

Contents

<i>Preface</i>	vii
1. SWITCHING AND TIMING SYSTEMS	1
1-1. Transmission-line Fault Locator	1
1-2. Industrial Counting	3
1-3. Nuclear Research Instrumentation	5
1-4. Other Applications	7
2. SOME CIRCUIT FUNDAMENTALS	8
2-1. Transients in Linear <i>RC</i> Circuits	8
2-2. Waveform-shaping Circuits Using Linear <i>RC</i> Elements	15
2-3. Useful Circuit Theorems	19
2-4. Helpful Techniques	25
3. ELECTRON DEVICES AS SWITCHING ELEMENTS	34
3-1. Ideal Switches	35
3-2. Electron Devices as Switches	39
3-3. Thermionic Diodes	40
3-4. Semiconductor Diodes	48
3-5. Three-electrode Devices	58
3-6. Separately Actuated Switching	58
3-7. Grid-circuit Switching	62
	xi

3-8. Linear Region	65
3-9. Combined Equivalent Circuit	66
3-10. Three Operating Regions	67
3-11. Output Resistance	69
3-12. Switching Speed of Triodes	73
3-13. Semiconductor Triodes. The Transistor	76
3-14. Transistor Operating Regions	79
3-15. Base Input Characteristics	80
3-16. Transistor Equivalent Circuits	82
3-17. Transistor Switching Speed	83
3-18. Pentodes and Beam Tubes	87
3-19. Pentode Operating Regions	89
3-20. Pentode Switching Speed	91
3-21. Summary	92
4. SOME CIRCUIT EXAMPLES INCORPORATING ELECTRON DEVICES	101
4-1. Decoupling Filter	102
4-2. Bias Circuit	107
4-3. <i>RC</i> Coupling Circuit	111
5. STABLE STATES AND REGENERATIVE SWITCHING. MULTIVIBRATORS	117
5-1. Introduction to the Multivibrator	117
5-2. Bistable Multivibrator	119
5-3. Triggering	124
5-4. Counting and Storage	126
5-5. Alternative Triggering Arrangements	127
5-6. Cathode-coupled Bistable Multivibrator	128
5-7. Astable Multivibrator	131
5-8. Transistor Astable Multivibrator	137
5-9. Monostable Multivibrator	142
6. FEEDBACK CIRCUITS FOR GENERATING LINEAR VOLTAGE SLOPES	164
6-1. Simple <i>RC</i> Integrator	165
6-2. Amplified <i>RC</i> Integrator	167
6-3. Miller-effect Integrator ("Miller Integrator")	167
6-4. Monostable Forms	180
6-5. Sanatron Circuit	181
6-6. Cathode-coupled Phantastron	182
6-7. Screen-coupled Phantastron	183
6-8. Complete Phantastron Circuit	185
6-9. Bootstrap Circuit	187
6-10. Summary Remarks	190
7. CIRCUITS CONTAINING INDUCTORS OR TRANSFORMERS	197
7-1. <i>RL</i> Circuit	197
7-2. <i>RLC</i> Circuit	199

	Contents	xiii
7-3. Pulse Transformer		204
7-4. Step-up Transformer		206
7-5. Decay of Pulse Top		206
7-6. Pulse Trailing Edge		207
7-7. Step-down Transformer		209
7-8. Further Comments on the Pulse Transformer		210
7-9. Transformers in Regenerative Circuits		211
7-10. Regenerative Pickoff Circuits		211
7-11. Blocking Oscillator		214
8. LINES AND PULSE-FORMING NETWORKS		230
8-1. Transient Behavior of Transmission Lines		231
8-2. Applications		239
8-3. Pulse-forming Networks		243
<i>Index</i>		261