

**SUBJECTS FOR THE *FOURTH* MIDTERM TEST (Pharmacy) (2010/11) 2nd semester
Biophysics**

Thermodynamic aspects of transport processes

Thermodiffusion, heat conduction
Thermodynamic system, extensive and intensive quantities
Onsager-relation
zeroth law of thermodynamics.
First law of thermodynamics, electro-chemical potential.
Second law of thermodynamics; microstate, macrostate; statistical definition of entropy
Third law of thermodynamics
Thermodynamic potential functions, enthalpy, Helmholtz free-energy, Gibbs free-energy

Transport phenomena across biological membranes

Passive diffusion of uncharged particles and ions
Facilitated diffusion, active transport
Resting membrane potential and the Nernst equation
Goldman-Hodgkin-Katz (GHK)-equation
Local changes of membrane potential
Membrane model with parallel RC-circuits, time constant and spatial constant and their role
Membrane potential in excited state
Propagation of the action potential
Frequency coding

Laws of sensation

Weber-Fechner law, Stevens law, phon and sone scale

Physical methods for structural analysis

Sedimentation velocity method, equilibrium method
Free electrophoresis, gel-electrophoresis

Topics from laboratory practices: Measurements on 6-10th weeks.

Problems: 46, 49, 50, 52, 54, 56, 57, 58