
Physics 2 is graded on explanation. A point needs the principle named and applied to the specific system – which charge, which surface, which direction. Numbers alone earn little. 物理 2 重在解释: 必须写出原理并说明作用于哪个电荷、哪个面、哪个方向。

Explanation and reasoning

Answering a JUSTIFY question with a formula. Name the principle and apply it to the objects in the question.

Describing a field without a direction. E points away from positive charge; B is given by the right-hand rule – state which you used.

Saying ‘the electron moves to lower potential’. A negative charge moves toward HIGHER potential; check the sign every time.

Treating potential as a vector or field as a scalar. Potential is scalar and adds arithmetically; field is a vector and adds by components.

Answering with a proportionality but no direction: say whether the quantity increases or decreases, and by what factor.

Electricity and magnetism

Applying Gauss’s law where symmetry does not make E constant on the surface. Gauss’s law is always true but only USEFUL under symmetry, and saying so is the mark.

Saying a magnetic force does work on a moving charge. It is always perpendicular to velocity, so it never does.

Forgetting Lenz’s law’s sign, or stating that the induced current opposes the FIELD rather than the CHANGE in flux.

Assuming the field inside a conductor in electrostatic equilibrium is non-zero, or that charge sits throughout its volume rather than on the surface.

Treating a capacitor’s capacitance as depending on charge or voltage. It depends on geometry and the dielectric only.

Confusing resistivity with resistance: resistivity is a material property, resistance also depends on length and area.

Fluids, thermodynamics and modern

Saying a floating object displaces its own volume. It displaces a weight of fluid equal to its own WEIGHT.

Using Bernoulli where the flow is not steady, incompressible or along one streamline.

Confusing heat with temperature, or saying internal energy depends on pressure for an ideal gas. It depends on temperature alone.

Getting the sign convention wrong in the first law. Be explicit about whether W is work done ON or BY the gas.

Saying brighter light ejects electrons with more energy in the photoelectric effect. Intensity changes the NUMBER; frequency changes the energy.