## Contents

Chapter 1.	Classical Mechanics and Electromagnetism	1
	Classical Mechanics	1
	Waves	6
	Properties of Waves in Material Media	8
	Maxwell's Theory of Electromagnetic Waves	14
	Properties of Waves in Material Media	8

2.	Special Relativity	34
	The Michelson-Morley Experiment	36
	The Lorentz Transformation	39
	Synchronization of Clocks	42
	Minkowski Diagrams	45
	Time Dilatation	49
	Relativity and Simultaneity	53
	The Lorentz Contraction	56
	vii	

## viii CONTENTS

61
61
63
69
70
75
80
82
84
90

## 3. The General Theory of Relativity 95 Inertial and Gravitational Mass and the Newton, 96 Bessels, Eötövs Experiments Newton's and Einstein's Ideas about Rotation 100 100 The Equivalence Principle 105 **Clocks in a Gravitational Field** 109

Experimental Tests of the General Theory

4.	Calculation of the General Relativistic Results	113
	Derivation of the Transformation Rule	114
	Velocity of Light near a Gravitating Mass	116
	Precession of the Perihelion	117
,	Deflection of Light in a Gravitational Field	119

	CONTENTS	ix
The Red Shift		121
Einstein's Cosmology		121
Problems		125
References		138
Appendix of Formulas		140
Index		145
	Einstein's Cosmology Problems References Appendix of Formulas	The Red Shift Einstein's Cosmology Problems References Appendix of Formulas