

CONTENTS

	Page
0. INTRODUCTION	5
0.1. Power supplies in electrical laboratory	5
0.2. Adjustment of voltage and of current	5
0.3. The laboratory report	5
0.4. Some practical hints for measurements	9
0.5. Basic safety rules for laboratory work	10
0.6. Specifications of some electronic measuring instruments used in laboratories	12
1. MEASUREMENT USING OSCILLOSCOPE	28
2. FREQUENCY DEPENDENCE OF AC VOLTMETERS	31
3. INFLUENCE OF THE WAVEFORM OF MEASURED VOLTAGE ON THE METER READING	35
4. MEASUREMENT ON VOLTAGE DIVIDER	41
5. MEASUREMENT OF LOW DC VOLTAGES	44
6. MEASUREMENT OF FREQUENCY	49
7. MEASURING RECTIFIER	51
8. MEASUREMENT OF LOW CURRENTS	54
9. MEASUREMENT OF THE PHASE DELAY	57
10. A SUCCESSIVE APPROXIMATION ADC; USING A LOGIC ANALYZER	60
11. MEASUREMENT OF VOLTAGE PHASORS	65
12. DIGITAL VOLTMETER WITH DUAL-SLOPE INTEGRATION ADC	68
13. DEMONSTRATION OF THE SIGNAL SAMPLING	72
13A. D/A CONVERTERS	74
14. MEASUREMENT OF ONE-PHASE POWER USING A CURRENT INSTRUMENT TRANSFORMER	76
15. MEASUREMENT OF POWER CONSUMPTION OF A 3-PHASE UNBALANCED LOAD	83
16. MEASUREMENT OF POWER CONSUMPTION OF PULSE REGULATED LOAD	91
17. WHEATSTONE BRIDGE. EVALUATION OF RESISTANCE	94
18. MEASUREMENT OF SMALL RESISTANCES	98
19. DIGITAL IMPEDANCE AND ADMITTANCE METER	102
20. TRANSFORMER BRIDGE	105
21. MEASUREMENT OF THE LEAKAGE MAGNETIC FIELD OF THE TRANSFORMER	108
22. MEASUREMENT OF THE AMPLITUDE PERMEABILITY	113
23. MEASUREMENT OF THE STATIC HYSTERESIS LOOP	117
24. MEASURING SYSTEM USING IEEE488 BUS	120
APPENDIX 1	
Influence of errors of zero of real operational amplifier on the properties of an amplifier with a feedback loop	124
APPENDIX 2	
Examples for preparation for tests, examination and the 1st comprehensive examination	127
REFERENCES	135