

CONTENTS

PREFACE	TX
CHAPTER I Elements of the Theory of Groups 1. Groups - 2. Subgroups - Isomorphism and homo- morphism of groups.	1
CHAPTER II Some Specific Groups	8
4. The permutation group - 5. The rotation group 6. The full orthogonal group - 7. The Euclidean group - 8. The point groups - 9. The point groups of the first kind - 10. The point groups of the second kind - 11. The translation group - 12. Syngonies - 13. The Symmetry of crystals.	
CHAPTER III The Theory of Group Representations	41
14. Representation of a group - 15. Equivalent representations - 16. The averaging functional 17. Reducible representations - 18. Irreducible representations and orthogonality properties - 19. The completeness theorem - 20. The theory of characters.	
CHAPTER IV Operations with Group Representations	62
21. The product of representations - 22. Conjugate representation - 23. Real representations - 24. The direct product - 25. Symmetrized multiple products of representations - 26. Decomposition of a reducible representation into irreducible representations.	
CHAPTER V Representations of Certain Groups	82
27. Representations of the permutation group Sn - 28. The irreducible representations of point groups - 29. Representations of translation groups - 30. Representations of space groups.	

	page
CHAPTER VI Small Oscillations of Symmetrical Systems	103
31. Normal coordinates and eigen-frequencies 32. Symmetrical coordinates - 33. The Lagrangian in symmetrical coordinates - 34. oscillatory representation - 35. An example: The molecule CHCl ₃ (117).	
CHAPTER VII Second Order Phase Transitions	121
36. Formulation of the problem - 37. Active representations - 38. An example.	
CHAPTER VIII Crystals	158
39. Sound in crystals - 40. Electron levels a crystal - 41. Tensors in crystals.	in
CHAPTER IX Infinite Groups	170
42. Specific properties of infinite groups - 43. Elements of the theory of Lie groups - 44. Infinitesimal representation of a Lie group.	
CHAPTER X Representations of the Rotation Gro	
in Two and Three Dimensions and or the full orthogonal Group	192
45. The irreducible representations of the tradimensional rotation group Z - 46. Classification of the irreducible representations of three-dimensional rotation group - 47. The matrix elements of the irreducible representations - 48. Properties of the irreducible representations of the rotation group - 49. The product of representations of the rotation group - 50. Spinor algebra - 51. Tensor algebra - 52. Representations of the full orthogonal group - 53. Double-valued representations of point groups.	a- on bra
CHAPTER XI Clebsch-Gordon and Racah coeffi- cients	227
54. Evaluation of the Clebsch-Gordon co- efficients - 55. Properties of the Clebsch- Gordon coefficients - 56. Racah coefficients	
CHAPTER XII The Schrödinger Equation	247
57. Conservation laws - 58. Classification of states.	£
CHAPTER XIII Equations invariant under the Euclidean group of motions in space	260
59. Spherical harmonics with spin - 60. Equa-	

	page
tions invariant under the group of Euclidean motions in space - 61. An example.	
HAPTER XIV Absorption and Raman Scattering of Light	273
62. Quantum mechanical introduction - 63. Selection rules for the absorption of light by atoms and molecules - 64. Raman scattering of light by atoms and molecules.	
HAPTER XV Representations of the Lorentz Group	286
65. The Lorentz group - 66. Infinitesimal operators of the Lorentz group - 67. Classification of the irreducible representations of the Lorentz group - 68. Product of irreducible representations of the Lorentz group - 69. Complex-conjugate representations - 70. Spinor algebra - 71. Tensor algebra - 72. Representations of the full Lorentz group.	
HAPTER XVI Relativistically invariant Equations	307
73. The wave function - 74. Relativistically invariant equations - 75. The Lagrangiang - 76. Conservation laws - 77. Spin - 78. The relativistically invariant operation of time inversion and the Pauli theorem - 79. The Dirac equation.	
HAPTER XVII Nuclear Reactions	335
80. The scattering matrix - 81. Angular distribution of the products of a nuclear reaction - 82. Angular distribution of the products of a nuclear reaction (continued).	•
PPENDICES	344
I. Characters of irreducible representations of the permutation groups S_4, S_5, S_6, S_7 .	
II. Characters of irreducible representations of point groups.	
III. Two-valued representations of point groups	•
IV. Space groups.	
V. Racah Coefficients.	
IBLIOGRAPHY	375
JBJECT INDEX	380