

Faculty of Physics

The Final State Exam questions in specialization of Physics on the subject of "MECHANICS" for the 2017/2018 academic year

Easy

1. Kinematics of a particle.
2. Kinematics of curvilinear motion.
3. Newton's First Law. Inertia. Galileo and the Concept of Inertia.
4. Newton's Second and Third Law.
5. Potential and Kinetic Energy.
6. Law of Conservation of Energy.
7. Law of Conservation of Impulse.
8. The motion of body of variable mass. Meshchersky equation.

Average

- 1 Elastic and inelastic collisions of ball.
- 2 Moment of Force and Moment of inertia. Fundamental Equation of Rotational Motion.
- 3 Moments of Inertia relative to any axis. Huygens-Steiner theorem.
- 4 Kinetic Energy of rotating rigid object. Energy of rigid object that performs a complex motion.
- 5 Force and Impulse. Conservation of impulse.
- 6 Work. Power. Gravitational work
- 7 Newton's law of universal gravitation. Kepler's Laws.
- 8 Collection of oscillations that occur in a straight line.

Difficult

1. Gravitational potential energy.
2. Centrifugal forces. Coriolis force.
3. Friction Forces.
4. Elastic force. The relationship between force and deformation. Huk law.
5. The equation of continuity for fluids. Bernoulli's equation.
6. Simple harmonic motion. The mathematical pendulum.
7. Physical Pendulum. The relative length.
8. Damped oscillations. Logarithmic decrement.

Dean of faculty

prof. Ramazanov M.A.

Chairman of the Methodical Council

prof. Abdinov A.Sh.

Head of Department

prof. Qasimova R.J.

Faculty of Physics

The Final State Exam questions in specialization of Physics on the subject of "MOLECULAR PHYSICS" for the 2017/2018 academic year

Easy

1. The main formula of molecular kinetic theory.
2. Equation of state for an ideal gas. Ideal Gas Law.
3. The determination of molecules velocity as experimentally. Shtern experiment.
4. The Perrin experiment.
5. The determination of molecules velocity as experimentally. Lammert-Eldridge experiment.
6. The first law of thermodynamics and application on different processes.
7. Heat capacity. Heat capacity at constant pressure and volume (C_p and C_v). Mayer formula.
8. Equation of state of real gas. Van der Waals equation.

Average

1. Barometric formula. Boltzmann distribution.
2. The equal distribution of energy according to degree of freedom.
3. The work which is done by ideal gas in different processes.
4. Carnot cycle and its efficiency.
5. Clausius inequality.
6. Entropy. The changing of entropy in reversible and irreversible processes.
7. Surface tension of liquids.
8. Polytropic process. Polytropic equation.

Difficult

1. The distribution of molecule's velocity due to their value. Maxwell distribution.
2. Thermal conductivity in gases. Steady thermal conductivity.
3. Diffusion process in gases. Stationary diffusion.
4. Internal friction of gases. Viscosity.
5. Adiabatic process. Adiabatic formula.
6. Entropy and thermodynamic probability. Boltzmann formula.
7. The III law of thermodynamics. Nernts theorem.
8. Real gas. Internal energy of a real gas.

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The Final State Exam questions in specialization of Physics on the subject of "OPTICS" for the 2017/2018 academic year

Easy

1. Photometric Quantities and Units.
2. Lens. Thin Lens Formula.
3. Fermat's Principle, the Law of Refraction and the Law of Reflection According to Fermat's Principle.
4. Total Internal Refraction and Its Application.
5. Emission and Absorption Ability of Bodies. Kirchhoff's Law.
6. Dispersion of Light. Normal and anomalous dispersion.
7. Absorption of light. Lambert-Beer Law.
8. Photoeffect. Laws of Photoeffect.

Average

1. Interference. The Width of the Interference Fringe and Its Calculation.
2. Coherence. Interference of Light Waves.
3. Newton's Rings.
4. Interference with a plane-parallel plate.
5. Diffraction of Light. Huygens-Fresnel Principle. Calculation of the total Amplitude.
6. Double and More Slit Diffraction. Diffraction Pattern.
7. Double refraction. Ordinary and Extraordinary Rays.
8. Linearly Polarized Light. Malus's Law.

Difficult

1. Propagation of Electromagnetic Waves. Phase and Group velocity.
2. Electromagnetic Nature of Light. The Energy of Electromagnetic Waves. Poynting vector.
3. Diffraction of Parallel rays. Fraunhofer Single Slit Diffraction.
4. The Electron Theory of Dispersion of Light.
5. Laws of Thermal Radiation.
6. Planck's Formula of Thermal Radiation.
7. Optical Activity. The Elementary Theory of the Rotation of Polarization Plane.
8. Optical Quantum Generators (lasers) and Their Working Principles.

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**The Final State Exam questions in specialization of Physics on the subject of
"ELECTROMAGNETISM" for the 2017/2018 academic year**

Easy

1. Properties of Electric Charges. Coulomb's Law.
2. Electric field strength. Gauss's Law. Poisson's equation.
3. Potential Difference. Electric Potential. Relation between electric field, strength and potential.
4. Definition of Capacitance. Capacitors. Combination of capacitors.
5. Direct current. Ohm's law for a homogeneous and inhomogeneous circuit sections.
6. Power of a current. Joule-Lenz law.
7. The Lorentz force.
8. The Biot-Savart Law

Avarege

1. Energy of charged conductor.
2. Energy of an electric field.
3. The law's of electrolysis - Faraday's Law.
4. Electric current in gases. Semi-self sustained and self sustained conduction.
5. Polarization of Dielectrics.
6. Work function. Contact potential difference.
7. The phenomenon of Electromagnetic induction. Magnetic flux. Inductance of a loop.
8. Faradey's Law of Induction. Self induction.

Diffucult

1. Resistors. Inductors and capacitors in an Alternating Current circuits.
2. Ohms's law for an Alternating current circuits
3. Classical theory of electrical conductance of metals. Ohm's and Joule-Lenz Law.
4. The kinds of emission of electrons. Termoionic emission.
5. The Wave Equation for Electromagnetic Waves.
6. Current loop in a magnetic field.
7. Magnetic field of a moving charge.
8. Maxwell's equations

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Head of Department

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Faculty of Physics

The Final State Exam questions in specialization of Physics on the subject of "ATOM PHYSICS" and "NUCLEAR PHYSICS" for the 2017/2018 academic year

Easy

1. Photoeffect.
2. Hydrogen atom in Bohr theory.
3. Binding energy of nuclei. Weizsäcker formula.
4. Magnetic momentum of the atom. Larmor theorem.
5. Fundamental interactions.
6. Wave-particle duality. De Broglie hypothesis, group and phase velocities
7. Parity.
8. Radioactivity. Radioactivity decay laws.

Average

1. Quantization of the circular orbits.
2. Nuclear potential. Exchange nuclear forces.
3. Vectorial addition of the moments. (jj) and (LS) connections.
4. Quantum numbers. Selection rule for the quantum numbers.
5. Liquid model.
6. Normal Zeeman effect (the classical theory)
7. Heisenberg's uncertainty principle.
8. The classification of the elementary particles.

Difficult

1. Schrödinger equation, standard conditions for the wave function.
2. β - conversion.
3. α -decay.
4. The shell model.
5. Nuclear reaction and conservation laws.
6. Pauli exclusion principle, Mendeleev periodic system.
7. Hund's rule for ground state.
8. Spin and magnetic momentum of electron.

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