The midterm exam will include all materials starting from the beginning of the course.

Consequently, the Checklist for the Quiz, provided earlier, is also applicable and all items should be reviewed.

Note: This list is not necessarily exhaustive; ultimately, you are responsible for whatever came up in class!

Chemistry Data Sheet will be the same as for the Quiz. Calculators allowed, but must not contain programmed scientific information.

Review

Nomenclature, see pp 9 -12 of lecture notes 8

Stoichiometry formulas, mole concept, balancing equations, mass relationships in chem. rxns, limiting reactant, yield calc., determination of empirical & molecular formulas, concentration & dilution

Lewis Theory

differentiate between ionic and covalent Lewis structures use concept of electronegativity to assess covalent and ionic bonds apply "extended octet rule" determine formal charge systematic derivation of Lewis structures: skeletal structure and e⁻ distribution describe concept of resonance derive resonance structures, incl. assessment of major/ minor contributors based on "preference rules"

Shapes of Molecules

foundation of VSEPR theory concept of e^- groups distinguish between e^- and atom arrangement derive shapes for AX₂AX₄E₂ type molecules from Lewis structures using VSEPR theory use geometry to assess molecular polarity based on bond polarity

Valence Bond Theory

foundation of VB (bonds a result of overlapping AO's occupied by 2 paired e^-) σ and π bonds concept of hybridization of AO's multiple bonds correlation between hybridization type and molecular shape review resonance and bond properties

MO Theory

foundation: combination of AO's bonding & antibonding MO's MO shapes and energy diagrams for row 1 & 2 homonuclear diatomics, incl. charged species "expected" & "modified MO diagrams MO's for heteronuclear diatomics