CHM 101 General Chemistry I (2+1+0 3units)

Summary: Atoms, molecules and chemical reaction; Chemical equations and stoichiometry, Atomic structure and Periodicity; Modern electronic theory of atoms; Radioactivity; Chemical bonding; Properties of gases; Equilibria and Thermodynamics; Chemical Kinetics; Electrochemistry

- Physical Qualities and Units: The physical qualities understood as consisting of numerical magnitude and unit.
- International system of units: Base units, mass length, time, current, amount of substance. Other units expressed as products or quotients of base units.
- Relative Masses of Atoms and Molecules: Relative atomic, isotopic, molecular and formula masses. The More concepts and the Avogadro constant. Determination of relative masses. Calculation of empirical and molecular formulae. Chemical stoichiometry.
- Atomic and Nuclear Basis: Evidence for atomic constituents: Electrons, protons and neutrons- their relative charge and masss. The nucleus, atomic number, mass isotopes and mass spectra. The electronic structure of the atom. Radio-activity; x-ray radiation and detection. Nuclear transformation and binding energy. Nuclear reaction and stability. Applications of radionuclides, electromagnetic radiation, wavelength and frequency. Radiation as energy, the plank relation, regions of electromagnetic spectrum absorption and emission of radiation. Wave particle duality and the de Broglie equation treated symbolically. Heisenberg uncertainty principle. Energy levels in atomic hydrogen and their quantum numbers. Ionization energy. The size, shape and orientation of atomic orbitals. Radical and Polar diagrams and the effect of nuclear charge. Electron and nuclear spin-the Sterm-Gerlach experiment. Many electro atoms, electron configuration and Pauli Principle. Hund’s rule.
- Chemical Bonding: Dependence of properties of solids, liquids and gases on type of chemical bonding. Electrovalent bond between ions. Covalent bonds. The shape of simple molecules including CO2 (linear), CH4 (tetrahedral), NH3 (pyramidal), HO (non-liner), SO (triagonal), SF (octahedral). Metallic bonds. Intermolecular bonds. Hydrogen bonding and its influence on propert