

VOLUME ONE

Table of Contents

Introduction to Course	.d
Volume One Table of Contents	.e-f
What and How You Will Learn from this Course	.g-h
Chapter One	1
Chapter 1 Table of Contents	3
SECTION 1	
1. PUTTING TOGETHER THE PIECES	.5-8
2. CHEMISTS WHO WANTED TO MAKE GOLD	.9-12
3. THE MAN WHO DEFINED AN ELEMENT	.13-16
4. THE MONEY METALS	.17-20
5. THE WORKING METALS	.21-25
SECTION 2	
6. METALS AND NONMETALS	.27-30
7. MAKING CHEMISTRY EASIER	.31-34
8. CHEMISTRY MATTERS	.35-38
9. CONTINUOUS AND DISCRETE	.39-42
10. CHEMICAL FORMULAS OF COMPOUNDS	.43-46
SECTION 3	
11. LEARNING CHEMICAL FORMULAS	.47-51
12. CHEMICAL SHORTHAND	.53-57
13. ATOMIC WEIGHTS	.59-62
14. HEAT	.63-66
15. MEASURING TEMPERATURE	.67-70
Chapter Two	71
Chapter 2 Table of Contents	73
SECTION 1	
1. GALILEO AND THE PENDULUM	.75-78
2. GALILEO AND MOTION: SPEED	.79-82
3. GALILEO AND MOTION: ACCELERATION	.83-86
4. GALILEO, ROEMER AND THE SPEED OF LIGHT	.87-90
5. BRAHE, KEPLER AND COPERNICUS: MOTION IN THE HEAVENS	.91-94
SECTION 2	
6. VELOCITY, MASS, ACCELERATION AND FORCE	.95-98
7. MOTION, GRAVITY AND THE STARS	.99-102
8. THE THREE LAWS OF MOTION	.103-106
9. NEWTON AND GRAVITY	.107-110
10. THE LAW OF GRAVITY	.111-114
SECTION 3	
11. MOMENTUM AND IMPULSE	.115-118
12. SIMPLE MACHINES	.119-122
13. EFFICIENCY OF SIMPLE MACHINES	.123-127
14. KINETIC AND POTENTIAL ENERGY	.129-132
15. MECHANICAL AND HEAT ENERGY	.133-136

Chapter Three	137
Chapter 3 Table of Contents	139
<u>SECTION 1</u>	
1. CHEMICAL NOMENCLATURE	141-144
2. LAVOISIER'S LIST OF ELEMENTS	145-148
3. SULFUR: USES AND PRODUCTION	149-152
4. CHEMISTS MAKE DIAMONDS	153-156
5. GRAPHITE AND COAL	157-160
<u>SECTION 2</u>	
6. MEDIEVAL METALS	161-164
7. PLATINUM AND ZINC	165-168
8. COBALT, NICKEL, MANGANESE, MOLYBDENUM AND TUNGSTEN	169-173
9. GASES AND THE ATMOSPHERE	175-178
10. AIR PRESSURE AND HUMIDITY	179-182
<u>SECTION 3</u>	
11. HENRY CAVENDISH AND HYDROGEN	183-186
12. JOSEPH PRIESTLEY AND OXYGEN	187-190
13. NITROGEN	191-194
14. NITROGEN IN FERTILIZERS AND EXPLOSIVES	195-198
15. NITROGEN IN DYNAMITE AND LAUGHING GAS	199-202

VOLUME TWO

Table of Contents

Introduction to Course	. . . . .d
Volume Two Table of Contents	. . . . .e-f
What and How You Will Learn from this Course	. . . . .g-h
Chapter Four	. . . . .1
Chapter 4 Table of Contents	. . . . .3
SECTION 1	
1. PROPERTIES OF SOLIDS: ELASTICITY	. . . . .5-8
2. COHESION AND ADHESION	. . . . .9-12
3. DENSITY AND PRESSURE	. . . . .13-16
4. HYDROSTATICS	. . . . .17-20
5. BUOYANCY	. . . . .21-24
SECTION 2	
6. GASES AND DIFFUSION	. . . . .25-28
7. FLUID FLOW	. . . . .29-32
8. BERNOULLI'S PRINCIPLE	. . . . .33-36
9. CHANGES OF STATE	. . . . .37-40
10. HEAT	. . . . .41-44
SECTION 3	
11. HEAT FLOW	. . . . .45-48
12. WAVES IN FLUIDS	. . . . .49-52
13. TRANSVERSE AND LONGITUDINAL WAVES	. . . . .53-56
14. SOUND WAVES: AMPLITUDE AND PITCH	. . . . .57-60
15. PROPERTIES AND SOUNDS	. . . . .61-64
Chapter Five	. . . . .65
Chapter 5 Table of Contents	. . . . .67
SECTION 1	
1. STATIC ELECTRICITY	. . . . .69-72
2. ELECTRIC CHARGE	. . . . .73-76
3. LIGHTNING— A KEY EXPERIMENT	. . . . .77-80
4. ELECTRIC POTENTIAL	. . . . .81-84
5. ELECTRIC CURRENT	. . . . .85-88
SECTION 2	
6. OHM'S LAW	. . . . .89-92
7. HUMPHRY DAVY: CHEMICAL DETECTIVE	. . . . .93-96
8. THE SODIUM METALS: LITHIUM	. . . . .97-100
9. SODIUM	. . . . .101-104
10. THE SODIUM FAMILY OF METALS	. . . . .105-108
SECTION 3	
11. BERYLLIUM AND MAGNESIUM	. . . . .109-112
12. MAGNESIUM AND CALCIUM	. . . . .113-116
13. CALCIUM, HARD WATER AND STRONTIUM	. . . . .117-120
14. BARIUM AND RADIUM	. . . . .121-124
15. PERIODIC LAWS	. . . . .125-128

<i>Chapter Six</i>	129
Chapter 6 Table of Contents	131
<u>SECTION 1</u>	
1. MAKING IT SHINE	133-136
2. AN ATTRACTIVE SUBJECT	137-140
3. PICKING UP PAPERCLIPS	141-144
4. FROM MAGNETS TO MARS	145-148
5. FORCE FIELDS	149-152
<u>SECTION 2</u>	
6. ELECTRIC TRANSFORMERS	153-156
7. FROM ELECTROMAGNETISM TO LIGHT	157-160
8. COLOR VISION	161-164
9. LIGHT TRAVELING IN STRAIGHT LINES	165-168
10. MIRRORS AND TELESCOPES	169-172
<u>SECTION 3</u>	
11. BENDING LIGHT	173-176
12. CAMERAS AND EYEGASSES	177-180
13. SINGLE LENS MICROSCOPES	181-184
14. MICROSCOPES AND TELESCOPES	185-188
15. RAINBOWS	189-192

VOLUME THREE

Table of Contents

Introduction to Course	d
Volume Two Table of Contents	e-f
What and How You Will Learn from this Course	g-h
Chapter Seven	1
Chapter 7 Table of Contents	3
SECTION 1	
1. EXPLORING THE PERIODIC TABLE	5-8
2. ELEMENT'S FINGERPRINTS	9-12
3. THE NOBLE GASES—ARGON	13-16
4. THE NOBLE GAS FAMILY	17-20
5. CHEMICAL BONDS	21-24
SECTION 2	
6. INSIDE THE ATOM—THE ELECTRON	25-28
7. INSIDE THE ATOM	29-32
8. CHEMICAL BONDING	33-37
9. FLUORINE, CHLORINE AND BROMINE	39-42
10. IODINE, ASTATINE AND HALOGENS	43-46
SECTION 3	
11. ACIDS, BASES AND SALTS	47-50
12. COVALENT COMPOUNDS AND WATER	51-54
13. ICE	55-58
14. SOLUTIONS	59-62
15. COOL, CLEAR WATER	63-66
Chapter Eight	67
Chapter 8 Table of Contents	69
SECTION 1	
1. ORGANIC CHEMISTRY	71-74
2. HYDROCARBONS	75-78
3. SATURATED AND UNSATURATED HYDROCARBONS	79-82
4. BLACK GOLD	83-86
5. BENZENE	87-90
SECTION 2	
6. ORGANIC ACIDS AND ETHERS	91-94
7. PLASTICS	95-98
8. ALCOHOL	99-102
9. CHANGING MOLECULES	103-106
10. CARBOHYDRATES	107-110
SECTION 3	
11. NITROGEN COMPOUNDS AND FIBERS	111-114
12. VITAMINS	115-118
13. VITAMINS AND PROTEIN	119-122
14. PROTEIN	123-126
15. COLLOIDS AND OTHER ELEMENTS IN ORGANIC COMPOUNDS	127-130

Chapter Nine	131
Chapter 9 Table of Contents	133
<u>SECTION 1</u>	
1. KEEPING TIME—YEARS AND DAYS	135-138
2. KEEPING TIME—THE CALENDAR	139-142
3. KEEPING TIME—THE SUNDIAL AND HOURGLASSES	143-146
4. KEEPING TIME—CLOCKS	147-150
5. KEEPING TIME—NAVIGATION	151-154
<u>SECTION 2</u>	
6. SOUND—PERIOD AND FREQUENCY	155-158
7. SOUND—PITCH AND QUALITY	159-162
8. RECORDING SOUND	163-168
9. SOUND—DOPPLER SHIFT	169-172
10. EARTHQUAKE WAVES	173-178
<u>SECTION 3</u>	
11. RADIO	179-182
12. AMPLIFYING ELECTRIC SIGNALS	183-186
13. SEMICONDUCTORS	187-190
14. TRANSISTORS	191-194
15. SERIES AND PARALLEL CIRCUITS	195-198

VOLUME FOUR

Table of Contents

Introduction to Course .....	.d
Volume Four Table of Contents .....	.e-f
What and How You Will Learn from this Course .....	.g-h
Chapter Ten .....	.1
Chapter 10 Table of Contents .....	.3
<u>SECTION 1</u>	
1. X-RAYS .....	.5-8
2. RADIOACTIVITY .....	.9-12
3. THE ELECTRON AND PROTON .....	.13-16
4. THE NEUTRON .....	.17-20
5. ISOTOPES .....	.21-24
<u>SECTION 2</u>	
6. SUBATOMIC PARTICLES .....	.25-28
7. HALF-LIFE AND RADIATION SICKNESS .....	.29-32
8. ARTIFICIAL RADIOACTIVITY .....	.33-36
9. FISSION .....	.37-40
10. NUCLEAR REACTOR .....	.41-45
<u>SECTION 3</u>	
11. ALBERT EINSTEIN AND NUCLEAR WEAPONS. ....	.47-51
12. PARTICLE ACCELERATORS AND DETECTORS .....	.53-56
13. CONSERVATION LAWS .....	.57-60
14. THE RISKS AND BENEFITS OF NUCLEAR ENERGY. ....	.61-64
15. BENEFITS OF RADIOACTIVITY AND COMPLETION OF THE PERIODIC TABLE .....	.65-68
Chapter Eleven .....	.69
Chapter 11 Table of Contents .....	.71
<u>SECTION 1</u>	
1. THE EARTH .....	.73-76
2. MINERALS .....	.77-80
3. SEDIMENTARY, IGNEOUS AND METAMORPHIC ROCK .....	.81-84
4. VOLCANOES, WEATHERING AND EROSION .....	.85-88
5. ROCK CYCLE .....	.89-92
<u>SECTION 2</u>	
6. SILICON .....	.93-96
7. SILICON COMPOUNDS .....	.97-100
8. GEMS .....	.101-104
9. BORON AND ITS FAMILY OF ELEMENTS .....	.105-108
10. ALUMINUM. ....	.109-112
<u>SECTION 3</u>	
11. ENERGY AND CHEMICAL REACTIONS. ....	.113-116
12. OXIDIZERS .....	.117-120
13. PHYSICAL EQUILIBRIUM .....	.121-124
14. CHEMICAL EQUILIBRIUM. ....	.125-128
15. IS A CAREER IN CHEMISTRY FOR YOU? .....	.129-132

Chapter Twelve	133
Chapter 12 Table of Contents	135
<u>SECTION 1</u>	
1. SPEED, DISTANCE AND TIME	137-140
2. ENERGY	141-145
3. FORCE AND SIMPLE MACHINES	147-150
4. LAWS OF MOTION	151-154
5. HEAT	155-158
<u>SECTION 2</u>	
6. PRESSURE AND DENSITY	159-162
7. WAVE MOTION	163-166
8. LIGHT	167-170
9. ELECTRICITY	171-174
10. SERIES AND PARALLEL CIRCUITS.	175-178
<u>SECTION 3</u>	
11. PARALLEL CIRCUITS	179-182
12. CURRENT AND POWER	183-186
13. KEEPING ELECTRICITY SAFE	187-190
14. DISCOVERY BY DESIGN	191-194
15. A CAREER IN PHYSICS MAY BE FOR YOU	195-198