

CONTENTS

Preface to the Fourth Russian Edition 1. Basic Concepts

The Centimetre and the Second 9. Weight and Mass 14. The International System of Units and Standards of Measurement 18. Density 21. The Law of Conservation of Mass 23. Action and Reaction 26. How Velocities Are Added 28. Force Is a Vector 32. Inclined Plane 37.

2. Laws of Motion

Various Points of View About Motion 40. The Law of Inertia 42. Motion Is Relative 46. The Point of View of a Celestial Observer 48. Acceleration and Force 51. Rectilinear Motion with Constant Acceleration 59. Path of a Bullet 62. Circular Motion 66. Life at g Zero 70. Motion from an "Unreasonable" Point of View 76. Centrifugal Forces 81. Coriolis Forces 88.

3. Conservation Laws

Recoil 96. The Law of Conservation of Momentum 98. Jet Propulsion 101. Motion Under the Action of Gravity 105. The Law of Conservation of Mechanical Energy 111. Work 114. In What Units Work and Energy Are Measured 117. Power and Efficiency of Machines 118. Energy Loss 120. Perpetuum Mobile 122. Collisions 125.

4. Oscillations

Equilibrium 129. Simple Oscillations 131. Displaying Oscillations 135. Force and Potential Energy in Oscillations 140. Spring Vibrations 143. More Complex Oscillations 146. Resonance 148.

5. Motion of Solid Bodies

Torque 151. Lever 155. Loss in Path 158. Other Very Simple Machines 161. How to Add Parallel Forces Acting on a Solid Body 163. Centre of Gravity 167. Centre of Mass 172. Angular Momentum 174. Law of Conservation of Angular Momentum 176. Angular Momentum as a Vector 178. Tops 181. Flexible Shaft 183.

6. Gravitation

What Holds the Earth Up! 187. Law of Universal Gravitation 188. Weighing the Earth 191. Measuring g in the Service of Prospecting 193. Weight Underground 198. Gravitational Energy 201. How Planets Move 206. Interplanetary Travel 212. If There Were No Moon 216.

7. Pressure

Hydraulic Press 223. Hydrostatic Pressure 235. Atmospheric Pressure 228. How Atmospheric Pressure Was Discovered 232. Atmospheric Pressure and Weather 234. Change of Pressure with Altitude 237. Archimedes' Principle 240. Extremely Low Pressures. Vacuum 245. Pressures of Millions of Atmospheres 247.

