

## Concepts of Science - Study Guide for Exam 1

Listed below are a number of concepts, people and techniques that you should be familiar with:

Chapter 1 Measurement: Scientific notation, units of measurement, the metric system, **Problems involving** converting to and from the metric system. You will be given metric-English conversion factors.

Chapter 2 The Structure of the Solar system: geocentric vs heliocentric system, Eratosthenes, Ptolemy, epicycle, Copernicus, Galileo, induction, deduction, phases of Venus, the scientific method, Kepler, Kepler's laws, Newton, the fate of the solar system, **Problems involving** Kepler's third law, the law of universal gravitation, and the velocity needed to keep a body in orbit. You will be given any formulas you need.

Chapter 3 Atomic Structure: Lavoisier and the significance of his experiment with HgO, Dalton, J. J. Thomson, cathode ray tube, Rutherford, models of the atom, atomic Weights, electrons, protons, neutrons, quarks, quantum Mechanics and the Uncertainty Principle, atomic Number and Atomic Mass, Isotopes, the Periodic table, Mendeleev, seeing atoms with STM and X-rays.

Chapter 4 Molecular Structure Molecule, ionic and covalent bonding, bond length, bond energy, chemical formulas, drawing structures, number of covalent bonds to H, C, N, O, halogens, acids and bases, acid strength, equilibrium constants, pH, hydrogen bonding, molecular weights, balancing chemical equations, the mole concept, molecular geometries, bond angles, chirality, enantiomers. **Problems involving** stoichiometry (given a mass of a reactant or product, calculate the mass of an additional reactant or product).

Chapter 5 Macromolecular Structure Monomers and polymers, drawing structures of polymers, biological polymers, peptides, proteins, amino acids, amino acid sequences, enzyme, catalyst. **Problems involving** peptide sequences.