MIMO – 2026 / Exit check 27.03.2026

The list of control questions:

1. The concepts of "information", "signal-to-noise ratio" and channel capacity.
2. Properties of the Fourier transform. OFDM system.
3. Compatibility of MIMO and OFDM technologies.
4. Spherical and flat radio waves. Fading and fading effects in the channel.
5. MIMO systems: the capacity of the data transmission channel in such systems.
6. Types of wireless data transmission systems based on antenna arrays.
7. Operating modes: SU-MIMO and MU-MIMO in wireless communication systems:
   main difference and key requirements to the channel conditions.
8. The concept of an effective channel, the basic principles of spatial separation of channels.
9. Methods for calculating the weight coefficients of the precoder based on various criteria in the SU-MIMO mode.
10. Methods for calculating the weight coefficients of the precoder based on various criteria in the MU-MIMO mode.
11. Spatial signal processing in the angular basis (beam domain).
12. Methods for measuring channel information in the LTE/5G downlink:
    SSB and CSI-RS mechanisms for channel acquisition.
13. Methods for measuring channel information in the LTE/5G uplink:
    SRS pilot configuration, purpose of use, pilot interference and way to mitigate interference.
14. Methods for improving channel estimates (noise removal, resolution improvement).
15. Properties of the effective channel as the number of antennas in the communication system increases.
16. The Doppler effect, the concept of the Doppler spectrum and the interference generated by them in MIMO systems.
17. Principles of management of radio resources of the base station. The concept of "planner".
18. Criteria for planning (allocating) resources and ordering users in the processing queue. Features of the scheduler in MU-MIMO mode.
19. The wireless communication system as a feedback system: adaptation of the modulation code scheme, requests for retransmission, the system's resistance to errors in estimating the parameters of the communication channel in the MIMO system.
20. Why are only time-sparse measurements available for channel estimation?
21. What are the main differences between ZF, MMSE and IRC receivers in the context of MIMO-OFDM systems?
22. Why is the MMSE receiver considered more efficient in the presence of noise compared to the ZF receiver?
23. Explain the performance of the IRC receiver in the absence of interference
24. How is the Wiener-Hopf equation method used in MMSE and IRC receivers