

EXAM THEORETICAL QUESTIONS

Mechanics

- Fundamentals of kinematics.
- Principle of Relativity of Galileo.
- Non-inertial frame of reference.
- Fundamental equations of dynamics. Linear momentum. Basic laws of the dynamics of the material point (Newton's laws).
- Jet propulsion. Escape velocities.
- Dynamics of a Solid Body. The moment of inertia. Angular momentum of the material point relative to the point of rotation O . Angular momentum of the body relative to the stationary axis of rotation z . Torque relative to a fixed point. Torque for two forces act. The basic equation of dynamics of a rotational movement.
- Work, power and energy. The elementary work. Power. Work and power in rotational motion. Energy. Conservative and non-conservative forces.
- Collision of bodies.
- Elements of the special theory of relativity. Consequences of the Lorentz transformations.
- Oscillations and Mechanical Waves. Free oscillations. Damped oscillations. Maintained oscillations. Forced oscillations. Resonance. Velocity, Acceleration of a particle in simple harmonic motion. Energy of a harmonic oscillator. Types of pendulums.

Fluid Mechanics

- Pressure. Pressure Measurements.
- Buoyant Forces and Archimedes's Principle.
- Fluid Dynamics.

Thermodynamics

- Temperature. Temperature and the Zeroth Law of Thermodynamics.
- The First Law of Thermodynamics. Heat and Internal Energy. Latent Heat. Work and Heat in Thermodynamic Processes. The First Law of Thermodynamics. Energy Transfer Mechanisms in Thermal Processes.
- The Kinetic Theory of Gases. Molecular Model of an Ideal Gas. Molar Specific Heat of an Ideal Gas. Adiabatic Processes for an Ideal Gas.
- Heat Engines, Entropy, and the Second Law of Thermodynamics. Heat Engines and the Second Law of Thermodynamics. Heat Pumps and Refrigerators. Reversible and Irreversible Processes.
- The Carnot Engine.