Questions for the Final control
in the "MULTIMEDIA COMMUNICATION NETWORKS" discipline

1st Group of questions

1. Describe the terms "Multimedia", hypermedia, multimedia networks. What is their difference?
2. To which classes of information provision is the term "multimedia" applied
3. What is meant by the global information infrastructure GII? What is its main tasks?
4. What applications are used in the global information infrastructure of GII? Explain its purpose and functions
5. What is meant by the global information society? Its features
6. Multimedia definition. Multimedia classification
7. Multimedia definition. Linear and non-linear multimedia
8. What is multimedia traffic? The most common types of multimedia services
9. What are the requirements for promising communication networks?
10. Information, message, signal – definition. Information parameters of messages. Types of signals
11. Information transmission system based on fixed telephone network example
12. Information transmission system based on mobile network example
13. Information transmission system based on Internet with Dial-up access example
14. Information transmission system based on Internet broadband access example
15. Classification of telecommunication systems (telecommunications) according to the transmitted messages types
16. Communication network, Telecommunications network – definition, components
17. Telecommunication network structure, the function of the elements
18. Describe the Telecommunication network levels, explain their functions
19. Primary telecommunication signals – definition, types
20. The main primary telecommunication signals and types of communication networks
21. Data transmission at the physical layer via communication channels
22. Describe what is included in the Analog-to-digital signal conversion
23. Digital signal representation. AD and DA conversion
24. Definition of AD and DA conversion. Kotelnikov's Theorem – Nyquist Criterion
25. Definition of AD and DA conversion. Quantization, quantization step, quantization error

26. Definition of AD and DA conversion. Nonlinear quantization and encoding

27. An example of the PCM implementation in the PBX subscriber interface (SLIC)

28. An implementation example of the AD and DA conversion in a PBX subscriber interface

29. Describe the structure of the PCM 30/32 channel

30. Describe the structure of the E1 flow channel

31. Definition of AD and DA conversion. An example of using an AD and DA conversion and an E1 stream in a fixed telephone network

32. Definition of AD and DA conversion. An example of using an AD and DA conversion and an E1 stream in a cellular communication network

33. Digital group signal – principles of formation

34. Structure and parameters of PCM 30/32

35. E1 flow – definition, structure and parameters

36. Hierarchy of digital transmission systems. Hierarchies types of digital transmission systems

37. Telephony service – definition. Methods of voice transmission over telecommunication networks

38. What is a digital PBX? What modules does it include?

39. Switching node – functions. Types of switching nodes. What is a PBX?

40. Switching node – functions. Classification of switching nodes.

41. What is PBX intended for? PBX classification

42. The structure of the digital PBX, module's functions

43. What is a digital PBX? Subscriber line modules. BORSCHT functions

44. What is a digital PBX? Trunk line module – purpose, performed functions

45. What is a digital PBX? Types of calls in digital PBX

46. Local call in the digital PBX – definition, which PBX modules involved to local call, the call setup phases from software view

47. Outgoing call in the digital PBX – definition, which PBX modules involved to outgoing call, the call setup phases from software view

48. Incoming call in the digital PBX – definition, which PBX modules involved to incoming call

49. Transit call in the digital PBX – definition, which PBX modules involved to transit call

50. Call setup phases from Call handling program (SW) view. The purpose of the Trunk Search program

51. Call setup phases from Call handling program (SW) view. The purpose of the "Logical subscriber identification" program

52. What is a prefix? The functions of the "Prefix analysis" program

53. What does the term "Signaling" mean in telephony? Signaling types

54. What does the term "Signaling" mean in telephony? Subscriber Signaling

55. What does the term " Signaling " mean in telephony? Inter-exchange Signaling system

56. What does the term "Signaling" mean in telephony? How is the Signaling network designed?

57. CCS7 functions. CCS7 advantages? Signaling point, Signaling link, Signaling point code – definitions

58. CCS7 functions. Signaling point code, OPC, DPC, Signaling data link

59. What is CCS7 ISUP intended for? Give examples of ISUP messages and explain it using.

60. What is CCS7 ISUP intended for? Signaling messages exchange during telephone call setup/release

61. CCS7 functions. CCS7 Signaling units – its purpose and types

62. The MTP subsystem in the CCS7 – functions. MTP1, MTP2, MTP3 functions

63. The MAP subsystem in the CCS7 – functions. Show the coverage area of the MAP protocol on the GSM network model

64. OSI model implementation based on CCS7 example

65. OSI model implementation based on TCP/IP stack example

66. The reference model of open systems interaction based on CCS7

67. The reference model of TCP/IP open systems interaction

68. Designing principles of national telecommunication networks

69. Designing principles of Uzbekistan telecommunication network

70. Zone telecommunication networks – purpose, designing principles

71. Local telecommunication networks – purpose, designing principles

2nd Group of questions

1. Characteristics of primary telecommunication signals

2. Characteristics of the telephone signal

3. Logarithmic measurement units of signals in telecommunications

4. What is commonly understood by a transport network? The relationship between transport and switched networks

5. Purpose of the transport network. What elements does the transport (primary) network include?

6. What is commonly understood by a transport network? What is included in the structure of the transport (primary) network?

7. Transmission systems for the transport network – purpose, types

8. Transmission systems. Hierarchies

9. Purpose of the transport network. What technologies are currently being used on transport networks?

10. Purpose of the transport network. How do transport network models compare to the OSI model?

11. Models of transport networks. Which model of the transport network can provide the greatest transport resource?

12. Administrative division of the transport network

13. The concept of synchronization on a communication network. Vander, jitter, slippage – definition

14. Types of synchronization on a digital network

15. Goals and types of synchronization in the E1 stream

16. Cyclic and super-cyclic synchronization – where it is used, purpose

17. Network clock synchronization – where it is used, purpose
18. Synchronization network architecture
19. Designing principles of urban telephone networks
20. Designing principles of rural telephone networks
21. Worldwide telecommunication networks – purpose, designing principles
22. "Telephone continents", the country telephone code assignments with the "Telephone continent". The composition of the telecommunication network of the "telephone continent"
23. Functions of international telephone exchanges (CT-1) and CT-3
24. What is meant by multimedia traffic? Multimedia traffic categories
25. Multimedia traffic parameters recommended by ITU-T
26. How do the traffic parameters of different multimedia services differ?
27. QoS parameters for multimedia traffic used in networks
28. What is the impact of transport connection parameters on the service QoS provision?
29. Types of multimedia communication network services and features of their implementation. Classification of communication services according to the importance principle
30. Classification of multimedia communication network services by the transmitted information type and by client types. Give some examples.
31. Classification of multimedia communication network services according to the client access and information exchange types. Give some examples.
32. Basic and additional services. Highly profitable services and services that perform marketing functions. Give some examples.
33. What is included in the concept of Data transmission services? Give some examples.
34. What is included in the concept of Quality of telecommunication services? What components does it consist of?
35. Describe the concept of Quality of Service (QoS)
36. The basic concepts of service quality are efficiency, safety, security and ease of use.
37. The quality of the telecommunication network (Network Performance, NP)
38. What is the difference between the quality of QoS service and network Performance
39. The basic concepts of the telecommunications network quality – transmission quality, reliability, availability, reliability, maintainability
40. What is the essence of the concept of a "service level agreement" (SLA)?
41. What should be the relationship between the service providers involved in providing end-to-end services?
42. What is meant by a single responsibility to the end user?
43. QoS features in optical IP networks
44. What optical switching technologies do you know? Its working principles
45. Components of the QoS structure in WR networks (Wave Routing Networks)
46. QoS in optical packet switching networks
47. QoS in IP-over-DWDM networks

48. Problems related to the quality of service
49. What is included in the Concept of Triple Play services? Types of Triple Play services
50. Composition and decomposition of Triple Play services
51. What is the difference between IP telephony, VoIP, and Internet telephony?
52. Types of connections in the IP telephony network
53. Types of Internet telephony connections
54. Describe the principles of packet speech transmission
55. The principle of packet speech transmission based on the "computer-to-computer" VoIP scenario
56. The principle of packet speech transmission based on the "computer-phone VoIP scenario
57. IPTV technology – purpose, principles of service provision
58. IPTV Architecture – composition, purpose of components
59. Types of IPTV services – purpose, principles of provision
60. Requirements for modern communication networks
61. What is meant by the convergence of communication networks? Types of convergence
62. Architecture of next-generation converged networks
63. Classification of NGN services
64. NGN functional model
65. Access network – definition. Draw the urban access network structure of the CIS countries before modernization
66. Access network – definition. Draw the rural access network structure of the CIS countries before modernization
67. Access network – definition. Draw the urban access network structure of the Uzbekistan Republic before modernization
68. Access network – definition. Draw the rural access network structure of the Uzbekistan Republic before modernization
69. IMS definition. The IMS level structure
70. IMS – definition. Convergence of fixed and mobile networks
71. IMS definition. IMS Components

3^d Group of questions (task examples)

1. Design the structure of the telecommunication path between two terminals, specify the terminal number and the dialed number. **Cg subscriber 263 PBX Tashkent – Cd subscriber Beijing China (country code =86).** In the diagram, specify the telephone district, telephone zone, national network, telephone continent.

   Give the algorithm of signaling exchange for subscriber and inter–station sections when transmitting control signals via the CCS7 signaling for an international call, **under the condition – Cd subscriber is idle, does not respond** (Cd subscriber is busy, the number of Cd subscriber was incorrectly dialed, Cd subscriber reject call, the waiting time for Cd subscriber's response

has been exceeded)

2. Design the structure of the telecommunication path between two terminals, specify the terminal number and the dialed number. **Cg subscriber Beijing China (country code =86) – Cd subscriber 263 PBX Tashkent.** In the diagram, specify the telephone district, telephone zone, national network, telephone continent.

Give the algorithm of signaling exchange for subscriber and inter–station sections when transmitting control signals via the CCS7 signaling for an international call, **under the condition – Cd subscriber is idle, does not respond** (Cd subscriber is busy, the number of Cd subscriber was incorrectly dialed, Cd subscriber reject call, the waiting time for Cd subscriber's response has been exceeded)

3. Design various VoIP scenarios, arrange (highlight) the basic procedures of voice packet processing on the diagrams.
   The **Computer-to-Computer scenario**, the phone server name – XXX.com
   The **Computer–Phone scenario**. A user name – name@XXX.com , B user phone number 273-70-90, Name, location and access number of the VoIP gateway – gateway@XXX.com PBX255, 255-17-17
   The **WEB browser – phone** scenario. Site Name www.aloqa.uz, the VoIP gateway location – PBX 254, provider's Call center location is PBX 272, access number to the provider's Call center is 0890

4. Design a connecting path diagram – **Stationary subscriber – Ucell's mobile subscriber, Cg subscriber speaks (according to variants).** On the connecting path diagram, highlight (mark) the components of the information transmission system and describe (write) the functions they perform. Specify the line and communication channels types used for the specified variant.

5. Design the structure of the telecommunication path between two terminals, specify the terminal number and the dialed number. **Cg subscriber 212 PBX Tashkent – Cd subscriber Sherobod (telephone code=7632) Surkhandarya region (telephone code Termez =76).** In the diagram, specify the telephone district, telephone zone, national network, telephone continent.
   Write an example of subscriber Cg's phone number, according to your assignment. Determine the phone number of the telephone district that the PBX belongs to. Explain the answer.

6. Design the structure of the telecommunication path between two terminals, specify the terminal number and the dialed number. **Cg subscriber Sherobod (telephone code=7632) Surkhandarya region (telephone code Termez =76) – Cd subscriber 212 PBX Tashkent.** In the diagram, specify the telephone district, telephone zone, national network, telephone continent.
   In the section "End office of A subscriber – the Toll office (PBX) of A

telephone district ", the E1 trunk number (number of the Voice channel in E1) is 23. Determine for a given E1 trunk the signaling channel number, the transmission cycle for the signaling command transmission, the bits to signaling command transmission

Developed by
PhD, Associate Professor
of the Telecommunications Engineering
 department, TUIT   Sadchikova S.A.