

CHEM 209 Preparation for Background Concepts and Skills

Your admission to the Schulich School of Engineering depended on certain courses including introductory courses in chemistry. Your CHEM209 course will require you to build on this background. These concepts are fundamental for all further work in chemistry.

Review this list of concepts and skills. Use the CHEM209 Data Sheet as a reference. If necessary, practice these recommended end-of-chapter questions from our textbook. Test your understanding with the online quiz for bonus points. This content will be tested within tutorial quizzes and the midterm and in your first experiment. Please ask your instructor or teaching assistants if you have any questions.

Key categories: Part 1 Preliminary Assessment Quiz. Chapters 1-4

Units and scientific notation

Convert between units	Chapter 1: 19, 26, 34, 45
Identify uncertainty in measurements	Chapter 1: 70
Indicate the differences between precision vs. accuracy	Chapter 1: 72
Assign the correct number of significant figures in calculations and rounding	Chapter 1: 52, 54

Laboratory calculation skills

Calculate concentration of solution prepared by dissolving solid	Chapter 3: 127
Calculate concentration of solution prepared by dilution	Chapter 3: 112
Write balanced chemical equations for simple reactions given an unbalanced equation	Chapter 3: 56

Chemical symbols and stoichiometric calculations

Calculate molar masses from formulas	Chapter 2: 102, 108; Chapter 3: 12, 25
Calculate the amount of product expected or reactants required in a chemical reaction	Chapter 3: 66, 68
Identify a limiting reagent and calculate the amount of product formed from a non-stoichiometric mixture of reactants	Chapter 3: 80
Calculate percent yield	Chapter 3: 86
Calculate properties of gases under changing conditions using the ideal gas law	Chapter 4: 24, 26
Perform stoichiometric calculations involving gases as reactants or products	Chapter 4: 47, 59, 104

Vocabulary (Chapter 2: 39, 43, 56, 70)

- electron, proton, nucleus
- atomic number, symbol, atomic mass, isotopes
- atom, ion, molecule, element, and compound

Sample and Follow-up Problems within each chapter:

- 1.3, 1.4-1.7, 1.8, 1.9
- 2.4, 2.6
- 2.15, 2.16
- 3.1-3.5, 3.12-3.27, 3.28-3.29
- 4.1, 4.2-4.8, 4.11-4.12

Key categories: Part 2 Preliminary Assessment Quiz.

Acids and bases in water

Write balanced reactions and K_a expressions for acids in water	Chapter 16: 17
Calculate pH from $[H_3O^+]$, calculate pOH from $[OH^-]$, and calculate pH from pOH and pOH from pH	Chapter 16: 49, 55
Review mathematical rules for logarithms	Appendix A

Electrochemistry

Assign oxidation numbers to all atoms within a formula	Section 19.1
Build and balance redox half-reactions	Chapter 19: 21
Balance a redox reaction using two half-reactions	Chapter 19: 10, 12, 14

Vocabulary

acid, base, conjugate acid-base pairs	Chapter 16: 23
strong acid, weak acid, strong base, weak base	Chapter 16: 35, 37, 44
oxidation, reduction, oxidizing agent and reducing agent	Section 19.1

Sample and Follow-up Problems within each chapter:

16.1-3, 16.5-6

19.1-3, 19.5