

CONTENTS

Preface to the First Edition	v
Preface to the Second Edition	vii
1. Introduction	1
2. The Properties of Elements and the Structure of their Atoms	12
3. The Electronic Theory of Valency and the Periodic Classification	40
4. Oxidation, Reduction and Electrochemical Processes	69
5. The Principles Governing the Extraction of Elements	86
6. The Extraction and Uses of Typical Elements	93
7. The Extraction and Uses of Transition and Associated Metals	100
8. Industrial Alloys	128
9. Commercial Processes Based on Air, Water, Petroleum and Coal	129
10. The Industrial Production of Sulphuric Acid	139
11. Chemicals from Salt: The Alkali Industry	144
12. Crystallization and the Crystalline State: allotropy, polymorphism and isomorphism	155
13. Hydrogen, the Hydrides and Water	174
14. Oxygen, Oxides and Peroxides	197
15. Group I: The Alkali Metals: lithium, sodium, potassium, rubidium and caesium	217
16. Group II: The Alkaline-Earth Metals: beryllium, magnesium, calcium, strontium and barium	236
17. Group III: The Boron Group: boron and aluminium	251
18. Group IV: the Carbon Group: carbon, silicon, germanium, tin and lead	261
19. Group V: The Nitrogen Group: nitrogen, phosphorus, arsenic, antimony and bismuth	290
20. Group VI: Sulphur	329
21. Group VII: The Halogens: fluorine, chlorine, bromine and iodine	343
22. Period 4: Transition and Associated Elements	379
23. Period 5: Silver	410
24. Period 6: Mercury	418
Examination Questions	424
Answers	452
Index	453