

Chemistry Unit-III Exam Outline

I. Ionic and molecular (or covalent) compounds

A. Know how to:

1. determine the number of valence electrons (to determine the charge of an ion).
2. draw and/or interpret Lewis dot diagrams.
3. recognize lone pairs of electrons.
4. identify ionic or molecular compounds, or compounds that are both (both is an ionic compound with one or more polyatomic ions— ammonium would be the only polyatomic cation you would see).
5. identify and/or write common monatomic and polyatomic ions (those you learned)

B. Know how to:

1. name ionic compounds (cation then anion).
2. name molecular compounds (using prefixes: mono, di, tri, etc.).
3. name acids, using the rules for each type of acid: (a) binary acid, (b) acid w/ anion ending in *-ate*, and (c) acid w/ anion ending in *-ite*.
4. write the formulas of compounds from the names (crisscross method recommended for ionic compounds).
5. determine the empirical formula (simplest whole-number ratio) of an ionic compound from data obtained in a lab investigation.
6. interpret molecular formulas.

II. Molecular geometry and polarity

A. Know:

1. how to determine the number of unpaired electrons (those available for bonding—use *HONC* rule)
2. how to use Lewis dot diagrams to represent covalent bonding (two electrons [dots], or “shared pair,” equal a single bond).
3. how to determine whether a bond is nonpolar, polar, or ionic from differences in electronegativity.
4. the five molecular geometries discussed in class.
5. how to predict shape of molecules from their formulas (use *HONC* rule to predict central atom).
6. how to interpret various molecular schematic representations (for example, ball-and-stick models, and others).
7. how to predict polarity of molecules from (a) polarity of bonds, and (b) shape of molecule
8. how to predict what solutes will dissolve in what solvents (“like dissolves like”).
9. (CP only) the three hybrid molecular orbitals: sp , sp^2 , sp^3 .
10. (CP only) how to predict the bond angles within given molecules based on hybridization (using water, ammonia, and others as rules helps).
11. (CP only) the difference between electron-pair and molecular geometry.