

List of questions

for the entrance exam (interview) for admission to the Master's program of Biology "Global Change Ecology and Novel Ecosystems"

1. The subject of ecology. Definition of ecology. Hierarchical organization of the Nature.
2. Life forms of organisms. Classification of life forms.
3. Environmental factors, their classification. The main types of environment for life. Adaptation of organisms to environmental conditions.
4. Temperature and its effect on organisms. Temperature coefficient. Poikilothermic and homoiothermic organisms.
5. Light mode and its effect on organisms. Adaptations of plants and animals to the light regime.
6. Definition of the population. Various approaches to the definition of the population.
7. Classification of interactions between species.
8. Features of mutualistic relationships. Examples.
9. Species structure of ecological communities.
10. The circulation of matter and the flow of energy are the organizers of the ecosystem. The main regularities of the transformation of energy in the biosphere.
11. The flow of energy in the ecosystem through trophic levels. Utilization of primary products in trophic chains. Ration, assimilation, secondary products. Pasture and detritus food chains.
12. Trophic structure of ecosystems. Food networks. Trophic pyramids.
13. Functional groups of organisms in the ecosystem. Producers, consumers and decomposers.
14. Decomposers and detritus feeders, their relationship with food resources.
15. Ecosystem – an elementary morpho-functional unit of the biosphere. Ecosystem concept: definition of the concept, the structure.
16. Climatic zoning and the main types of terrestrial ecosystems (tundra, taiga, temperate forests, steppes, tropical moist forests, deserts).
17. Novel (artificial) ecosystems – agrocenosis, fish farms, etc.
18. The main hydrological zones of the World ocean (littoral, pelagic and batial) and their ecosystems. Phytoplankton, zooplankton, nekton, benthos, neuston, plaston.
19. The concept of the biosphere. The structure of the biosphere. Types of matter in the biosphere.
20. The cycle of matter in the biosphere. Structure and main types of biogeochemical cycles.
21. The nitrogen cycle in the biosphere. Microbiological processes in the nitrogen cycle.
22. The carbon cycle. Biological significance of carbon. A feature of the cycle in aquatic and terrestrial ecosystems. Not a closed carbon cycle. Human economic activity and the transformation of the carbon cycle.
23. The cycle of oxygen in the biosphere. Oxygen and the evolution of the biosphere.
24. Biosphere functions of humanity. Causes of the planetary ecological crisis.
25. Main anthropogenic impacts and ecosystem successions caused by them. Limited resources and environmental pollution as a factor limiting the human development.