

For General Medicine

Topic of section: Electromagnetic waves. Light polarization

Topic of seminar: Polarization

Answer the questions:

1. What is an electromagnetic wave? Explain relationship between electric field strength amplitude and magnetic induction one. What does absolute refractive index characterize?
2. Specify the electromagnetic spectrum main ranges.
3. Describe types of polarization. Write down formula for degree of polarization.
4. Explain the principle of polarization by reflection. Write Brewster's Law.
5. Explain the double refraction phenomenon. Describe differences between an ordinary wave and extraordinary one.
6. Explain the Nicol prism construction and a light propagation through it.
7. Explain phenomenon of dichroism. Describe the structure of polarizer.
8. Write Malus's Law.

Solve the problems:

1. Plate of quartz with thickness of 3 mm is placed between two crossed polarizers and field of vision has been maximally light as result. Determine the specific rotational constant.

Answer: 30 degr/mm

2. What part of the natural light will pass through a polarizer and analyzer, if the angle between their polarization planes is equal to 60° ?

Answer: 1/8

3. Estimate the sugar concentration in solution, if the angle of rotation of the light polarization plane is equal to 2.2° , and cuvette length is 4 cm. The sugar specific rotational constant is equal to $6,6 \text{ deg}\cdot\text{cm}^2/\text{g}$.

Answer: 0.083 g/cm^3

Literature:

1. Medical and biological physics for medical students (pages 159-171)