

## Top-10 List of Must-Know Items For Chemistry Graduates

### I. Atomic structure

#### 1. Information encoded in the Periodic Table

- **Z** and **A**
- Metal/non-metal
- Ionization energy,
- Electronegativity

#### 2. Electronic structure

- Orbital types and filling
- Pauli principle
- Hund's rule
- VE count

#### 9. Equilibrium constant

- LeChatelier's Principle
- $\Delta G^\circ = -RT \ln K$

#### 10. Energy

- Endothermic/exothermic
- Catalyst
- $\Delta G^\circ = \Delta H^\circ - T\Delta S^\circ$

### II. Molecular structure

#### 3. Covalent bond vs. ionic bond

- Covalent formulas
- Ionic formulas
- FW

#### 4. Lewis structure

- Oxidation numbers, formal charges
- Dipole moment
- 3-D structures
- Hybridization
- Resonance

#### 5. MO diagram

### III. Chemical reactions

#### 6. Balancing chemical equations

- Calculating molarity
- Limiting reagent
- Percent yield

#### 7. Reaction types

- Acid-base
- Redox
- Radical

#### 8. Chemical Dynamics

- Rate Laws
- Transition States
- $k = A \cdot \exp(E_a/RT)$