Topics for Acceptance Test (MEA)

1. Definition of Impedance and Admittance of the Basic Elements, Electric Power of the Harmonic Steady State, Resonance, Ideal Transformer, Three Phases System.

2. Physical Definition of Basic Circuits Quantities (Voltage, Current), Making of the Circuit Equations in Accordance with Kirchhoff's Law.

3. Bipolar and Unipolar Transistors.

4. Operational Amplifier (Ideal Operational Amplifier, Static and Dynamic Parameters of the Real Operational Amplifier), Typical Connection with Operational.

5. Combinational Logic Circuits and Sequential Circuits.

6. Measuring of the Basic Electrical Quantities (Voltage, Current, Power, Electrical Energy, Electrical Resistance, Impedance, Admittance, Frequency, Phase), Electromechanical Measuring Device (Magnetoelectric, Electromagnetic, Electrodynamic, Induction, Ratio).

7. Temperature Measuring, Contacting Temperature Measuring, Thermometers – Liquid, Dilatation, Pressure. Electrical Temperature Sensors, Resistance Sensors, Thermocouples, Crystal Sensors. Time Constant of the Thermometer, Pyrometers, Thermovision.

8. Measuring of the Kinematical and Kinetic Quantities in Mechanics of the Solids and Flexible Bodies (Sensors of the Direct and Angular Position, Velocity and Acceleration, Sensors of the Force and Moment of Torsion, Tensiometers).

9. Measuring of the Quantities in Mechanical Liquids. Measuring of the Speed and Flow (Mechanical and Electrical Anemometer Sensors, Principles of the Laser Anemometer), Measuring of the Speed (Piezoelectric Sensors).

10. Logic Control, Kinds of Signals, Logic Function, Combination and Sequential (Synchronous and Asynchronous) Logic Circuits, Optimization of Logic Function, Simplification, Karnaugh's Map.

11. Linear Dynamic Systems, Mathematical Description of Dynamic Systems, Application of Laplace Transform to Model Analyzing, Transfer Function, Static and Dynamic Characteristics.

12. Modeling and Simulation of Dynamic Systems, Inductive and Deductive Approach to Formulation of Model, Input-Output and State Space Models Description. Computer Simulation, Simultaneous Integration, Simulation Model of Linear Systems, Implementation of Initial Conditions.

13. Simple Feedback Control, PID Controller, Experimental Tuning Methods. Discrete Equivalent of PID Controller (PSD). Control Systems with Two/Three Steps Controllers.

23.1.2012

14. Programmer's Model of Central Processor, Instructions, Instruction Set, Symbolic Address, Operations in Registers, Operations with Memory, I/O Operations. Sequence of Instructions, Program Timing, Subprogram, Interrupt.

15. High Level Language (Pascal, C), Review, Differences. Implementation of Single Numeric Data Types, One Dimensional Array. Algorithm Development of Elementary Task in High Level Language.

16. Structured Data Types – Arrays, Records and Sets. Elementary Algorithms of Data Sorting. Input-Output Operations. Files – Basic Types and Manipulation with them.

17. Structure of Program in High Level Language. Functions, Procedures, Macros. Global and Local Variables.

18. Work with Graphic Information. Color Coding. Color Models in Computer Graphic, Graphic Formats, Elementary Graphic Transformations.

19. Characteristics of Local Area Computer Network. Ethernet Technology, its Principle and Development, Algorithm CSMA/CD. Wireless Local Area Network Standard IEEE 802.11.

20. Internet Architecture. Fundamental Principles of Internet Protocol (IP, TCP, UDP) Function. IP Address, System DNS.

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