

«Approved»

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**Questions for the Final control
in the "IMS – structure and services" discipline**

1st Group of questions

1. Features of modern communication services, the difference between infocommunication services and services of traditional communication networks. Requirements for converged communication networks
2. Functional model of NGN networks
3. Functions and structure of the NGN network transport layer
4. Softswitch – purpose and main functions
5. List and describe the main Features of Softswitch
6. Softswitch – Purpose and supported protocols
7. Softswitch reference architecture using the example of the ZTE ZXSS10 SS1b
8. Softswitch reference architecture using Huawei's SoftX3000 as an example
9. Softswitch reference architecture, transport plane
10. Softswitch reference architecture, call and signaling service management plane
11. Softswitch Reference Architecture, Service and Application plane
12. Softswitch reference architecture, operational management plane
13. Functional objects of the Softswitch reference model of the service and application plane
14. Functions of the service management layer in a converged network
15. Functions of the NGN service management layer
16. Functional objects of the Softswitch reference model of the call and signaling service management plane
17. Functional objects of the Softswitch reference model of the transport plane
18. Softswitch network environment. PSTN and Internet protocols used in NGN
19. Access Network – definition. Variants of for using optical cables in an access network
20. Current state and prospects of access network development
21. Place and role, functional purpose and types of call setup protocols in NGN network
22. NGN's interaction with other telephone networks
23. Call control architecture in NGN network
24. Describe the PSTN – NGN Interaction under the services providing to subscribers
25. NGN interaction with other telephone networks – principles of packet voice processing
26. Functions and structure of the NGN network transport layer
27. Multi-layered architecture of the transport network
28. The components of the transport packet network

29. Packet voice processing under the "NGN – other telephone networks" interaction – the main characteristics of speech codecs
30. The scheme of the "PSTN – multiservice network" junction based on Tashkent city example – interfaces and protocols of interaction
31. The scheme of the "NGN subscriber – PSTN subscriber" interaction
32. Network architecture based on the MGCP protocol
33. Describe the principle of gateway decomposition
34. The evolution of the NGN access network
35. The H.248 protocol call handling model
36. Access network – definition, development trends
37. Purpose of the H.248 protocol. The H.248 commands
38. A general requirement for modern multiservice access technologies. Draw the structure of the urban access network used in the Republic of Uzbekistan before modernization
39. Trends in the development of the access network. Draw the structure of the rural access network used in the Republic of Uzbekistan before upgrading
40. The structure of the analog urban access network used in the CIS countries. A common requirement for modern multiservice access technologies
41. A general requirement for modern multiservice access technologies. The structure of the analog rural access network used in the CIS countries
42. The structure of the analog urban access network used in the Republic of Uzbekistan. Trends in access network development
43. Call setup and call release algorithm for connection using the H.248 protocol. "H.248 subscriber– H.248 subscriber"
44. Call setup and call release algorithm for a connection using the H.248 protocol. "H.248 subscriber– PSTN subscriber"
45. Network architecture based on the H.248 protocol
46. Basic SIP requests for call setup
47. SIP answers for multimedia session
48. Access network – definition. Classification of technologies used on access network
49. SIP requests for real-time multimedia applications
50. The common architecture of the NGN services platform
51. Session setup scenario of "SIP client –SIP client" connection
52. Session setup scenario of "SIP client – PSTN user" connection
53. Packet voice processing in UMG
54. SIP based network architecture
55. NGN edge access level – functions, used devices
56. NGN access node structure
57. NGN maintenance and Operation system requirements
58. Service Provider Application Platforms for NGN networks
59. Evolution of platforms for providing value-added communication services, new services
60. Classification of converged network services
61. Basic converged network services
62. Converged network access services

63. Access technologies used in a converged network

2nd Group of questions

1. The difference between infocommunication services and the services of traditional communication networks. IMS advantages
2. Requirements for modern communication networks. The IMS Reference Architecture
3. The IMS level structure. Support for IMS multiple access network
4. The IMS level structure. Value-added services in IMS
5. The migration stages of mobile network operators to NGN technology. The structure of 2G networks
6. The migration stages of mobile network operators to NGN technology. GPRS 2.5G generation cellular networks
7. The migration stages of mobile network operators to NGN technology. 3G network structure
8. Convergence of fixed and mobile networks. IMS assignment
9. IMS assignment. Network convergence
10. IMS assignment. Convergence of devices
11. The IMS purpose. Convergence of services
12. IMS definition. IMS's place in the converged network. Standardization of IMS
13. IMS Architecture – the service plane
14. Components of IMS Application plane
15. IMS architecture – Control plane
16. Components of IMS Control plane
17. IMS architecture – transport plane
18. Components of IMS transport plane
19. SIP function, addressing. Generating a SIP signaling message.
20. SIP network architecture
21. Routing of SIP messages. SIP forking method
22. Format of SIP messages
23. Basic SIP requests for voice call handling.
24. Basic SIP requests for video call handling
25. SIP INVITE, ACK, BYE requests – field of application, usage examples
26. SIP CANCEL, REGISTER, OPTIONS requests – field of application, usage examples
27. SIP INFO, PRACK, UPDATE requests – field of application, usage examples
28. SIP SUBSCRIBE, NOTIFY, REFER requests – field of application, usage examples
29. SIP PUBLISH, SUBSCRIBE, NOTIFY requests – field of application, usage examples
30. SIP answers – purpose, classification, usage examples
31. SIP requests for real-time multimedia applications.
32. Intermediate SIP answers – purpose, usage examples
33. The general principle of the IMS concept. Basic properties of the IMS architecture
34. The basic principle of the IMS concept. The main equipment of the IMS transport plane

35. Why are MGCF and MRFC devices of the IMS control plane considered with Transport layer devices?
36. The MRFP device – which plane does it belong to, its connection with the MRFC, and what tasks does it perform
37. Call session control function (P-CSCF, S-CSCF, I-CSCF) – which plane do they belong to, which tasks do they perform
38. HSS, SLF devices – which plane do they belong to, which tasks do they perform
39. BGCF, SGW, MGCF and MRFC devices – which plane do they belong to, which tasks do its perform
40. RACS, PDF, NASS devices – which plane do they belong to, which tasks do they perform
41. SCIM (Service Capability Interaction Manager), SIP AS (SIP Application Server) devices – which plane they belong to, which tasks they perform
42. OSA-SCS (Open Service Access – Service Capability Server), IM-SSF (IP Multimedia – Service Switching Function) devices – which plane do they belong to, which tasks do they perform
43. TAS (Telephony Application Server), SIP AS (SIP Application Server) devices – which plane they belong to, which tasks they perform
44. Standard services in IMS multiservice networks. Push to Talk Over Cellular Service
45. Architecture of the PoC service (Push to Talk Over Cellular)
46. The pre-established session model of the PoC service
47. On-demand session model when using the non-confirmation mode in the end network) PoC services
48. Standard services in IMS multiservice networks. The Presence Service
49. Architecture of the Presence Service, components functions
50. Standard services in IMS multiservice networks and Complementary Services offered by IMS Multimedia Telephony
51. Standard services in IMS multiservice networks. Group management service
52. Standard services in IMS multiservice networks. Data exchange service
53. Standard services in IMS multiservice networks. The Conferencing service
54. The Conferencing service in IMS – purpose and functionality. IMS Conference Communication Architecture
55. The Conferencing service in IMS – purpose and functionality. Creating a Hosted Conference/Conference Policy
56. The Conferencing service in IMS – purpose and functionality. What does the conference policy include?
57. The Conferencing service in IMS – purpose and functionality. Creating and joining the conference
58. IMS multimedia telephony and SIP protocol
59. Standard services in IMS multiservice networks. The "presence" service (subscriber status)
60. Standard services in IMS multiservice networks. Messaging Service
61. Standard services in IMS multiservice networks. Half Duplex Fast Communication (PoC) service
62. Explain the SIP usage in the provisioning of IMS Multimedia Telephony service

63. Standard services in IMS multiservice networks. Conference call service

3d Group of questions – task example

Call from an H. 248 subscriber (AMG, UMG, MSAN, mini-MSAN, IAD) to a PSTN subscriber

Call from PSTN subscriber to H. 248 subscriber (AMG, UMG, MSAN, mini-MSAN, IAD)

Call from a SIP client to a PSTN subscriber

Call from a PSTN subscriber to a SIP client

Packet voice processing in UMG (AMG, TMG, MSAN, mini-MSAN, IAD)

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