
Physics 1 is graded on reasoning, and a reasoning point almost always begins with a definition used precisely. Write the definition, then say which quantity is constant and which changes. A qualitative answer that never names the conserved quantity scores nothing.

Kinematics

Displacement – the change in position of an object, a vector from start point to end point; it is not the distance travelled

Velocity – the rate of change of displacement with time, a vector

Acceleration – the rate of change of velocity with time; an object changing direction at constant speed is still accelerating

Average velocity – total displacement divided by total time, which equals the slope of the line joining two points on a position-time graph

Forces and translational dynamics

Free-body diagram – a diagram showing every force acting ON one chosen object as a labelled arrow, and no forces exerted BY it

Newton's second law – the acceleration of an object is proportional to the net force on it and inversely proportional to its mass

Newton's third law pair – two forces equal in magnitude and opposite in direction, acting on DIFFERENT objects and of the same type

Static friction – the force that opposes impending relative sliding; it takes whatever value is needed up to a maximum

Centripetal acceleration – the acceleration of an object in circular motion, directed toward the centre, of magnitude v^2/r

Energy and momentum

Work – the energy transferred by a force, equal to the component of force along the displacement multiplied by that displacement

Kinetic energy – the energy an object has because of its motion, equal to $\frac{1}{2}mv^2$

Potential energy – energy stored in the configuration of a system of interacting objects; it belongs to the system, not to one object

Conservation of energy – the total energy of a closed system is constant; energy is transferred between forms rather than created or destroyed

Power – the rate at which energy is transferred or work is done

Momentum – the product of an object's mass and velocity, a vector

Impulse – the product of net force and the time it acts, equal to the change in momentum

Elastic collision – a collision in which total kinetic energy is conserved as well as momentum

Inelastic collision – a collision in which momentum is conserved but kinetic energy is not

Rotation

Torque – the turning effect of a force, equal to the force multiplied by the perpendicular distance from the axis to the line of action

Rotational inertia – the resistance of an object to angular acceleration; it depends on both mass and how that mass is distributed about the axis

Angular momentum – the rotational analogue of momentum, conserved when the net external torque on a system is zero

Oscillations and fluids

Simple harmonic motion – motion in which the restoring force is proportional to the displacement from equilibrium and directed toward it

Period – the time for one complete oscillation; for a mass on a spring it is independent of amplitude

Amplitude – the maximum displacement from the equilibrium position

Spring constant – the force needed per unit extension of a spring, the slope of a force-extension graph

Density – mass per unit volume

Pressure – force per unit area exerted perpendicular to a surface

Buoyant force – the upward force on a submerged object, equal in magnitude to the weight of the fluid it displaces