work through the examples and problems in your textbook and lecture notes.

Reading all the Fundamentals sections in your textbook is highly recommended. The following are essential reading:

7<sup>th</sup> Edition: Fundamentals E, F, G, H, L1-2, M

Appendix 1B, 1C, 1D, 1E

Problems E 1, 3, 7, 9, 15, 17, 21, 23, 25, 27, 29; F 1, 3, 5, 9, 11, 13, 15, 17, 19, 23, 25;

G 5, 7, 9, 11, 13, 17, 19, 21, 23, 25; H 1, 3, 5, 7, 11, 13, 15, 17, 19, 21; L 1, 3, 5, 7, 35, 39;

M 1, 3, 5, 7, 9, 11, 15, 19

6<sup>th</sup> Edition: Fundamentals E, F, G, H, L1-2, M

Appendix 1B, 1C, 1D, 1E

Problems E 1, 3, 7, 9, 15, 17, 21, 23, 25, 27, 29; F 1, 3, 5, 9, 11, 13, 15, 17, 19, 23, 25;

G 5, 7, 9, 11, 13, 17, 19, 21, 23, 25; H 1, 3, 5, 7, 11, 13, 15, 17, 19, 21; L 1, 3, 5, 7, 35, 39;

M 1, 3, 5, 7, 9, 11, 15, 19

After going through the online Audio-Visual Focus-Topics, the readings, worked examples, and homework problems you should be able to:

- Use SI units.
- Convert units (e.g., Kelvin, Celsius and Fahrenheit).
- Use scientific notation and apply dimensional analysis.
- Define accuracy and precision.
- Use the correct number of significant figures.
- Use various means of representing molecules and write formulas from molecular structures.
- Write symbols for the elements, given their names, and vice versa.
- Define a mole.
- Convert between mass and moles.
- Calculate mass percentage composition of a compound and determine its empirical formula.
- Determine the molecular formula of a compound from its empirical formula and its molar mass.

- Calculate the molarity of a solute in solution, volume of solution, and mass of solute, given the other two quantities.
- Do dilution calculations.
- Understand conservation of mass and balance chemical equations.
- Understand and apply the concept of a limiting reactant.
- Calculate real and theoretical yields in chemical reactions.