

# CONTENTS

oscillator 181, 186	
phase-shift sinusoidal oscillator 186	
practical oscillator circuit 186	
simple LC-oscillator 187	
capacitor 203, 205	
collector-base p-n capacitor 203	
junction capacitor 203, 205	
thin-film integrated capacitor 203, 204	
parallel-plate capacitor 203	
capacitance 203, 204	
total capacitance 204, 205	
final capacitance 204	
resulting capacitance 205	
<b>Chapter V. Electroautomation and Telemechanics</b>	
transform 208, 213	
Laplace transform 208, 209	
single-sided Laplace transform 203, 209, 213	
a linear integral transform 208, 209	
feedback 215, 216, 217, 218, 221	
a simple feedback system 215, 216, 220	
negative feedback 215	
feedback-measuring system 217, 219	
response 214, 227	
fast response 214	
transient response 216, 217, 218	
resulting transient response 216	
impulse response 217, 218	
decreasing response 217	
increasing response 217	
neutral response 217	
transducer 218, 219	
inverse transducer 218, 219	
modulation 221, 222, 223, 224, 227, 228	
amplitude modulation 221, 222, 227	
pulse modulation 221, 227	
signal modulation 221	
phase modulation 222	
frequency modulation 222, 227	
pulse-amplitude modulation system (PAM) 224, 225, 226	
pulse-width modulation (PWM) 224, 225	
pulse-position modulation (PPM) 224, 225	
pulse-code modulation 224, 225, 226	
transmission 222, 223	
transmission medium 222, 223	
direct transmission 222, 223	
multiplex 235, 238	
time-division multiplex (TDM) 235, 236	
frequency-division multiplex 235, 236	
multiplexer 235, 236, 238	
frequency 236	
low frequency 236	
subcarrier frequency 236, 237, 238, 239	
main high-frequency carrier signal 236, 237	
modulated high-frequency signal 236, 237	
frequency spectrum 239	
<b>Chapter VI. Control Systems and Programming</b>	
data 245, 249, 251, 254, 255	
feeding data 245	
receiving data 245	
data manipulation 248	
data movement 248	
processed data 251, 256	
typical data format 255	
serial data format 255	
unit 246, 255	
microprocessor unit 246, 247, 248	
input-output unit 246	
memory unit 247	
terminal 251, 254, 256	
remote terminal 251, 254, 256	
well-designed terminal 251	
data-acquisition terminal 252, 256	
data transaction terminal 253, 254	
display terminal 253, 254	
data inquiry terminal 254	
display 254	
personal display	
large-screen display	
graphic display 254	
transmission 257, 258, 259	
data transmission 258, 259	
simplex transmission 259	
half-duplex transmission 259	
duplex transmission 259	
binary data transmission 260, 261	
half binary transmission 260, 261	
multiple binary transmission 261	
zero	
return-to-zero 261	
non-return-zero 261	
code 261	
pulse code 261	
binary character code 262	
eight character code 263	
unique code set 264	
flowchart 273	
flowchart language 273	
flowchart action 273	
variable 274	
numerical variable 275	
alphanumerical variable 275	
logical variable 275	
Pедучовные . . . . .	3
Introduction: Engineering Rises to a New Stage . . . . .	6
<b>Chapter I. Electricity and Magnetism . . . . .</b>	<b>8</b>
Lesson 1. Basic Concepts of Electricity and Magnetism . . . . .	8
Lesson 2. Electrical Units and Circuits . . . . .	16
Lesson 3. Magnetism . . . . .	29
Lesson 4. Electric Lighting . . . . .	38
Lesson 5. Power Sources . . . . .	45
<b>Chapter II. Electronic Devices and Electronic Technique . . . . .</b>	<b>54</b>
Lesson 1. Thermionic Valves . . . . .	54
Lesson 2. The Tetrode and Pentode . . . . .	62
Lesson 3. The P-N Junction . . . . .	71
Lesson 4. The Bipolar Transistor . . . . .	80
Lesson 5. The Field-effect Transistor . . . . .	87
Lesson 6. Amplification and the Transistor . . . . .	95
<b>Chapter III. Computer Technology . . . . .</b>	<b>105</b>
Lesson 1. The Transistor as a Switch . . . . .	105
Lesson 2. Binary Number System and Boolean Algebra . . . . .	115
Lesson 3. Logic Circuits . . . . .	124
Lesson 4. Flip-flop Circuits . . . . .	133
Lesson 5. Control in a Computer . . . . .	144
<b>Chapter IV. Radio Electric Circuits and Measuring Technique . . . . .</b>	<b>156</b>
Lesson 1. Negative Feedback . . . . .	156
Lesson 2. The Emitter Follower and the Direct-coupled Amplifier . . . . .	165
Lesson 3. The Operational Amplifier . . . . .	173
Lesson 4. Logarithmic Amplifier and Oscillator . . . . .	181
Lesson 5. Integrated Circuits . . . . .	188
Lesson 6. MOS Technology . . . . .	198
<b>Chapter V. Electroautomation and Telemechanics . . . . .</b>	<b>207</b>
Lesson 1. The Laplace Transform . . . . .	207
Lesson 2. General Properties of Feedback Systems . . . . .	214
Lesson 3. Modulation and Encoding Methods . . . . .	221
Lesson 4. Statistical Measurements . . . . .	229
Lesson 5. Multiplexing . . . . .	235
<b>Chapter VI. Control Systems and Programming . . . . .</b>	<b>243</b>
Lesson 1. Computers in Command and Control Systems . . . . .	243
Lesson 2. Terminals . . . . .	250
Lesson 3. Data Transmission . . . . .	257
Lesson 4. Multiplexors and Concentrators . . . . .	265
Lesson 5. Programming . . . . .	272
Краткий грамматический справочник . . . . .	280
List of books used . . . . .	288
Subject Index . . . . .	299