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## Preface

This book is intended as a supplementary textbook for a radiation physics course in academic medical physics and biomedical engineering graduate programs as well as a reference book for candidates preparing for certification examinations in medical physics subspecialties. The book may also be of interest to graduate students in physics, chemistry, and various branches of engineering wishing to improve their knowledge and understanding of modern physics and its intimate relationship with radiation physics applied to medicine.

The book contains 129 specific sections grouped into 14 chapters. Each section contains one or more long questions that consist of several shorter questions related to the subject material of the specific section. The chapters and sections of this textbook follow the layout of the textbook: “*Radiation Physics for Medical Physicists*” published by Springer in 2010 and the 300 solved problems presented in this book are intended to provide supplementary information to the radiation physics textbook through examples relevant to the topics discussed in individual sections of the textbook. Of course, this book can also stand on its own as a radiation physics textbook serving as a tool for learning radiation physics through perusing a series of solved radiation physics problems.

Many of the problems in this textbook are based on notes and written as well as oral examinations that I used over the past 35 years of teaching radiation physics to M.Sc. and Ph.D. students in medical physics at McGill University in Montreal. I am indebted to the many students who contributed to radiation physics classes with probing questions and who, through their performance on examinations, highlighted difficulties with certain concepts in radiation physics either because I did not explain them well enough in class or because they are truly difficult to grasp. A set of solved problems in these areas is bound to be of interest and benefit to medical physics students, to candidates in medical physics certification examinations as well as to professionals who wish to review and improve their understanding of radiation physics.

The material covered in this textbook does not deal with intricacies of medical physics subspecialties: radiation oncology physics, diagnostic radiology physics, and nuclear medicine physics. Many well-established textbooks are already available for this purpose. Rather, this textbook highlights the basic knowledge of modern radiation physics that a medical physicist must possess to be able to function as a professional on a multidisciplinary medical team that uses ionizing radiation for imaging and treatment of human disease.

Special thanks are due to my colleague Dr. Wamied Abdel-Rahman from King Fahad Specialist Hospital in Dammam, Saudi Arabia for his skillful drawing of figures presented in the textbook, for contributing several problems to the set, and for many helpful discussions and advice on individual questions.

Finally, I gratefully acknowledge that completion of this textbook could not have been accomplished without the support, encouragement, and patience of my spouse Mariana.

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300 Problems and Solutions

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