Wydział Informatyki i Telekomunikacji

Faculty of Computing and Telecommunications

Kierunek studiów:

Field of study

# ELEKTRONIKA I TELEKOMUNIKACJA

**Electronics & Telecommunications**

Studia stacjonarne pierwszego stopnia prowadzone w języku angielskim

Undergraduate studies in English

## ZAGADNIENIA NA EGZAMIN DYPLOMOWY INŻYNIERSKI

### ISSUES AND PROBLEMS ON GRADUATION EXAM

| **Lp.**<br>**Item** | **Zagadnienie**<br>**Issues and problems** |
|---|---|
| 1. | Basic metrological definitions and terminology |
| 2. | Methods of measuring the parameters of periodic signals |
| 3. | Electrical circuits analysis |
| 4. | Impulse response and transmittance of LTI system |
| 5. | Mobile radio communication channel |
| 6. | Cellular networks |
| 7. | Distribution of frequency signal in the network physical layer |
| 8. | Network synchronization in the packet layer |
| 9. | Digital phase loop realizations |
| 10. | Parameters of synchronization signals |
| 11. | Digital Filters |
| 12. | Filter design algorithms |
| 13. | A/D and D/A signal conversion |
| 14. | Spectral analysis |
| 15. | The transmission properties of optical fiber |
| 16. | Active and passive elements of optical link |
| 17. | Assessment of the range of the fiber optic link limited by power and band |
| 18. | Multiplexing technologies in fiber optic links |
| 19. | Fiber optic links measurement methods |
| 20. | Design a fiber optic link |
| 21. | Interfaces in measuring systems |
| 22. | Sensors and measuring circuits |
| 23. | Analog and digital modulations of harmonic carrier |
| 24. | Analog and digital pulse modulations |
| 25. | Digital transmission over baseband and bandpass channels |
| 26. | Sequential and combinational logic circuits |
| 27. | Boolean algebra |
| 28. | Design of finite state machines |
| 29. | Complement arithmetic |

| Lp.<br>Item | Zagadnienie<br>Issues and problems |
|---|---|
| 30. | Internet services |
| 31. | Searching in the Internet |
| 32. | Local Area Networks |
| 33. | Conversion of integer or real numbers from decimal to binary and from binary to decimal system |
| 34. | Methods of solving nonlinear equations: bisection, falsi, Newton's |
| 35. | Numerical solving of sets of linear equations: accurate methods – Gauss-Jordan; approximate solutions – Jacobi, Gauss-Seidl and gradient methods |
| 36. | Numerical calculation of integrals – rectangles, trapezoids and Simpson's methods |
| 37. | Methods of discrete-event simulation |
| 38. | Data structures that can be used to construct the simulation agenda |
| 39. | Generation of pseudo-random numbers: uniform and other distributions |
| 40. | Transient phase length estimation in simulations |
| 41. | Android application components |
| 42. | Way of defining user interface for Android application |
| 43. | Android application project structure in AndroidStudio |
| 44. | Codd's postulates |
| 45. | Entity relationship diagrams (ERD) |
| 46. | DDL, DQL, DML, DCL and TCL commands |
| 47. | SQL extensions – PL/SQL, T-SQL |
| 48. | Database normalization |
| 49. | Database models |
| 50. | Major pillars of object oriented programing in C# |
| 51. | C# - Interfaces and abstract classes |
| 52. | C# - Exception handling |
| 53. | C# - Control statements |
| 54. | Memory management and Garbage Collection in C# |
| 55. | Major pillars of object oriented programing in Java. |
| 56. | Java - Interfaces and collections |
| 57. | Java - Exception handling |
| 58. | Java - Control statements |
| 59. | Types of JDBC drivers |
| 60. | Object programming in C++ |
| 61. | IPv4 and IPv6 addressing |
| 62. | ISO/OSI and TCP/IP layer models |
| 63. | Protocols and data transmission in networks |
| 64. | Switching in LAN networks |
| 65. | Signaling systems in telecommunication networks |
| 66. | Integrated services in telecommunication networks |
| 67. | Structural aspects of the Internet of things (traffic, scalability, interoperability) |
| 68. | Key technologies for the Internet of things |
| 69. | Addressing and routing for the Internet of things |
| 70. | Big Data Analytics |

| Lp.<br>Item | Zagadnienie<br>Issues and problems |
|---|---|
| 71. | Access networks' technologies |
| 72. | Design of logical topology of local area networks (VLAN) |
| 73. | Planning networks with OSPF, ISIS and BGP protocols |
| 74. | Metro(Carrier) Ethernet, MPLS and GMPLS |
| 75. | Design of virtual private networks |
| 76. | Network testing |
| 77. | Model for computer networks based on layers |
| 78. | Logical addresses in computer networks (IPv4/IPv6) |
| 79. | Basic routing algorithms used in computer networks |
| 80. | Hardware Oriented Network Operating Systems |
| 81. | Application Oriented Network Operating Systems |
| 82. | Mechanisms in IP addressing |
| 83. | Rules in protocols, mechanisms and devices from link layer in computer networks |
| 84. | Rules in protocols, mechanisms and devices from network layer in computer networks |
| 85. | Features and functions of operating systems (tools and commands) |
| 86. | Services and their realization in Data Center |
| 87. | Programmability in computer networks |
| 88. | Topologies of telecommunication networks |
| 89. | Information transfer modes in telecommunication networks |
| 90. | Layered network models, network architectures |
| 91. | Telecommunication services |
| 92. | Numbering and addressing in telecommunication networks |
| 93. | Switching nodes’ functions and architectures |
| 94. | Routing in switching nodes and telecommunication networks |
| 95. | Functions, properties and operation of switching networks (switching fabrics) |
| 96. | Signalling in telecommunication networks |
| 97. | Connection setup process in a mobile network |
| 98. | Buffering in packet switching nodes |
| 99. | Systemy ze stratami i z oczekiwaniem |
| 100. | Rodzaje pierścieni w sieciach optyczny |
| 104. | Circuits with Zener diodes, rectifiers and switching diodes |
| 105. | Bipolar transistors - circuits and applications |
| 106. | Operational amplifier - principles of operation and typical circuits |
| 107. | Antenna parameters |
| 108. | Antennas for radiocommunication systems |
| 109. | EM wave propagation |
| 110. | Resonance in electrical circuits |
| 111. | Power in DC and AC circuits |
| 112. | Transient states in electrical circuits |
| 113. | Vision systems optics |
| 114. | Image segmentation methods |
| 115. | Image features |

| Lp.<br>Item | Zagadnienie<br>Issues and problems |
|---|---|
| 116. | Signal representation with harmonic components |
| 117. | Processing of signals by linear and time invariant (LTI) systems |
| 118. | Frequency characteristics of LTI systems |
| 119. | Analog filter requirements |
| 120. | Stability of systems |
| 121. | Automatic Control Systems |
| 122. | Representation of systems in the state space |
| 123. | General structure of programmable devices |
| 124. | Basic functional primitives in FPGA devices |
| 125. | Verilog hardware description language |
| 126. | Acquisition, perception by humans, representation and display of multimedia data in digital systems |
| 127. | Compression of multimedia data |
| 128. | Video and audio processing |
| 129. | Standardization in multimedia communications |
| 130. | Impulse response and transmittance of LTI system |
| 131. | Mobile radio communication channel |
| 132. | Cellular networks |