PHYSIQUIZ PREFACE

This PhysiQuizzes booklet is designed to accompany the textbook by Ohanian and Markert. It is based on problems from the IQ (interactive quiz) library that I developed in the past, together with some newly added problems.

In 1995 I became interested in the use of the interactive approach in teaching engineering physics. With a large class enrollment, I found (and still find) that interspersing IQ questions in my lecture in conjunction with the use of a class communication system (which facilitates quick electronic feedback from students) is an effective way to engage students' attention. This approach lets me emphasize more effectively the key points and nuances in my lecture. Instant feedback from students helps me refine my lecture presentation to better meet their needs. Since then, the interactive teaching approach using a clicker feedback system has gained momentum. This method of teaching is now used in many classes in our College of Natural Science and in other colleges on our campus.

The IQ questions I developed began as part of my lecture notes. They grew into a checkout folder in the library and eventually an organized posting on the Web, which has since been referred to as the "IQ library." The library consists of a collection of "bite-size" questions, many of which are self-contained. Many have been or will be covered during lectures. When a student has trouble with a certain topic, I prescribe several IQ questions, which are referred to as "vitamin pills" for students to study. As the semester goes along, I encourage students to work through some of the IQ library, especially the exercises that are closely related to the lecture material and homework problems. I hope instructors and students who are using the present booklet will use PhysiQuizzes in a similar manner—perhaps in other innovative ways, and perhaps making up new questions for in-class and out-of-class use.

I have added new problems in thermodynamics (Chapters 19–21) and in modern physics (Chapters 36–41). Some supplementary questions extend beyond the textbook discussion. Examples include the Fermat's Principle exercises (Chapter 34), quantitative applications of Lorentz transformations (Chapter 36), derivation of the blackbody radiation spectrum (Chapter 37), and digressions on the Feynman diagram estimation of pion mass and the strength of the color force (both in Chapter 41).

Special thanks to my colleague Professor John Markert, who suggested including the basic content of my IQ library as ancillary material for his textbook. I am glad to contribute these supplementary materials, and I am pleased to see that some of my undergraduate teaching labor can now be preserved in a published form. Thanks also to Jason Stevens, who through an arrangement with W. W. Norton has taken on the responsibility of coauthoring this booklet. He has overseen the transformation of my draft PhysiQuizzes into publishable form. My gratitude extends as well to Professor Mel Oakes of our physics department and Professor Jeff Brumfield at the dean's office of our College of Natural Science for their interest and support throughout my interactive teaching support/IQ library project. Special grants from AT&T, the Educational Advancement Foundation, and eInstruction are acknowledged. Finally, thanks to my wife, Lynda Chiu, for her encouragement and editorial help throughout my PhysiQuizzes project.

Charles Chiu
Professor of Physics and
UT Distinguished Teaching Professor
University of Texas at Austin

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