AP Physics 2

Key Definitions · 核心定义

Physics 2 is graded on explanation. A point is earned by naming the principle and applying it to the specific system – which charge, which field, which surface. Write each definition below, then practise attaching "in this case …" to it. 物理 *2* 重在解释*:* 写出原理并结合具体系统 *(*哪个电荷、哪个场、哪个面*)* 作答。

Fluids and thermodynamics

Pressure 压强 — force per unit area exerted perpendicular to a surface

Buoyant force 浮力 — the upward force on a submerged or floating object, equal to the weight of the fluid displaced

Continuity equation 连续性方程 — for an incompressible fluid, the volume flow rate Av is constant, so a narrower pipe means faster flow

Bernoulli's principle 伯努利原理 — along a streamline, the sum of pressure, kinetic energy density and potential energy density is constant, so faster flow accompanies lower pressure

Ideal gas law 理想气体定律 — PV = nRT, treating molecules as point particles with no intermolecular forces

Internal energy 内能 — the total kinetic energy of a gas's molecules; for an ideal gas it depends only on temperature

First law of thermodynamics 热力学第一定律 — the change in internal energy equals the heat added to the system plus the work done on it

Second law of thermodynamics 热力学第二定律 — the total entropy of an isolated system never decreases, so heat flows spontaneously from hot to cold

Electrostatics and circuits

Electric field 电场 — the force per unit positive charge at a point, a vector pointing away from positive and toward negative charge

Electric potential 电势 — the electric potential energy per unit charge at a point, a scalar

Potential difference 电势差 — the work per unit charge required to move a charge between two points

Equipotential surface 等势面 — a surface on which the potential is constant, always perpendicular to the field lines; no work is done moving along it

Capacitance 电容 — the charge stored per unit potential difference across a capacitor

Kirchhoff's junction rule 基尔霍夫电流定律 — the total current into a junction equals the total current out, a statement of charge conservation

Kirchhoff's loop rule 基尔霍夫电压定律 — the sum of potential changes around any closed loop is zero, a statement of energy conservation

Magnetism and induction

Magnetic field 磁场 — the field that exerts a force on a moving charge, of magnitude qvB sin θ and direction given by the right-hand rule

Magnetic flux 磁通量 — the product of the magnetic field component perpendicular to a surface and that surface's area

Faraday's law 法拉第定律 — an induced emf equals the negative rate of change of magnetic flux through a circuit

Lenz's law 楞次定律 — the induced current flows in the direction whose magnetic field opposes the CHANGE in flux that produced it

Optics and modern physics

Index of refraction 折射率 — the ratio of the speed of light in vacuum to its speed in a medium

Total internal reflection 全内反射 — reflection of all light at a boundary when it travels from a denser to a less dense medium at an angle beyond the critical angle

Photoelectric effect 光电效应 — the emission of electrons from a surface struck by light of sufficient FREQUENCY, evidence that light energy arrives in quanta

Work function 逸出功 — the minimum energy needed to remove an electron from a metal surface

Mass-energy equivalence 质能等价 — $E = mc^2$; the mass defect of a nucleus corresponds to its binding energy