

AP PHYSICS 'C'
WORKBOOK

**ELECTRICITY
&
MAGNETISM**

by

John McGehee

- PREFACE -

The eight units included in this workbook are a compilation of lecture notes, worksheets and other materials covering the electricity and magnetism portion of the Advanced Placement Physics C-level course. The material covered is limited to the subject areas listed in the learning objectives published by the College Board. The units are written in workbook form for the purpose of involving the student in the development of the concepts of electricity and magnetism and to facilitate independent study. The workbook is not designed to replace a textbook, but to clarify and compliment it and focus the student's attention specifically on the material that will be covered on the C-level examination. Although it is keyed to the particular text I was using at the time, the material is standard in all commonly used calculus based college physics textbooks.

This workbook is considered to be in the public domain and permission is hereby granted to anyone wishing to copy, plagiarize, expand, delete, etc., any part of it as long as the result is directed toward helping students gain a better understanding of electricity and magnetism.

Assembling these materials into their present form was accomplished during the summers of 1983, 1984, and 1985 through the support of TRW, Inc. without whose encouragement and financial support the project could never have been completed.



John McGehee

Palos Verdes Peninsula High School
27118 Silver Spur Road
Rolling Hills Estates, CA 90274
310.377.4888

ELECTRICITY & MAGNETISM WORKBOOK

Table of Contents

1. Request for Letter to TRW Cover Sheet Preface
2. Assignment Sheets for Units I - VIII
3. Unit I - CHARGED PARTICLES AND ELECTRIC FIELDS
Unit I Problem Solutions
4. Unit II - ELECTROSTATIC FIELDS AND GAUSS' LAW
Unit II Problem Solutions
5. Lab - Equipotentials And Electric Fields
6. Unit III - ELECTRIC POTENTIAL
Unit III Problem Solutions
7. Unit IV - CAPACITORS AND DIELECTRICS
Unit IV Problem Solutions
8. Lab - DC Circuits
9. Unit V - OHMS LAW AND DC CIRCUITS
Unit V Problem Solutions
10. Lab - RC Circuits
11. Unit VI - MAGNETIC FORCES AND FIELDS
Unit VI Problem Solutions
12. Lab - Forces On Currents
13. Unit VII - CALCULATING MAGNETIC FIELDS
Unit VII Problem Solutions
14. Unit VIII - ELECTROMAGNETIC INDUCTION
Unit VIII Problem Solutions

AP Physics Assignment Sheet - ELECTRICITY & MAGNETISM

Unit I - Charged Particles & Electric Fields

Reference: PHYSICS FOR SCIENTISTS & ENGINEERS, Serway,
3rd ed., Chapter 23

Day	Pages in Workbook	Workbook Problems
1, 2	1 through 9	1 through 8
3	10 through 15	9 through 12
4	16 through 20	13
5	21 through 27	14 through 16

Unit II - Electrostatic Fields & Gauss' Law

Reference: PHYSICS FOR SCIENTISTS & ENGINEERS, Serway,
3rd ed., Chapters 23 & 24

Day	Pages in Workbook	Workbook Problems
1	1 through 5	1
2	6 through 11	2
3	12 through 16	3 through 6
4	17 through 25	
5	26 through 32	
6		7 through 12
7	Catch up and	review for Quiz
8	Quiz on Units	I and II

AP Physics Assignment Sheet - ELECTRICITY & MAGNETISM

Unit III - Electric Potential

Reference: PHYSICS FOR SCIENTISTS & ENGINEERS, Serway,
3rd ed., Chapter 25

Day	Pages in Workbook	Workbook Problems
1,2	1 through 6	1 through 7
3	7 & 8	8 through 10
4	9 through 16	11 through 14
5	17 through 22	15 through 19
6	23 through 24	
7	Quiz on	Unit III

Unit IV - Capacitors & Dielectrics

Reference: PHYSICS FOR SCIENTISTS & ENGINEERS, Serway,
3rd ed., Chapter 26

Day	Pages in Workbook	Workbook Problems
1,2	1 through 8	1 through 3
3	9 through 16	4 through 8
4,5	17 through 22.5	9 through 13
6	22.5 through 23	14 through 17

AP Physics Assignment Sheet - ELECTRICITY & MAGNETISM

Unit V - Ohm's Law & D.C. Circuits

Reference: PHYSICS FOR SCIENTISTS & ENGINEERS, Serway,
3rd ed., Chapters 27 & 28

Day	Pages in Workbook	Workbook Problems
1-3	"D.C. Circuits"	Experiment
	{ 1 through 7.5	1 through 3
4,5	{ 7.5 through 11	4 through 7
	{ 12 through 14	8 through 11
6	15 through 22.5	12 & 13
7	22.5 through 27	14 through 19
8,9	28 through 35	20 through 23
10	Quiz on Units	IV & V

AP Physics Assignment Sheet - ELECTRICITY & MAGNETISM

Unit VI - Magnetic Forces & Fields

Reference: PHYSICS FOR SCIENTISTS & ENGINEERS, Serway,
3rd ed., Chapter 29

Day	Pages in Workbook	Workbook Problems
1	1 through 10	
2	11 through 13	1 through 5
3	14 through 18	6 through 10
4	19 through 24	11 through 16
5	Quiz on	Unit VI

Unit VII - Calculating Magnetic Fields

Reference: PHYSICS FOR SCIENTISTS & ENGINEERS, Serway,
3rd ed., Chapter 30

Day	Pages in Workbook	Workbook Problems
1	1 through 5	1 through 3
2	6 & 7	4 through 12
3	8 & 9	13 through 16
4	10 through 14	17 through 20
5	15 through 17	21 through 25
6	Quiz on	Unit VII

AP Physics Assignment Sheet - ELECTRICITY & MAGNETISM

Unit VIII - Electromagnetic Induction

Reference: PHYSICS FOR SCIENTISTS & ENGINEERS, Serway,
3rd ed., Chapters 31 & 32

Day	Pages in Workbook	Workbook Problems
1	1 through 11	
2		1 through 7
3	12 through 16	8 through 10
4	17 & 18	11 through 14
5	19 through 26	15 & 16
6	27 through 36	
7		17 through 20
8	Quiz on	Unit VIII