

## SUBJECTS FOR THE 2<sup>nd</sup> MIDTERM TEST (Pharmacy) (2011/2012)

### Biophysics

#### Light sources

Sun, incandescent lamps, halogen lamp, metal vapour (e.g. Hg) lamps

#### Lasers

Light amplification, conditions for LASER operation

Properties of laser light

#### Structure of atoms

Atoms, electrons, nuclei, Rutherford's scattering experiment

Franck-Hertz experiment, Bohr's model

Electron as a wave, state function

Propagation law of free electrons, Heisenberg uncertainty relation

Bound state electron and atomic states

Discrete atomic energy levels, quantum numbers

Spin and associated magnetic momentum of an electron

Structure of the nucleus, mass deficiency and binding energy

#### Atomic interactions

Binding distance, binding energy

Classification of bond types, intramolecular, intermolecular

Van der Waals interactions, radii

#### Boltzmann distribution

Barometric formula; thermal emission of metals; Nernst equation

Equilibrium and rates of chemical reactions, Arrhenius-plot

#### Gases

Ideal gases; temperature, pressure of the gas

Real gases; Van der Waals state equation

**Topics from laboratory practices:** Measurements on 6-10<sup>th</sup> weeks.

**Problems:** 1, 2, 3, 4, 5, 6, 7, 8, 41, 67, 68