ELECTRICAL PROBLEMS FOR ENGINEERING STUDENTS

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649502479

Electrical Problems for Engineering Students by William L. Hooper & Roy T. Wells

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WILLIAM L. HOOPER & ROY T. WELLS

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Trieste

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FOR

ENGINEERING STUDENTS

BY

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BOSTON, U.S.A., AND LONDON

GINN & COMPANY, PUBLISHERS

The Athenæum Press

1902

ENTERED AT STATIONERS' HALL

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PREFACE

"Electrical Problems" has been written in the belief that there is a field and should be a demand for this class of text-book.

In physical science generally, and especially in engineering, knowledge is of use only so far as we are able to calculate numerical results, and ability to obtain such results quickly and accurately is to be obtained only by extensive practice. Then, too, the ordinary mind arrives at a clear conception of general principles only by the way of concrete examples. To the average student mathematical formulæ are vague and uninviting until he has himself made practical application of them.

For some years the students of electrical engineering in Tufts College have been largely exercised in the solution of numerical problems, and both the experience of the instructors and the testimony of the students themselves clearly indicate the value of such work in rendering clear and precise their views of electrical phenomena. Especially valuable in clarifying the students' conceptions of physical relations are those problems whose answers appear in the form of curves, showing the effects of varying the quantities involved.

Most of the problems in this book have already been presented to the electrical classes in Tufts College. Nevertheless, among so large a number it is probable that errors, especially in the answers, remain to be corrected. Those communicating such corrections to them will receive the hearty thanks of

THE AUTHORS.

TUFTS COLLEGE,
September, 1902.

CONTENTS

CHAPTER		PAGE
I.	The Fundamental Units	1
II.	Current, Electro-Motive Force, and Resistance	4
III.	Resistivity	7
IV.	Electro-Motive Forces and Resistances in Series Grouping	11
V.	Electro-Motive Forces and Resistances in Parallel Grouping	16
VI.	Drop	21
VII.	Power and Efficiency	25
VIII.	The Magnetic Field due to a Current	30
IX.	Inductance	38
X.	The Condenser	45
XI.	Thermoelectricity	51
XII.	Electro-Chemistry	56
XIII.	Alternating Electro-Motive Forces and Currents	58
XIV.	Combination of Alternating Electro-Motive Forces	64
XV.	Combination of Alternating Currents	69
XVI.	Impedance	73
XVII.	Direct Current Armatures	85
XVIII.	Alternating Current Armatures	90
XIX.	The Winding of Armatures	94
XX.	Armature Reactions	107
XXI.	Field Winding	112
XXII.	The Transformer	118
XXIII.	The Rotary Converter	124
XXIV.	The Induction Motor	127
XXV.	Testing of Dynamos	132
XXVI.	The Transmission of Power	138
	Appendix	141
	Wire Table	142
	Answers	145
	Graphical Solutions	157

ELECTRICAL PROBLEMS

CHAPTER I

THE FUNDAMENTAL UNITS

The system of units generally used in physical science employs the centimeter, the gram, and the second, respectively, as the units of length, mass, and time, and hence is known as the centimeter-gram-second, or more briefly as the C.G.S., system.

Since, however, commercial measurements are frequently made in terms of other units, as, for instance, feet, pounds, and minutes, it is important that one should be able to readily change from one system of units to the other.

It is assumed that the student is familiar with both the metric and the English systems. He should remember that

2.54 centimeters = 1 inch;
453.6 grams = 1 pound avoirdupois.

PROBLEMS

1. How many centimeters in a foot?
2. How many meters in a mile?
3. How many centimeters in a knot?
4. A No. 6 wire (Brown and Sharp Gauge, or B.S.G.) has a diameter of 162 mils. What is its diameter in centimeters?

NOTE. — The mil is the thousandth part of an inch.