IGCSE Physics

Common Mistakes · 常见错误

Every error below is a mark lost by a candidate who understood the physics. They are ordered by how often they appear, not by how serious they look. Read this before a mock, and again the night before the exam.
下面每一条都是”懂了却写丢分”的错误，按出现频率排列。

Numbers, units and working

Leaving the unit off a final answer. A calculation mark is withheld however good the working, and it is the single most common lost mark in the subject.

Not converting a prefix before substituting: cm to m, g to kg, kN to N, ms to s. Substituting 5 cm as 5 puts the answer out by a factor of a hundred.

Rounding in the middle of a calculation and carrying the rounded value forward. Keep full precision and round once, at the end.

Writing only the answer. If it is wrong there is nothing to credit; with the formula and the substitution shown, most of the marks survive an arithmetic slip.

Giving an answer to more significant figures than the data justifies. Match the least precise value in the question, usually 2 or 3.

Motion, forces and energy

Confusing speed with velocity, and distance with displacement. Velocity and displacement need a direction; a question that says ”velocity” wants one.

Reading a distance-time graph’s gradient as acceleration. On a distance-time graph the gradient is speed; acceleration is the gradient of a speed-time graph.

Forgetting that the area under a speed-time graph is the distance travelled – the commonest way to lose a whole part-question.

Saying a falling object at terminal velocity has ”no forces” on it. The forces are balanced, which is not the same thing, and the mark is for saying so.

Treating mass and weight as interchangeable. Mass is in kg and does not change with location; weight is a force in N and does.

Writing ”the object slows down because there is no force” – an object with no resultant force keeps its velocity. Name the friction or air resistance.

Using g = 10 N/kg when the paper gives 9.8, or the reverse. Use the value printed on the paper.

Forgetting that work done is only the force ALONG the direction of motion, so a force at right angles to the motion does no work.

Thermal physics

Confusing heat with temperature. Heat is energy transferred; temperature is how hot something is. A large cold object can hold more energy than a small hot one.

Saying that during melting the temperature rises. It does not: the energy goes into breaking the bonds, which is why the graph is flat.

Explaining conduction in a metal by ”the particles vibrate” alone. The mark is for the FREE ELECTRONS, which is why metals conduct so much better.

Describing convection without saying the fluid becomes less dense – that is the mark, not ”hot air rises”.

Forgetting that thermal radiation needs no medium, and is the only method that works through a vacuum.

Waves, light and sound

Measuring the angle of incidence or reflection from the mirror surface instead of from the NORMAL.

Drawing a ray diagram without arrows on the rays. Unarrowed lines are not rays and are not credited.

Saying light ”bends towards the normal” without saying it slows down. The cause is the change in speed, and that is where the mark sits.

Confusing amplitude with wavelength on a wave diagram: amplitude is measured from the middle line, not from crest to trough.

Saying sound travels faster in a vacuum, or can travel through one at all. Sound needs a medium.

Mixing up frequency and pitch with amplitude and loudness.

Electricity and magnetism

Adding resistors in parallel as if they were in series. In parallel the total is SMALLER than the smallest single resistor – if your answer is larger, it is wrong.

Saying current is ”used up” going round a circuit. Current is the same everywhere in a series circuit; it is energy that is transferred.

Connecting an ammeter in parallel or a voltmeter in series in a circuit diagram. Ammeter in series, voltmeter across.

Forgetting that a longer wire has more resistance and a thicker wire has less – candidates routinely state one and reverse the other.

Giving the direction of the magnetic field without naming the rule used, or applying the left-hand rule to a wire carrying conventional current when the right-hand grip rule is wanted.

Saying a transformer works with direct current. It needs a CHANGING field, so it works only with a.c.

Nuclear and space physics

Writing the nucleon number as the number of neutrons. It is protons plus neutrons; the neutron count is $A - Z$.

Saying alpha radiation is the most dangerous ”because it is the most ionising” without distinguishing inside from outside the body. Outside it is stopped by skin; inside it is the most damaging.

Treating half-life as ”the time to decay completely”. After one half-life half remains, after two a quarter – it never reaches zero.

Confusing the count rate with the number of undecayed nuclei when reading a decay graph.