

List of questions for the diploma exam

Field of study:	Automatic Control and Robotics	First-cycle studies
Profile: Robotics		
No.	Question	
1	How to interpret frequency response from input-output relations viewpoint? [Automatic Control]	
2	Clarify how obtain frequency response by means of an experiment. [Automatic Control]	
3	Analyze the need to introduce I term into a PID controller. [Automatic Control]	
4	Average power of a sum (or a difference) of random signals. [Signals and dynamic systems]	
5	Basic properties of variance and correlation estimators. [Signals and dynamic systems]	
6	The Fourier Transform as an extension of the Fourier Series to non-periodic function. [Signals and dynamic systems]	
7	List and characterize the manipulator kinematics tasks. [Robotics]	
8	Specify possible ways to determine robot tool orientation. [Robotics]	
9	Sketch the signal flow diagram in the robot dynamics model. [Robotics]	
10	Define the real-time system. [Real Time Systems]	
11	Specify the process components in the computer system. [Real Time Systems]	
12	Point out 3 ways to pass arguments to functions in C++. [Introduction to Computer Science]	
13	Explain how floating point variables are represented in memory. [Introduction to Computer Science]	
14	Referring to containers of STL library: vector, map, and list, explain how each of them stores data in memory. [Introduction to Computer Science]	
15	What is the role of the IP address in network communication. [Introduction to Computer Science]	
16	Structure, operation, models and characteristics of various types of semiconductor diodes and transistors. [Electronics]	
17	Diagrams, characteristics and equations describing the operation of basic systems with an operating amplifier. [Electronics]	
18	Operation of basic types of DC impulse converters. [Electronics]	
19	Diagrams, characteristics and control methods for voltage source inverters. [Electronics]	
20	Mechanical characteristics of a DC commutator motor in case of changes in the armature voltage and excitation flux, speed control capability. [Electrical machines in control engineering]	
21	Classification and principle of operation of stepper motors. [Electrical machines in control engineering]	
22	Principles of synthesis of combinational and sequential systems using elements of small and medium scale of integration. [Microprocessor systems]	
23	Measurement of time in microprocessor system. [Microprocessor systems]	
24	The principle of synchronous and asynchronous serial communication. [Microprocessor systems]	
25	Measurement of analog signal including calibration of the analogue path. [Microprocessor systems]	
26	Motion types of robot manipulators. [Control of electromechanical systems]	
27	Kinematic singularities of robot manipulators. [Control of electromechanical systems]	
28	The purpose and limitations of using motion types with approximate positioning. [Control of electromechanical systems]	
29	Tool calibration methods and their parameters. [Control of electromechanical systems]	
30	Offline robot programming. [Control of electromechanical systems]	
31	Procedures preceding start in the manual control mode and first start of the program. [Control of electromechanical systems]	
32	Parameters of the motion instructions of an industrial robot. [Control of electromechanical systems]	
33	Direct and inverse kinematics procedures and their calculation in an industrial robot's controller. [Control of electromechanical systems]	
34	Types of production and concepts of their automatization [Flexible Manufacturing Systems]	
35	Petri nets - definition of the position/transition network. [Flexible Manufacturing Systems]	
36	How to create a Gantt diagram. [Flexible Manufacturing Systems]	
37	Nonparametric identification methods. [System identification]	
38	Differences between LS and IV method. [System identification]	
39	Methods of order estimation. [System identification]	
40	Describe the principle of operation of the relay and the difference between it and the contactor. [Devices of automation and actuators]	
41	What are the types of sensors used in automation devices? [Devices of automation and actuators]	
42	Describe the principle of operation of a chosen pneumatic actuator. [Devices of automation and actuators]	
43	Describe an encoder mode of action. [Devices of automation and actuators]	
44	The operating points of the drive motor of the crane lifting mechanism. [Foundations of electrical drives]	

45	Method of equivalent torque for motor power selection. [Foundations of electrical drives]
46	Voltage control of the DC motor using an impulse converter. [Foundations of electrical drives]
47	Discrete implementation of the PID controller, block diagram and operating principle. [Digital controllers and PLC]
48	Principle of operation of basic functional blocks of programmable controllers, timers and counters. [Digital controllers and PLC]
49	Programmable logic controller operating cycle. [Digital controllers and PLC]
50	Principles of programming languages: LD, FBD and SFC. [Digital controllers and PLC]