

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION AND HOW CARS WORK

Introduction	8
Objectives	8
Major Automotive Contributors	8
Automotive Milestones	9
How Cars Work	10
Engine Identification	12
Vehicle Identification	12
Common Fuels and Designs	14
The Future	15
Summary	15

CHAPTER 2

BUYING AN AUTOMOBILE

Introduction	16
Objectives	16
Purpose of Buying	16
Buying Steps	17
Summary	21

CHAPTER 3

AUTOMOTIVE EXPENSES

Introduction	22
Objectives	22
Car Payments	23
Insurance	23
Fuel Expenses	26
License and Registration	26
Maintenance and Repairs	27
Summary	27

CHAPTER 4

REPAIR FACILITIES

Introduction	28
Objectives	28
Key Characteristics of a Quality Repair Facility	28
Facility Types	30
Estimates and Repair Orders	31
Warranty Considerations	32
Summary	33

CHAPTER 5

SAFETY AROUND THE AUTOMOBILE

Introduction	34
Objectives	34
Laboratory Safety	35
OSHA	36
Safety Equipment	36
Fire Extinguishers	38
Automotive Lifts	39
Lifting a Vehicle Safely	40
Using Jacks and Jack Stands	42
Safety Around Airbags	42
Summary	43

CHAPTER 6

BASIC TOOLS

Introduction	44
Objectives	44
Common Hand Tools	44
Lifting Tools	48
Tire Tools	49
Measuring Tools	50
Electric Related Tools	52
Oil Change and Lube Tools	54
Cutting and Grinding Tools	55
Inspection Tools	56
Cleaning Supplies	56
Specialty Tools	56
Vehicle Service Manuals	57
Summary	57

CHAPTER 7

AUTO CARE AND CLEANING

Introduction	58
Objectives	58
Automotive Finishes	58
Exterior Care and Cleaning	59
Interior Care and Cleaning	62
Engine Compartment Cleaning	63
Finish Repair	64
Forgotten Part Lubrication	65
Summary	65

6 TABLE OF CONTENTS

CHAPTER 8

FLUID LEVEL CHECK

Introduction	66
Objectives	66
Types of Fluids	66
Summary	73

CHAPTER 9

ELECTRICAL SYSTEM

Introduction	74
Objectives	74
Electrical Terms.....	74
Battery.....	75
Starting System.....	77
Charging System.....	78
Fuses.....	80
Lights	82
Computer	83
Summary.....	83

CHAPTER 10

LUBRICATION SYSTEM

Introduction	84
Objectives	84
Purpose of Engine Oil.....	85
Understanding Oil Ratings.....	86
Synthetic Oil	87
Oil Filters.....	88
Changing the Oil and Filter	88
Summary.....	89

CHAPTER 11

FUEL SYSTEM

Introduction	90
Objectives	90
Fuel System Purpose.....	90
Fuel System Components	90
Crude Oil Distillation.....	94
Gasoline Properties	95
Diesel Properties.....	96
Refueling.....	97
Improving Fuel Economy	98
Cylinder Deactivation	99
Fuel Prices	99
Summary.....	99

CHAPTER 12

COOLING SYSTEM AND CLIMATE CONTROL

Introduction	100
Objectives	100
Cooling System Purpose.....	101
Cooling System Components.....	101
Coolant Properties	104
Coolant Flow.....	106
Heater Core.....	107
Cabin Air Filter	107
Air Conditioning	108
Summary.....	109

CHAPTER 13

IGNITION SYSTEM

Introduction	110
Objectives	110
Ignition System Purpose	110
Ignition System Generations	111
Ignition System Components	112
Summary.....	115

CHAPTER 14

SUSPENSION, STEERING, AND TIRES

Introduction	116
Objectives	116
Suspension System Purpose.....	116
Suspension Components	117
Steering System Purpose.....	118
Steering System Components	118
Tire Classifications	120
Tire Care and Maintenance	122
Summary.....	123

CHAPTER 15

BRAKING SYSTEM

Introduction	124
Objectives	124
Braking System Purpose.....	124
Types of Brakes.....	125
Braking System Components	125
Brake Fluid.....	128
Antilock Brakes	128
Electronic Stability Control	129
Parking Brakes	129
Summary.....	129

CHAPTER 16

DRIVETRAIN
 Introduction 130
 Objectives 130
 Purpose of the Drivetrain 130
 Transmission Fluid 131
 Drivetrain Components 132
 Drivetrain Systems..... 134
 Summary..... 135

CHAPTER 17

EXHAUST AND EMISSION SYSTEM
 Introduction 136
 Objectives 136
 Exhaust and Emission Purpose 136
 Exhaust Components 137
 Emission Components 138
 Emission Testing..... 140
 Summary..... 141

CHAPTER 18

ALTERNATIVE FUELS AND DESIGNS
 Introduction 142
 Objectives 142
 Purpose of Alternatives 143
 Biodiesel Vehicles..... 143
 Flex-fuel E85 Vehicles..... 144
 Natural Gas Vehicles..... 144
 Propane Vehicles 145
 Bi-fuel Vehicles..... 145
 Hybrid Vehicles 146
 Electric Vehicles..... 148
 Solar Vehicles..... 148
 Hydrogen Powered Vehicles 149
 Technological Issues 150
 Summary..... 151

CHAPTER 19

AUTOMOTIVE ACCESSORIES
 Introduction 152
 Objectives 152
 Interior Accessories..... 152
 Electronic Accessories 154
 Exterior Accessories 158
 Hauling and Towing Accessories .. 161
 Summary..... 163

CHAPTER 20

COMMON PROBLEMS AND ROADSIDE EMERGENCIES
 Introduction 164
 Objectives 164
 Diagnosing Problems 164
 Common Problems 168
 Roadside Emergencies..... 172
 Summary..... 177

APPENDIX A

ONLINE/WORKBOOK ACTIVITIES 178

APPENDIX B

ACRONYMS/ABBREVIATIONS..... 179

APPENDIX C

TEXT FEATURES 180
 Procedures 180
 Q & As 180
 Tech Tips..... 180
 Calculations..... 180
 Trouble Guides 181
 Servicing..... 181
 Web Links 181
 Career Paths 181

GLOSSARY..... 182

INDEX..... 184

ORDER INFORMATION..... 190

ONLINE/WORKBOOK INFORMATION..... 191

REVIEWS 192