For General Medicine

Topic of section: Spectral analysis. Luminescence

Topic of lab work: Spectral analysis fundamentals

Answer the questions:

1. Specify Bohr's postulates.
2. Explain appearance of emission spectrum and absorption one.
3. Give the energy diagram for hydrogen atom. Explain spectral lines formation for this atom.
4. Explain molecular spectrum formation. Give molecular spectrum classification.
5. What is a luminescence? Specify types of luminescence.
6. Write a formula for luminescence intensity decay with time.
7. Explain the Stokes Law and the Kasha – Vavilov Law for luminesce

Solve problems:

1. The electromagnetic radiation with wavelength λ=1.5μm is used in optical communications. Find the frequency and energy of photon for this radiation. *Answer: $2 \cdot 10^{14}$ Hz; 0.829 eV*
2. Find relation between the second low-frequency line of the Paschen series and the second low-frequency line of the Lyman series in the hydrogen atom emission spectrum. The ground state energy of the hydrogen atom $\boldsymbol{E_0}$ is -13.6 eV, the Planck's constant ***h*** is 6.63.10-34J·s. *Answer:12.5*
3. The initial luminescence intensity decreases in e^3 =20 times during 12 ms after termination of the radiation. Find the delay time. *Answer: 4 ms*

Literature

1. Medical and biological physics for medical students, pages 188 – 201.