

**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