

SUBJECTS FOR THE THIRD MIDTERM TEST BIOPHYSICS (DENTISTRY) 2017-2018.

Radiotherapy

Types of radiations in radiotherapy
Linear ion density, Linear Energy Transfer
Percentage depth dose
Gamma-knife

Radiation dose, dosimetry

Radiation damage in matter: stochastic damage - deterministic damage
Basic dosimetric quantities

- Absorbed dose; exposure (electron equilibrium principle);

Measurement of exposure by ionization chamber, relationship of absorbed dose and exposure

- Equivalent dose, radiation weighting factor; effective dose, tissue weighting factor
- Dose rate
- Radiation protection, permissible maximum, effective dose limits
- Optimization of radiation protection, ALARA principle

Ultrasound imaging: Sonography

- ultrasound, description as a wave, characteristic parameters, ranges used in diagnostics and therapy.
Intensity of ultrasound beams.
- ultrasound sources (direct and inverse piezoelectric effect)
- ultrasound absorption, frequency dependence
- ultrasound reflection, acoustic impedance
- distance determination of a reflecting object
- ultrasound imaging techniques (A-image, two-dimensional B-imaging, M-image)
- Doppler effect, color-coding, duplex sonography
- 3D, 4D imaging

Topics from laboratory practices

Dosimetry
Coulter-counter
Amplifier
Gamma energy
X-ray

Chapters: *Damjanovich-Fidy-Szöllösi:* II/2.4, II/4.1, II/4.2, II/4.3, VIII/ 4.2, IX/3, IX/5.1
Lab. manual: 11, 13, 15, 18, 23
Problems:, 31, 32, 33, 34, 35, 36, 37, 38, 45, 55, 65 + further calculations on the homepage