

Entrance exams program in Applied Physics

Electrics and Magnetism

1. Conductors in the electrostatic field. Dependence of the field strength on the curvature of the conductor surface.
2. Electrical capacity. Capacitors in Series and Parallel.
3. Earnshaw's theorem.
4. Surface and volume polarization charges, their relation to the vector of polarization.
5. Millican experiments to determine the electron charge.
6. Integral and differential of the Ohm's law for the chain that does not contain energy sources.
7. Dependence of the conductor's resistance on temperature.
8. Kirchhoff's rules.
9. Faraday's Law's of Electromagnetic Induction. Lenz's Rule.
10. Maxwell's equations in the system of Gauss units in the integral and differential form and their physical meaning.

Optics

1. The method of cardinal planes, proposed by Gauss for the description of lenses and optical systems
2. Holographic information recording schemes.
3. Absolutely black body.
4. Optical axis of an anisotropic crystal.
5. Coherent radiation
6. Electrooptic Kerr effect
7. $\lambda/4$ - phase plate
8. Name known ways to increase the resolution of the microscope.
9. Name known ways to increase the resolution of the telescope.
10. Temperature dependence of black body emission spectral energy distribution.