
Contents

Introduction	Injection Molding – An Ideal Manufacturing Method	1
Lesson 1	Basic Principles of Plastics	5
	1.1 Classification and Identification of Polymeric Materials (Plastics and Elastomers)	6
	1.2 Deformation Characteristics of Plastics	8
	1.3 Molding Compounds and Shaping Methods	11
	1.4 Plastics Melts	12
	Review Questions	18
Lesson 2	The Injection Molding Machine	19
	2.1 Classification of Injection Molding Machines	20
	2.2 Structural Units of Injection Molding Machines	24
	2.3 Special Injection Molding Processes	26
	Review Questions	30
Lesson 3	The Plasticating and Injection Unit	31
	3.1 Tasks of the Plasticating and Injection Unit	32
	3.2 Plasticating	35
	3.3 Injection	37
	Review Questions	40
Lesson 4	The Mold	41
	4.1 Tasks and Modes of Operation	42
	4.2 Gating and Runner System	43
	4.3 Cavity	47
	4.4 Heating/Cooling Systems	49
	4.5 Ejection System	50
	Review Questions	54
Lesson 5	The Clamping Unit	55
	5.1 Function and Structure	56
	5.2 Mechanical Clamping Units	57
	5.3 Hydraulic Clamping Units	59
	Review Questions	62

Lesson 6	Drive System and Controls	63
	6.1 Drive System	64
	6.2 Controls	67
	Review Questions	68
Lesson 7	The Injection Molding Process	69
	7.1 Phases of an Injection Molding Cycle.	70
	7.2 Start	72
	7.3 Injection Phase	74
	7.4 Holding Pressure Phase	77
	7.5 Cooling Phase	80
	7.6 Feed Phase.	82
	7.7 Removal from the Mold	83
	Review Questions	86
Lesson 8	Mold Design	87
	8.1 Tasks and Specifications of Injection Molding Tools	88
	8.2 The Designer's Tasks	88
	8.3 Mold Layout	90
	Review Questions	98
Lesson 9	Quality Assurance in Injection Molding	99
	9.1 Quality	100
	9.2 Quality Assurance	101
	9.3 Quality Management	102
	9.4 Integrated Management Systems	108
	Review Questions	110
Lesson 10	Recycling of Plastics Waste	111
	10.1 Reutilization of Plastics	112
	10.2 Recycling of Production Waste	115
	10.3 Recycling of Industrial and Domestic Plastics Waste	116
	Review Questions	118
Appendix I	The Modern Injection Molding Company	119
	I.1 Structure of an Injection Molding Company.	120
	I.2 Order Processing Organization within an Injection Molding Company	121
	I.3 Specifications for Injection Molding Companies	122
Appendix II	Occupational Safety Around Injection Molding Machines	125
	II.1 European Regulations	126
	II.2 U.S. Regulations.	130
Appendix III	Selected Literature	135
Appendix IV	Glossary of Injection Molding Technology	139
	Answers to Review Questions	149