

Overview

The Qualitative/Quantitative Translation (QQT) question is the fourth and final free-response question in Section 2 of the AP Physics 1 exam. It requires students to move back and forth between qualitative reasoning (words) and quantitative reasoning (equations and algebra) to describe and analyze a physics scenario.

Quantitative reasoning involves algebraic manipulation of variables and equations.

Qualitative reasoning involves writing out words to explain the physics behind the reasoning. Students who have primarily practiced numerical problem solving often struggle with QQT questions, as they require a more conceptual understanding of both content and representations.

Points and Timing

- Worth 8 points out of 40 total points in Section 2 – the lowest point value of the four free-response questions.
- Suggested time: 15 to 20 minutes out of 100 minutes total in Section 2 – the shortest suggested time of the four free-response questions.

Typical Question Structure

A Qualitative/Quantitative Translation question follows this three-part pattern:

- **Qualitative part:** Use words to describe or estimate something about the physics scenario, without manipulating equations.
- **Quantitative part:** Derive an equation that describes the same physics scenario.
- **Translation part:** Use words to justify whether the qualitative and quantitative descriptions agree with each other. You may alternatively be asked to describe the functional dependence in the equation, meaning how the equation describes the relationships between variables.

Example from the AP Physics 1 Course and Exam Description (FRQ #4 on [page 198](#))

The CED example question illustrates the three-part QQT structure clearly:

- **Part a:** Estimate something and justify the estimate using qualitative reasoning beyond referencing equations. This is the qualitative part.
- **Part b:** Derive an equation for the same quantity estimated in part a. This is the quantitative part.
- **Part c:** State whether the derived equation from part b agrees with the qualitative reasoning from part a, and justify why or why not. This is the translation part.

Key Takeaways

- The quantitative input is not always an equation you derive yourself. It could also be a data table, a graph, or a student's equation that is provided in the question. Be prepared to respond both quantitatively and qualitatively to any of these representations.
- You may also be given a student's qualitative argument and asked to explain what is correct or incorrect about it. In that case, the qualitative input is provided, and your response is also qualitative.
- The 2025 exam changes added a more consistent structure to the QQT question from year to year, but the core skill of translating between qualitative and quantitative reasoning has been tested on every AP Physics 1 exam since 2015.
- All Qualitative/Quantitative Translation questions in the Ultimate Exam Slayer practice exams and the Ultimate Review Packet follow this same structure, which is also what to expect on the actual AP Physics 1 exam.