

Contents

Foreword	v
Selected Topics in Statistical Mechanics	1
<i>G. E. Uhlenbeck, The Rockefeller Institute, New York</i> (Notes by N. Ranganathan)	
Statistical Mechanics of Equally Likely Quantum Systems	91
<i>N. Rosenzweig, Argonne National Laboratory</i> (Notes by H. Leff)	
Functional Integrals in Statistical Mechanics	159
<i>A. J. F. Siegert, Northwestern University</i> (Notes by N. Wheeler)	
Information Theory and Statistical Mechanics	181
<i>E. T. Jaynes, Washington University</i> (Notes by the lecturer)	
Approach to Equilibrium of a Many-Particle System	219
<i>S. Fujita, Université Libre de Bruxelles</i> (Notes by the lecturer)	

CONTENTS

1. Introduction	3
2. Van der Waals' Equation	5
3. Cluster Integrals	10
4. Equation of State	23
5. Some General Theorems on Phase Transition	31
6. Models for Condensation	40
7. Kac's One-Dimensional Model	49
8. One-Dimensional Model Exhibiting Phase Transition	59
9. Distribution Functions	76
A. Canonical Distribution Functions	76
B. Grand Canonical Distribution Functions	79
References	89

CONTENTS

Introduction	93
I. Survey of Nuclear and Atomic Phenomena. Statement of the Problem	94
II. Theory of Time-Reversal and the Effect of Time-Reversal Invariance on Hamiltonian Matrices	100
III. Ensembles of Real-Symmetric Matrices	108
A. General Features	108
B. The Fixed Strength Ensemble	110
C. Wigner Ensembles and the Gaussian Ensemble	115
D. Moment Equivalence of E_R and E_G for $N \rightarrow \infty$	118
E. The Joint Distribution of Eigenvalues and Eigenvectors	121
IV. Calculations with the Gaussian Ensemble	124
A. Normalization Constant	124
B. The Density of Levels	135
C. The Nearest Neighbor Level Spacing Distribution	144
References	156

CONTENTS

1. Introduction	161
2. Mathematical Preliminaries	163
3. Formulation of the Ising Model in Random Variables	165
4. Calculation of Higher-Order Terms	169
5. Application of the Functional Method to Plasma Problems	175
References	180

CONTENTS

1. Introduction	182
2. The General Maximum-Entropy Formalism	187
3. Application to Equilibrium Thermodynamics	195
4. Generalization	199
a. Density Matrix	200
b. Continuous Distributions	201
5. Distribution Functions	206
6. Entropy and Probability	212
7. Conclusion	217
References	217

CONTENTS

1. General Introduction	220
2. Preliminaries	221
A. Density Operator	221
B. Hamiltonian. A System of Interacting Particles	222
3. Master Equations	224
4. Initial Condition	229
5. Generalized Master Equations	231
A. Van Hove's Equation	231
B. Prigogine-Résibois' Equation	235
C. Interrelation	239
6. Approach to Equilibrium	245
7. Remarks and Vistas	249
A. Density Operator and Reduced Quantities	249
B. Non-Markoffian Evolution	250
C. Transport Coefficients	250
Acknowledgments	251
References	251