

Contents

1	Electrocardiography	1
1.1	Function of the healthy heart	1
1.2	The electrocardiogram (ECG)	4
1.3	Recording the ECG from the surface of the body	6
1.4	Detection and recording of the ECG	12
1.5	Interpretation of the ECG	19
1.6	Automatic ECG evaluation	24
1.7	Limits of standardized ECG evaluation	28
1.8	Bibliography	28
2	Cardiac catheterization	31
2.1	Overview	31
2.2	Cardiac catheters	31
2.3	X-ray equipment	32
2.4	Catheterization techniques	32
2.5	Measuring and recording techniques	35
2.6	Bibliography	39
3	Electrotherapy of the heart	40
3.1	Overview	40
3.2	Cardiac rhythm disorders	40
3.3	Cardiological electro-shock	42
3.4	Artificial stimulation of the heart with a pacemaker	46
3.5	Bibliography	51
4	Phonocardiography and auscultation	52
4.1	Introduction	52
4.2	Physiology of heart sounds and murmurs	52
4.3	Techniques of sound pick-up and processing	58
4.4	Practical example	67
4.5	Remarks on methodology	68
4.6	Bibliography	69
5	Blood pressure, blood flow	71
5.1	Principles of haemodynamics	71
5.2	Blood pressure measurement	75

5.3	Blood flow measurement	79
5.4	Bibliography	88
6	Electroencephalography	90
6.1	Introduction	90
6.2	Origin of EEG potentials	90
6.3	Technique of electrode placement	94
6.4	Recording	100
6.5	Evoked responses (potentials)	103
6.6	Source derivation	106
6.7	Bibliography	108
7	Pulmonary function analysis	109
7.1	Exchange of gases	109
7.2	Examination methods and equipment	112
7.3	Bibliography	127
8	Patient monitoring in intensive care and in the operating theatre	129
8.1	Definition of the speciality	129
8.2	Patient monitoring parameters	130
8.3	Parameter pick-up	132
8.4	Bedside devices—the basis of monitoring systems	135
8.5	Visual representation of the information pick-up	137
8.6	Aspects of equipment design	139
8.7	Central functions of monitoring systems	142
8.8	Data systems	145
8.9	Bibliography	148
9	Measuring techniques in perinatal medicine	149
9.1	General	149
9.2	Parameters and measuring procedures	149
9.3	Bibliography	165
10	Diagnostic and therapeutic stimulation currents	167
10.1	Overview	167
10.2	Nervous system	167
10.3	Muscular system	169
10.4	Effect of artificial electrical stimulation	170
10.5	Diagnostic stimulation current	174
10.6	Stimulation current therapy	174
10.7	Equipment technology	182
10.8	Bibliography	185

11	High-frequency heat therapy	186
11.1	Development of the field	186
11.2	<i>Biophysical principles</i>	186
11.3	Methods of treatment in HF heat therapy	190
11.4	Equipment technology	196
11.5	VDE regulations	199
11.6	Application of HF heat therapy and its limitations	200
11.7	Bibliography	200
12	Electrosurgery	203
12.1	Development	203
12.2	The physical principles of electrosurgery	203
12.3	Method of application	206
12.4	Surgery techniques	211
12.5	Equipment technology	213
12.6	Patient safety	215
12.7	Recent methods	217
12.8	Bibliography	218
13	Ultrasonic therapy	220
13.1	Development of the field	220
13.2	Method	220
13.3	Mechanisms of the effect	221
13.4	Therapeutic applications	222
13.5	Dosage	223
13.6	Technical data (SONOSTAT 733)	224
13.7	Bibliography	225
14	Ultrasonic diagnosis	227
14.1	Fundamentals	227
14.2	Instruments	236
14.3	Doppler technique	254
14.4	Bibliography	264
15	Devices for programmed dosing of drugs	268
15.1	Field of application	268
15.2	Principle of guided and controlled dosing systems	268
15.3	Technical features of dosing devices	271
15.4	Mutual action drug pump	276
15.5	Glucose sensor	277
15.6	Further drugs for pump therapy	278
15.7	Bibliography	279

16	Artificial respiration	280
16.1	Introduction	280
16.2	Mechanical methods	281
16.3	Classification of respirators	283
16.4	Example: Servo Ventilator system	283
16.5	Bibliography	287
17	Technical safety in electromedicine	288
17.1	What is safety? Who is responsible for it?	288
17.2	The need for protection	288
17.3	Comprehensive protection	289
17.4	Laws and standards	295
Index	297