

CLASS 11

PHYSICS

EXTRA QUESTIONS

Class 11 Physics Physical World – HOTS & Extra Questions (Legacy Chapter, Removed from 2026-27 Syllabus)

The questions below go beyond the standard NCERT exercises, testing deeper conceptual reasoning -- distinguishing fundamental forces in unfamiliar contexts, evaluating assertion-reason logic, and building multi-step reasoning chains. These Class 11 Physics Physical World important questions are handy for last-minute...

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Class 11 Physics Physical World – Solutions and Notes

Note: NCERT has replaced this chapter in the current 2026-27 syllabus. If you're looking for the current curriculum, see [Chapter 1: Units and Measurements — HOTS & Extra Questions](#). This page is kept as a reference for the previous (pre-2023 rationalization) syllabus.

The questions below go beyond the standard NCERT exercises, testing deeper conceptual reasoning — distinguishing fundamental forces in unfamiliar contexts, evaluating assertion-reason logic, and building multi-step reasoning chains. These Class 11 Physics Physical World important questions are handy for last-minute exam practice.

1. Assertion-Reason: Scope of Physics

Assertion (A): A phenomenon inside an atomic nucleus and a planet's motion around the Sun are both studied under physics without contradiction.

Reason (R): Physics is unified by a common method — observation, mathematical modelling, experimental verification — across vastly different scales.

Answer: (a) Both true, R correctly explains A. Physics is defined by its unifying method and goal of general laws, not by a single scale of size.

2. Force Classification in Real-World Contexts

Identify the fundamental force for: (a) a neutron decaying inside a nucleus; (b) two protons staying bound in a nucleus despite repulsion; (c) a comet's path bending near Jupiter; (d) a balloon rubbed with wool sticking to a wall.

Answer: (a) **Weak nuclear force** (beta decay). (b) **Strong nuclear force** (dominates electromagnetic repulsion at nuclear range). (c) **Gravitational force** (long-range, dominant at planetary scale). (d) **Electromagnetic force** (static charge from friction).

3. Compare and Contrast: Gravitational vs Electromagnetic Force

Both are infinite-range, inverse-square forces, yet gravity dominates cosmically while electromagnetism dominates atomically. Explain.

Answer: Electromagnetic force is $\sim 10^{37}$ times stronger between elementary charges, so it dominates where charges are directly present. But bulk matter is electrically neutral overall, so electromagnetic effects largely cancel at cosmic scale. Gravity is always attractive and never cancels, so its cumulative effect over enormous masses dominates cosmic structure despite being intrinsically weakest.

4. "Which Law Explains This?" Reasoning Chain

A satellite orbits Earth for years without engine firing. Trace: (i) which force keeps it in orbit, (ii) why no continuous force input is needed, (iii) the connection to the chapter's unification theme.

Answer: (i) **Gravitational force** provides centripetal pull. (ii) Newton's laws combined with gravitation: a

force perpendicular to velocity changes only direction, not speed, so motion continues without energy input in near-vacuum. (iii) The same law explaining a falling apple also explains satellite orbits — a direct illustration of unification.

5. Assertion-Reason: Limits of Physics

Assertion (A): Physics can, in principle, explain every human decision and emotion.

Reason (R): All physical systems, including the brain, are made of particles governed by physical laws.

Answer: R is broadly true, but A does not follow in practice — current tools/theory cannot explain higher-level phenomena like decision-making, even though nothing is thought to violate physical law. **A is false as an achievable claim today, R is true, R does not fully justify A** — illustrating the distinction between scope and current limits of physics.

6. Multi-Force Scenario Analysis

A massive star collapses under gravity. Identify which force resists collapse at (a) the atomic/electron level, (b) the nuclear/neutron level, and state the general principle.

Answer: (a) **Electromagnetic repulsion + electron degeneracy pressure** (supports a white dwarf). (b) **Strong nuclear force via neutron degeneracy pressure** (supports a neutron star); beyond this, gravity wins and a black hole may form. **Principle:** gravity, though weakest, is cumulative and always attractive, so sufficient mass eventually overpowers stronger but non-cumulative forces.

7. Technology-to-Physics Reverse Mapping

Name the specific physics principle behind: (a) MRI machines, (b) fibre-optic cables, (c) solar photovoltaic panels.

Answer: (a) **Nuclear magnetic resonance**. (b) **Total internal reflection** of light. (c) **Photoelectric/photovoltaic effect**.

8. Conceptual Compare: Classical vs Modern Physics

Evaluate: “Classical physics is ‘wrong’ and fully replaced by modern physics.”

Answer: Incorrect. Classical physics remains highly accurate for everyday, macroscopic, low-speed situations. Modern physics extends it where it breaks down (atomic scale, near light-speed). Both reduce to classical predictions in the everyday limit (correspondence principle) — classical physics is a highly accurate special case, not a falsified theory.

9. Assertion-Reason: Conservation Laws and Symmetry

Assertion (A): Conservation of energy is connected to physical laws not changing over time.

Reason (R): Every conservation law corresponds to an underlying symmetry of nature.

Answer: **Both true, R correctly explains A** (Noether’s theorem, referenced conceptually): energy conservation $\leftrightarrow$ time-translation symmetry; momentum conservation $\leftrightarrow$ space-translation symmetry; angular momentum conservation $\leftrightarrow$ rotational symmetry.

10. Applied Reasoning: Ranking Force Dominance by Scale

Rank which force dominates from galactic → planetary → atomic → nuclear scale, with justification.

Answer: Galactic: Gravity (cumulative, uncanceled). **Planetary/everyday:** Gravity and Electromagnetism both matter. **Atomic:** Electromagnetism dominates (binds electrons/atoms; gravity negligible). **Nuclear:** Strong and Weak forces dominate (negligible beyond nuclear distances). Reflects the interplay of intrinsic strength, range, and whether effects cancel over large matter collections.

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[Class 11 Physics Formulas Handbook](#)

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