

Medical Biophysics 1

2017 autumn

Topic List #2: Topics Asked in the Second Midterm

A) Lectures: weeks 5, 6, & 8 (week 7 was holiday) i.e. lectures № 5, 6, & 7

- Structure of matter
 - The structure of atoms (I/1.)
 - Interatomic interactions (I/2.)
- Scanning probe microscopy (X/2 & lab No. 21 "Resonance")
- Many-particle systems (I/3. introduction)
 - The Boltzmann-distribution and its applications (I/3.1.)
 - Ideal and real gases (I/3.2.)
 - Solid state materials and semiconductor electrical elements (I/3.3. & VII/1.3.)
 - Liquids and liquid crystals (I/3.4.)

Sources required for preparation:

- Lectures № 5, 6, & 7: everything told and written by the lecturer including the demonstrated experiments and the projected material, as well as the lecture slides uploaded to the website (**Attention! The lecture № may differ from the week № because one lecture was cancelled due to a holiday.**)
- The Textbook (Damjanovich-Fidy-Szöllősi: Medical Biophysics): all chapters shown in brackets
- The Lab Manual (Kellermayer: Medical Biophysics Practices): all chapters shown in brackets
- The material of the "Mathematical and Physical Basis of Medical Biophysics" subject

B) Laboratory Practices: weeks 5–7

- Microscopy II (Lab Manual: 3.; Textbook: II/2.1.3–7., VI/2.2.2., VI/2.3.; Basic Physics book: Chapter 8.)
- Light Emission (Lab Manual: 5.; Textbook: II/2.2.)
- Resonance (Lab Manual: 21.; Textbook: X/2; Basic Physics book: Chapter 7.)

Sources required for preparation:

- Laboratory practices: material told and written by the lab teacher and/or TA including the demonstrated experiments and the projected material, as well as the individual measurements
- The evaluation and drawings/graphs prepared for the lab report (according to the tasks listed on the website)
- The Lab Manual (Kellermayer: Medical Biophysics Practices): all chapters shown in brackets
- The Textbook (Damjanovich-Fidy-Szöllősi: Medical Biophysics): all chapters shown in brackets
- The Basic Physics book (Tölgyesi: Mathematical and Physical Basis of Medical Biophysics e-book): all chapters shown in brackets
- The material of the "Mathematical and Physical Basis of Medical Biophysics" subject

C) Calculation Problems:

- Lab Manual: 1–6, 15, 39, 40.
- Microscopy II further calculations: **all of them**
- Light Emission further calculations: **all of them**
- Resonance further calculations: **all of them**

Sources required for preparation:

- The Lab Manual (Kellermayer: Medical Biophysics Practices): chapter 31: "Problems"
- documents with calculation problems under the "Homework problems" tab of the subject on the website

Besides everything mentioned above, we assume that you know – even though we will not explicitly ask – the complete material of Topic List #1 and the "Mathematical and Physical Basis of Medical Biophysics" subject.

The form of the midterm is a written test containing open questions about theory, labs, drawings, and calculations. One may partake in the midterm only if a **passport** or **residence card** is presented. One may use a **pen** with blue ink (for drawings: **pencil**), a non-programmable **calculator** that cannot store textual information in its memory, a **ruler**, and a **protractor** during the midterm – all these have to be provided for by oneself. Formula collections are provided by the department, own copies may not be used. Results of the midterm will be announced by the lab teacher.