

PHYSICS - topics for written part

Mechanical motion, types of the motion, trajectories, scalar and vector quantities, Newton laws of motion, quantity of motion, force, measurement of mass, centrifugal force, law of the energy conservation, momentum of force.

Liquids - basic characteristics, Archimedes law, streaming of ideal liquid, continuity equation, pressure energy, Bernoulli equation.

Gravitation, Newton gravitation law, gravitation field intensity, gravitation acceleration, gravitation potential.

Electric field, electric charge, Coulomb law, electric field intensity, electric potential, electric voltage, capacity, capacitors.

Molecular kinetic theory, thermodynamic temperature, specific heat, calorimeter, thermodynamic laws, ideal gas, isothermic, isochoric, isobaric and adiabatic processes, equation of state.

Characteristics of solids, crystal lattices, deformations of solid bodies, characteristics of liquids, surface tension, expansivity of liquids, changes of state of matter.

Electric current, conductors and insulators, electric conductivity of metals, Ohm law, electric resistance, electric circuits, semiconductors, electrolytes, electric current in gases, ionisation.

Magnetic field, magnetic induction, magnetic field of a coil, magnetic induction current, electromagnetic induction, Faraday law of electromagnetic induction, Lenz law, electromagnetic oscillator, Thompson formula, oscillator resonance.

Alternative current, circuits of alternative current with the resistance induction and capacity, rectifiers, amplifiers, power of alternative current, electromotors, transformers.

Mechanical wave motion, interference of the wave motion, Huygens principle, sound and its characteristics, sound intensity, sound velocity, ultrasound, infrasound.

Electromagnetic wave motion, propagation of electromagnetic wave motion, types of electromagnetic wave motion, electroacoustic transducers.

Light, light refracture, light reflection, refracture index, total reflection, optical systems, lenses, mirrors, microscopes, telescopes, wave properties of the light, dispersion, spectral colours, light interference, light diffraction, light polarisation, polarimeter, types of electromagnetic radiation, basic radiometric and photometric quantities.

Introduction to the theory of relativity, connections between mass and energy.

Basic concepts of quantum physics, electron shells of atoms, Pauli principle, chemical bonds, atomic nucleus, nuclides, isotopes, mass decrement in an atomic nucleus, nuclear reactions, nuclear fusion and nuclear fission, nuclear reactors, natural and artificial radioactivity, kinetics of the radioactive decay, half life, decay constant.