SOFTWARE & TECH

# Ap Physics C Multiple Choice

PUBLISHED
November 25, 2026

REFERENCE
#1795583422107658

## Mastering the AP Physics C Multiple Choice Section: A Comprehensive Guide

The AP Physics C exam is widely regarded as one of the most challenging Advanced Placement assessments, particularly for students aiming to earn college credit in physics or engineering. A critical component of this exam is the multiple choice section, which accounts for half of the total score. Success on the AP Physics C multiple choice requires not only a deep conceptual understanding of mechanics and electricity and magnetism but also strategic test-taking skills. In this guide, we'll break down everything you need to know to approach the multiple choice questions with confidence, from exam structure to proven strategies and common traps to avoid.

## Understanding the AP Physics C Exam Structure

The AP Physics C exam is divided into two separate courses and corresponding exams: AP Physics C: Mechanics and AP Physics C: Electricity and Magnetism (E&M). Each exam lasts 90 minutes and contains two sections: a multiple choice section and a free response section. For each exam, the multiple choice section consists of 35 questions and lasts 45 minutes, accounting for 50% of the total score. The remaining 50% comes from three free response questions. Because the multiple choice portion is worth exactly half, performing well here is essential for a high overall score.

It is common for students to take both the Mechanics and E&M exams in the same testing window. In that case, you'll complete two separate 90 minute tests, each with its own multiple choice and free response components. Understanding the pacing and content differences between the two exams is crucial—Mechanics tends to feel more intuitive to many students, while E&M requires a solid grasp of abstract field concepts and circuit analysis.

### Multiple Choice Question Format and Scoring

The AP Physics C multiple choice questions are not straightforward recall items. They are designed to test your ability to apply calculus based physics principles to novel situations. Each question has five answer choices (A through E). There is no penalty for guessing—points are awarded for correct answers, and no points are deducted for incorrect or blank answers. This means you should never leave a question unanswered. Even if you have no idea, making an educated guess can only help your raw score.

Questions often include graphs, diagrams, or equations that require interpretation. Some problems are purely conceptual, asking you to predict the effect of changing a variable or to identify the correct physical law. Others require a short calculation—typically one or two steps—using calculus or algebra. The key is efficiency: you have roughly 77 seconds per question (45 minutes / 35 questions), so you cannot afford to linger on any single item.

## Core Topics Covered in the AP Physics C Multiple Choice

To prepare effectively, you must know the specific content areas tested on each exam. The multiple choice questions sample from the entire course curriculum, with an emphasis on major topics.

### AP Physics C: Mechanics Multiple Choice Topics

- Kinematics – One and two dimensional motion, vectors, derivatives and integrals of position, velocity, and acceleration. Questions often involve projectile motion or motion graphs.
- Newton's Laws of Motion – Forces, free body diagrams, friction, tension, and applications of F = ma. Expect questions involving systems of objects, pulleys, and inclined planes.
- Work, Energy, and Power – Work energy theorem, conservation of mechanical energy, potential energy functions (including gravitational and spring potentials), and power.
- Linear Momentum and Collisions – Impulse, conservation of momentum in one and two dimensions, elastic and inelastic collisions, and center of mass.
- Rotational Motion – Torque, rotational kinematics and dynamics, moment of inertia, rotational kinetic energy, angular momentum conservation, and rolling without slipping.
- Oscillations and Gravitation – Simple harmonic motion (mass spring systems, pendulums), energy in oscillatory systems, Newton's law of gravitation, orbits, and Kepler's laws.

### AP Physics C: Electricity and Magnetism Multiple Choice Topics

- Electrostatics – Coulomb's law, electric fields and potentials for point charges and continuous charge distributions, Gauss's law, conductors and insulators.
- Conductors, Capacitors, and Dielectrics – Capacitance, energy stored in capacitors, dielectrics, and combinations of capacitors.
- Electric Circuits – Current, resistance, Ohm's law, Kirchhoff's rules, RC circuits (charging and discharging), and power dissipation. Questions frequently involve resistor networks and capacitor charging/discharging graphs.
- Magnetic Fields – Forces on moving charges and current carrying wires, Biot Savart law, Ampere's law, and magnetic field due to various geometries (solenoids, wires, loops).
- Electromagnetic Induction – Faraday's law, Lenz's law, induced emf, motional emf, and inductors (RL circuits).
- Maxwell's Equations (conceptual) – While not heavily quantitative, the multiple choice section may include conceptual questions about the unification of electricity and magnetism.

## Effective Strategies for the AP Physics C Multiple Choice

Approaching the 35 questions in 45 minutes requires a structured plan. Here are the most effective strategies used by top scorers.

### 1. Use the Process of Elimination Relentlessly

Since there is no guessing penalty, you should never leave a question blank. Even if you are unsure, eliminate obviously wrong answers to improve your odds. Often, two or three choices can be discarded by checking units, sign errors, or inconsistent formulas. For example, if a question asks about the direction of an electric field, and two choices indicate the same direction but different magnitudes, both cannot be correct—one of them is likely a distractor.

### 2. Master the Formula Sheet and Calculator Use

You are provided with a formula sheet for both exams, and you are allowed a graphing calculator (though not required). Familiarize yourself with the formula sheet before test day so you don't waste time searching for equations. However, note that many multiple choice questions test conceptual understanding and do not require heavy calculation. Use your calculator only when necessary. If a calculation seems too long or messy, you may have missed a simpler method, such as conservation laws or symmetry.

3. Manage Your Time with Strategic Skipping

Read each question quickly. If you can solve it in under a minute, do so immediately. If it looks time consuming or confusing, mark it for review and move on. The goal is to first answer all the easy and medium questions. Then, use any remaining time to tackle the harder ones. Because there is no penalty for guessing, at the two minute warning, bubble in an answer for every unanswered question—preferably using a consistent letter (e.g., C) to save time.

### 4. Draw Diagrams and Scan the Answer Choices

For mechanics problems, quickly sketch a free body diagram or coordinate system on the test booklet. For E&M, draw field lines or circuit diagrams. This visual approach often reveals the solution. Additionally, before diving into calculations, scan the multiple choice answers. Sometimes the options differ by factors of 2 or by a sign, which can guide your approach. For instance, if all answers are negative numbers, you know the final result must be negative.

### 5. Watch for Common Traps

AP exam writers love to include answer choices that correspond to common mistakes. For example, forgetting to convert units (e.g., cm to m), mixing up radian and degree modes, or neglecting the direction of vectors. Pay attention to whether a question asks for magnitude, direction, or a component. Another classic trap: using the wrong moment of inertia formula (e.g., using a solid sphere equation for a spherical shell). Double check the geometry given in the problem.

## Common Pitfalls and How to Avoid Them

Even well prepared students can lose points on the multiple choice section due to avoidable errors. Here are the most frequent pitfalls.

- Misreading the Question: Students often rush and miss key phrases like “which of the following is NOT true” or “the velocity when the acceleration is zero.” Circle or underline such modifiers to keep them top of mind.
- Over relying on Memory: AP Physics C emphasizes application over memorization. Do not assume that a problem is identical to one you have seen before. Always re evaluate the situation from first principles.
- Ignoring Sign Conventions: In mechanics, direction matters. In electrostatics, the sign of charge determines field direction and potential. A simple sign error can lead you to an answer that seems plausible but is actually the opposite.
- Falling for “All of the Above” or “None of the Above”: These options can be tricky. If you can confirm that two statements are true, “all of the above” might be correct. However, be cautious—if one statement is false, the answer cannot be “all of the above.”
- Spending Too Much Time on One Hard Question: You might encounter a problem involving a complex integral or a multi step derivation. Remember that all questions are weighted equally. A difficult question is worth the same as an easy one. Don’t sacrifice four easy questions for one hard one.

## Sample AP Physics C Multiple Choice Walkthrough

Let’s work through a typical Mechanics multiple choice question to illustrate the above strategies.

**Question:**A block of mass m slides down a frictionless incline of angle ;,à Which of the following correctly gives the acceleration of the block along the incline?

(A) g sin;€

(B) g cos;€

(C) g tan;€

(D) g / sin;€

(E) g / cos;€

**Solution:**Draw a free body diagram. The only forces are gravity (mg downward) and the normal force (perpendicular to the incline). The component of gravity along the incline is mg sin;,à Using Newton's second law, F = ma along the incline gives mg sin;€ = ma !' a = g sin;,à The correct answer is (A). Common mistake: choosing g cos;€ (that's the component perpendicular to the incline). By scanning the options quickly, you can eliminate (B) and (C) because tan;€ and cos;€ are not the correct trigonometric decomposition. (D) and (E) are obviously too large for most angles. This conceptual approach takes about 15 seconds.

## Essential Practice Resources for Multiple Choice Success

To sharpen your skills, you need high quality practice materials that mimic the real exam. Here are the best resources.

### Official College Board Materials

The College Board releases free response questions and scoring guidelines each year, but they also provide sample multiple choice questions in the AP Course and Exam Description. These are the most authentic practice items. Additionally, the College Board has an online AP Classroom platform where teachers can assign multiple choice questions from a secure bank. If your teacher uses it, take advantage of every opportunity.

### Review Books

Several publishers offer dedicated AP Physics C review books with hundreds of multiple choice practice questions. Look for books that separate Mechanics and E&M sections. Popular options include:

- Princeton Review's AP Physics C Prep – Known for clear explanations and strategy tips.
- Barron's AP Physics C – Offers slightly more challenging questions, good for overpreparation.
- 5 Steps to a 5: AP Physics C – Includes diagnostic tests and targeted drills.

### Online Platforms and Practice Tests

Websites like **Albert.io** and **UWorld**provide interactive multiple choice questions with detailed answer explanations. Some offer timed practice tests that simulate the real

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