ELECTRICITY AND MAGNETISM FOR ENGINEERS. PART II. ELECTROSTATICS AND ALTERNATING CURRENTS

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FOR

ENGINEERS

PART II

ELECTROSTATICS AND ALTERNATING CURRENTS

BY

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PREFACE

In the following pages is given, from an engineering point of view, (1) a description of the more important effects commonly described as electric and magnetic phenomena, (2) a statement of the fundamental laws in accord with which these phenomena have been found to occur, and (3) the application of these laws to some of the simpler problems which arise in connection with the generation, transmission and utilization of electric energy.

Particular emphasis is laid upon exact *quantitative* statements of the fundamental laws or principles. Both safety and economy demand that the engineer be able to answer not only "how," but also "how much." To this end, the student of engineering should be taught to analyze, not only qualitatively, but also *quantitatively*, each problem which may be presented to him.

Most of the simpler formulas used by scientists and engineers are special cases of certain general relations, and these special formulas are applicable only under certain specific conditions. One of the most common causes of confusion on the part of the beginner arises from his attempt to apply such special formulas to cases to which they are not applicable. This is due in part to the failure in many text-books to state the *limitations* of such formulas. Particular care is therefore taken in these pages to state specifically the exact conditions under which each formula is applicable.

The procedure adopted throughout the book is to pass from simple phenomena, known to practically every school-boy, to the more complex phenomena and principles with which the engineer has to deal.

For convenience the book has been divided into two parts. Part I deals with the electric and the magnetic circuits, and Part II with electrostatics and alternating currents. Each part of the book can readily be covered in four hours of classroom work per week for a term. Part I may be looked upon as an introduction to the study of direct-current machinery, and Part II as an introduction to the study of alternating-current machinery.

At the end of each important section are given one or more problems, illustrating the principles developed in the text. The answers to these problems are also given. The student should be required to solve each problem, and when time is available additional problems, without answers, should be assigned. It is only by the solution of numerical problems that the student can understand the full significance of the relations developed in the text.

The two volumes of this book cover substantially the same ground as that of the author's "Principles of Electrical Engineering," McGraw-Hill Book Company, 1911. The method of treatment, however, is distinctly different, the various laws and relations are more fully discussed, and a greater number of practical applications is given.

HAROLD PENDER.

PHILADELPHIA, PA.,
April, 1919.

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