

CONTENTS

	<i>Page</i>
Preface to the English edition	vii
 I. THE EQUATIONS OF MOTION 	
§1. Generalised co-ordinates	1
§2. The principle of least action	2
§3. Galileo's relativity principle	4
§4. The Lagrangian for a free particle	6
§5. The Lagrangian for a system of particles	8
 II. CONSERVATION LAWS 	
§6. Energy	13
§7. Momentum	15
§8. Centre of mass	16
§9. Angular momentum	18
§10. Mechanical similarity	22
 III. INTEGRATION OF THE EQUATIONS OF MOTION 	
§11. Motion in one dimension	25
§12. Determination of the potential energy from the period of oscillation	27
§13. The reduced mass	29
§14. Motion in a central field	30
§15. Kepler's problem	35
 IV. COLLISIONS BETWEEN PARTICLES 	
§16. Disintegration of particles	41
§17. Elastic collisions	44
§18. Scattering	48
§19. Rutherford's formula	53
§20. Small-angle scattering	55

V. SMALL OSCILLATIONS

	<i>Page</i>
§21. Free oscillations in one dimension	58
§22. Forced oscillations	61
§23. Oscillations of systems with more than one degree of freedom	65
§24. Vibrations of molecules	70
§25. Damped oscillations	74
§26. Forced oscillations under friction	77
§27. Parametric resonance	80
§28. Anharmonic oscillations	84
§29. Resonance in non-linear oscillations	87
§30. Motion in a rapidly oscillating field	93

VI. MOTION OF A RIGID BODY

§31. Angular velocity	96
§32. The inertia tensor	98
§33. Angular momentum of a rigid body	105
§34. The equations of motion of a rigid body	107
§35. Eulerian angles	110
§36. Euler's equations	114
§37. The asymmetrical top	116
§38. Rigid bodies in contact	122
§39. Motion in a non-inertial frame of reference	126

VII. THE CANONICAL EQUATIONS

§40. Hamilton's equations	131
§41. The Routhian	133
§42. Poisson brackets	134
§43. The action as a function of the co-ordinates	138
§44. Maupertuis' principle	140
§45. Canonical transformations	143
§46. Liouville's theorem	146
§47. The Hamilton-Jacobi equation	147
§48. Separation of the variables	149
§49. Adiabatic invariants	154
§50. General properties of motion in s dimensions	158
Index	163