

# Tips for Oral Exams

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Physics involves many skills: formal reasoning, collaborative thinking, informal reasoning, and more. Formal reasoning is best tested through written exams, collaborative thinking is best tested through assignments, informal reasoning is best tested through oral exams. And that's the reason for oral exams: they are not given to intimidate you, they are not given to distress you, they are given to test your command of the informal reasoning that is essential in the pursuit of physics.

With this objective in mind I present the following tips:

- Your examiner is testing your reasoning skills, not your appearance. Don't dress in elegant "dress for success" fashion. Wear comfortable clothing that will not fall off when you're writing on the chalkboard.
- You will be asked questions for which you will not know the answer off the top of your head. Your examiner wants to see *how* you reason your way to the answer. Some students ruminate silently until they hit upon the answer, complete in all respects. Bad idea, since this doesn't show the examiner how you're approaching the problem. Instead, say your ruminations out loud, and write them on the board. In particular, it almost always helps to (1) first sketch the situation and (2) then write down the major ideas you'll use to solve it ( $F = ma?$ , Gauss's Law?, Energy conservation?, Momentum conservation?, Equipartition?)
- The most exciting phrase in science is not "eureka!" but "hmm...that's funny...". If your informal reasoning leads you to an unexpected conclusion, then be bold and point out that it's funny. It is entirely possible that the point of the question was to lead you to this discovery, and to determine whether or not you can recognize that "that's funny".
- If you make a mistake, realize it yourself, and correct it yourself, you will impress your examiner. The same holds if you head off down a blind alley. Don't deliberately make errors, but don't shy away from them either.
- Oral exams are tailored to your performance. If you're doing poorly, the examiner will give you hints. If you're doing well, the examiner will generalize the problem to make it harder. A consequence is that you're always a bit out of kilter. This can distress students who are used to being confident. Just realize that it's going to happen and that being out of kilter is not a bad sign.
- If you say something obviously wrong, correct yourself and move on. Everyone makes stupid mistakes, but only the stupid get stuck defending their stupid mistakes.
- Don't be defensive and don't argue with the examiner. (On the other hand, if you have a panel of examiners you might want to get them arguing among themselves. This happened during my Ph.D. dissertation defense.)

You will be taking oral exams throughout your life: If you go on in physics you will take a graduate qualifying exam. If you work for an employer you will give presentations to your boss that are essentially oral exams although they are given a different name. If you work for yourself you will give presentations to bankers or funders; if you become a lawyer you will give arguments to judges; if you become a teacher you will banter about your subject with students and colleagues: all of these are forms of oral exam. If you get married you will have conversations with your spouse that might or might not have the aura of an oral exam. It's best to prepare for these as an undergraduate.