EXAMINATION QUESTIONS FOR APPLICANTS TO DOCTORAL STUDIES IN THE PROFILE OF THE GROUP OF THE EDUCATIONAL PROGRAM 8D05201 –«ECOLOGY»

LEVEL 1 QUESTIONS:

1. Rationing in the field of environmental protection.
2. Atmospheric air pollution.
3. The concept of waste-free and low-waste technology.
4. Protection of the air basin.
5. Waste management.
6. Monitoring of atmospheric air.
7. Monitoring of surface waters.
8. Environmental monitoring. Environmental monitoring and control.
9. Habitat monitoring – comprehensive monitoring.
10. Atmospheric air monitoring
11. Water quality requirements and their classification.
12. Theoretical foundations of coagulation of water impurities.
13. Theoretical foundations of suspension deposition.
14. Methods of disinfection of water.
15. Water treatment.
16. Theoretical foundations of water softening, classification of methods.
17. The main criteria for the selection of the technological scheme and composition of facilities for the treatment of drinking water.
18. Technological modeling of the deposition process. Types of settling tanks and their scope of application. Horizontal, radial, vertical sedimentation tanks and sedimentation tanks with low deposition depth.
19. Chlorination ozonation of water. Disinfection of water with bactericidal rays.Electrodialysis units. The use of oxidizing agents and sorbents.
20. Technology of fluoridation and desfluorination of water. The genesis of iron in natural waters.

LEVEL 2 QUESTIONS:

1. Methods and methods of habitat control.
2. Methods of environmental management and methods of observation.
3. Environmental monitoring devices and systems. Chromatography: gas-liquid, liquid-adsorption, etc. Spectrometry, reagent methods.
4. Monitoring and forecasting of emergency situations. Potentially dangerous and critically important objects.
5. Regulatory mechanisms in the field of environmental monitoring.
6. Methods of desalination and desalination of water, their classification.
7. Mine water treatment. Removal of zinc, copper, arsenic and phenols from water. Purification of water from radioactive substances
8. The emergence of planetary systems.Methods of ecology and tasks of conservation of biological resources. The emergence of life on Earth and the levels of organization of living matter. The circulation of substances in nature
9. The concept of the biosphere and anthropogenic factors. Allogeneic, autogenic factors. Species diversity. Ecosystem productivity. Indicators of the state of the environment Genetic diversity.
10. Fundamentals of biodiversity conservation.Diversity of communities and ecosystems. Key types and resources. Measuring biodiversity. The rate of disappearance. Human-caused species extinction. The rate of extinction in water and on land.
11. Degradation and pollution of habitats. Pesticide contamination. Water pollution. Air pollution. Global climate change. Excessive depletion of resource exploitation.
12. Measurement of biological diversity. Conservation of species by population conservation. Small populations are particularly vulnerable. Loss of genetic diversity. The effective population size.

13. OS changes and disasters. Population monitoring. Formation of new plant populations. Ex situ conservation strategies.
14. The problem of small populations, global climate warming, human activity, forest depletion, innovations in science and technology, species extinction, studying the causes of threats to biodiversity
15.The legal basis for the protection of biodiversity. Categories of species conservation. Protected areas. Existing protected areas. Setting priorities for protection. International agreements. Design of protected areas.
16. Terrestrial and aquatic ecosystems. Zoos, botanical gardens, nature reserves, nature reserves, national parks. Natural monuments. Bisoferny international nature reserves.
17. Design of protected areas.The most optimal sizes of protected areas. Allocation of land for nature reserves. Priorities according to which lands are selected for nature reserves.
18. Monitoring of the soil cover. Monitoring and control of soil conditions. Basic principles, tasks and types of observations.
19. Global monitoring system. The place and role of local monitoring in the National Environmental Monitoring System of the Republic of Kazakhstan. Principles of the organization of biological monitoring. Methods of bioindication and biotesting of the habitat.
20. Organization of observations on the level of chemical pollution of soils by heavy metals and oil. Control of pesticide contamination of farmland. Compilation and design of soil pollution maps.

LEVEL 3 QUESTIONS:

1.The composition of natural waters. the main methods and technological schemes of their conditioning. The quality of natural waters and the requirements imposed on them by various water consumers
2.Disinfection of water with heavy metals
3. Methods and technological schemes for improving water quality
4.Determination of the full capacity of the water treatment plant
5. The physico-chemical basis of the flocculation process.
6. Design of protected areas.The most optimal sizes of protected areas. Allocation of land for nature reserves. Priorities according to which lands are selected for nature reserves.
7. Design of protected areas. The most optimal sizes of protected areas. Allocation of land for nature reserves. Priorities according to which lands are selected for nature reserves.
8. Monitoring of water bodies. The main physico-chemical methods of control of natural and wastewater. The main hydrochemical methods of natural and wastewater control.
9. Organization of observations on the level of chemical pollution of soils by heavy metals and oil. Control of pesticide contamination of farmland. Compilation and design of soil pollution maps.
10. Overexploitation of natural resources
11. Temperature rise and precipitation changes
12. The rate of extinction. Human-caused species extinction. The rate of extinction in water and on land.
13. Automated flare monitoring systems
14. Unified State Environmental Monitoring System
15. Organization of environmental monitoring
16. Monitoring of natural factors of influence. Monitoring levels, global, background, regional, local monitoring. Types of environmental monitoring
17. Social and environmental monitoring
18. Calculation of the fee for polluting the environment
19. Environmental assessment of the state of the environment
20. Environmental pollution management