

# CONTENTS.

## PART I.

	PAGE
PREFACE .....	v
INTRODUCTION.....	ix
FUNDAMENTAL LAWS OF CHEMISTRY.....	1
DEFINITIONS.....	2
PRELIMINARY REMARKS.....	4
THERMOMETERS.....	7
METRIC SYSTEM .....	9
TABLES OF METRIC SYSTEM.....	11
PROBLEMS IN THE METRIC SYSTEM.....	13
ORDINARY WEIGHTS AND MEASURES.....	14
CONVERSION, METRIC TO ORDINARY AND REVERSE .....	16
MENSURATION DATA AND EXAMPLES .....	18
CHEMICAL PROBLEMS .....	20
THE CHEMICAL EQUATION AND EXAMPLES .....	21
DEDUCTION OF ANALYSIS FROM FORMULA.....	27
DEDUCTION OF CHEMICAL FACTORS AND EXAMPLES .....	32
DEDUCTION OF FORMULA FROM ANALYSIS AND EXAMPLES .....	36
EXCESS AND DEFICIENCY .....	42
ATOMIC AND MOLECULAR WEIGHTS.....	44
VAPOR DENSITIES AS RELATED TO MOLECULAR WEIGHTS.....	47
RAOULT'S LAW.....	54
FREEZING AND BOILING POINTS OF SOLUTIONS.....	55
COMPUTATION OF GAS VOLUMES.....	56
DEDUCTION OF GAS VOLUMES FROM WEIGHTS .....	59
THE "CRITH" METHOD.....	59
THE "22.4" METHOD AND EXAMPLES .....	62
APPLICATION OF THE "22.4" METHOD TO ENGLISH MEASURES .....	65
PROBLEMS INVOLVING ALL PRECEDING PRINCIPLES.....	69
DENSITY OF GASES WHEN AIR IS "UNITY".....	75
CHARLES' LAW.....	76
BOYLE'S LAW .....	78
COMBINATION OF CHARLES' AND BOYLE'S LAWS .....	80
WEIGHTS OF GASES UNDER VARIANT CONDITIONS .....	83
SPECIFIC GRAVITY.....	86
SUBSTANCE HEAVIER THAN WATER.....	88
SUBSTANCE SOLUBLE IN WATER.....	88
SUBSTANCE LIGHTER THAN WATER.....	89
LIQUID SUBSTANCE .....	90
BOTTLE METHOD .....	92

	PAGE
SPECIFIC GRAVITY OF A MIXTURE .....	93
MISCELLANEOUS PROBLEMS IN SPECIFIC GRAVITY .....	94
CALCULATION OF ANALYSES AND EXAMPLES .....	97
MINERAL WATERS .....	110
ASSAY WEIGHTS AND CALCULATIONS .....	111
MEXICAN ASSAY RETURNS .....	116
VOLUMETRIC ANALYSIS AND EXAMPLES .....	117
MISCELLANEOUS PROBLEMS .....	138
ANSWERS TO MISCELLANEOUS PROBLEMS .....	172
TABLE OF ELEMENTS AND ATOMIC WEIGHTS .....	184
TABLE OF CHEMICAL FACTORS .....	185
TABLE OF MOLAR WEIGHTS AND PERCENTAGE COMPOSITION .....	189
TABLE OF SPECIFIC GRAVITIES, MELTING POINTS, ETC. ....	198
TABLE OF GASES AND VAPORS, DENSITIES, ETC. ....	201
TABLE OF SPECIFIC GRAVITY OF WATER AT VARIOUS TEMPERATURES	202
SPECIFIC GRAVITIES OF CERTAIN LIQUIDS:	
AMMONIA .....	203
SULPHURIC ACID .....	204
HYDROCHLORIC ACID .....	205
NITRIC ACID .....	206

---

## PART II.

CALCULATION OF FURNACE CHARGES .....	209
DEFINITIONS .....	210
FORMULISTIC SLAGS .....	217
INTRODUCTORY PROBLEMS .....	221
CALCULATION BY "EXCESS" .....	221
TAKING OUT MATTE .....	223
SIMPLIFICATION OF DATA .....	234
CONVERSION FACTORS FOR BASES .....	239
MIXING ORES .....	242
CONCENTRATION .....	243
PROPORTIONAL AND PERCENTAGE TABLES .....	245
FORMULISTIC AND PERCENTAGE SLAGS .....	246
METHOD OF "REPRESENTATIVE" EQUATIONS .....	249
TYPICAL SLAG PROBLEM (FROM PETERS) .....	261
IRON FURNACE PROBLEM .....	268
TYPE SLAGS .....	271
INDETERMINATE CASES .....	286
PYRITIC SMELTING .....	289
SOME WELL-KNOWN FORMULÆ .....	291
BURDENING THE IRON FURNACE .....	298

---

INDEX .....	301
-------------	-----

### ERRATA.

- Page 149, Problem 102, for 114.016 read 102.396.  
Page 154, Problem 136, for 100 liters read 1000 liters.  
Page 156, Problem 155, for Light read Sound.  
Page 157, Problem 165, for 1.0402 read 1.4534.  
Page 158, Problem 170, for 100° C. read 10° C.  
Page 159, Problem 174, for 72.8 read 44.4.  
Page 165, Problem 214, read 125.611 liters. Cancel other conditions.  
Page 167, Problem 228, for 3 Fe + 2 O read 2 Fe + 3 O.  
Page 170, Problem 251, for 6 read 3.

### ANSWERS.

- Page 174, Problem 75, read 2.9867 liters.  
Page 177, Problem 130, read 1.232 liters.  
Page 177, Problem 132, for KOH 3390.9 read 2635.  
Page 177, Problem 140, read Acid 3658.  
Page 178, Problem 143, in equation for KCl read 2 KCl.  
Page 179, Problem 170, for 100° read 10°.  
Page 181, Problem 211, read 3494 cu. ft.  
Page 182, Problem 227, read 36.8.  
Page 182, Problem 228, read minus 84° C.  
Page 183, Problem 243, for acid solution 3222 read acid solution 2641, for Vol. of same 2920 read 2401.  
Page 183, Problem 254, read NaOH solution 5083.5.