

Questions for the state examination

1. Neuron structure and classification
2. Synapse structure, classification and work mechanisms
3. Nerve fibers, structure and classification
4. Spinal cord anatomy. Reflex arc, structure and classification
5. Nervous system development in ontogenesis
6. Brainstem anatomy
7. Cerebellum anatomy. Neuronal organization of cerebellum cortex
8. Diencephalon structure (thalamus and hypothalamus)
9. Encephalon subcortical nuclei
10. Cerebral cortex anatomy
11. Resting membrane potential, its ionic mechanism
12. Action potential, its characteristics and mechanics
13. Central nervous system mediators general overview
14. Brain regions participation in movements
15. Autonomic nervous system physiology
16. Modulatory brain systems
17. Memory psychophysiology
18. Brain regions participation in emotions
19. Functional brain asymmetry, contemporary approach
20. Psychophysiological problem
21. History of the development of functional localization ideas
22. Theory of system dynamic localization of higher mental functions
23. Luria's theory of three functional brain units
24. Visual sensory system anatomy. General characteristics of visual agnosia
25. Auditory sensory system anatomy. General characteristics of auditory agnosia
26. Somatosensory system anatomy. General characteristics of somatosensory agnosia
27. Apraxia: classification and characteristics
28. Aphasias: classification and characteristics
29. Types of memory impairment. General characteristics of amnesias
30. Principles of children neuropsychological diagnosis
31. Neuropsychological analysis of dysgraphias
32. Attention deficit and hyperactivity disorder in children
33. Frontal neuropsychological factors characteristics, their diagnosis
34. Modal specific mechanisms of brain activity
35. Spatial factor, its neuropsychological diagnosis
36. Hemispheric factors of brain activity
37. Three types of computational models in computational neuroscience (based on the example of Mach bands)
38. Hubel and Wiesel experiments. Receptive field definition. Receptive field models in retina and primary visual cortex
39. Efficient coding hypothesis. Original and reconstructed image. Means of differentiation (similarity) of images: MAE, RMSE, Corr
40. Exciting postsynaptic potential. Hebb's plasticity and Hebb's rule. Long-term potentiation and long-term oppression
41. Spike-timing and synaptic plasticity
42. Types of measuring scales and possible operations with them
43. Random variables. Distribution function and probability density function based on normal distribution. Normal distribution parameters
44. Numerical characteristics of distribution (quantile, median, mode, mathematical expectation, dispersion, standard deviation)

45. Estimation. Point and interval estimates. Confidence interval and probability, their interpretation. Confidence interval for position parameter in normal distribution with sigma unknown
46. Statistic hypothesis testing. Null hypothesis. Alternative hypothesis. Significance level. Test statistics. Critical area for the right-sided case. 2*2 table. Type I and II errors. P-value. ROC curve
47. Psychophysical model of detection theory. Criterion (liberal and conservative). 2*2 table. Correct rejection, false alarm, miss, hit. d'-prime and bias. Perfect observer. ROC curve
48. Social brain and its role in education and upbringing
49. Neuropsychological bases of education of different ages
50. Research problem and research questions. Research objective and research tasks (steps of research)
51. Theoretical analysis: theory and main concepts of topic planned to study. Types of reviews: integrative, methodological, historical, argumentative, systemic. Conceptual and operational concepts
52. Hypotheses to test. Variables: independent, dependent, control. Replication rule in study
53. Sampling: types, motivation, briefing, ethical requirements
54. Research results. Theoretical significance. Scientific value of the research results. Practical implication
55. Discussion. Limitations. Avenue for future research. Conclusion
56. Structure of the scientific report