**MATERIALS FOR THE ENTRANCE EXAMS TO THE DOCTORAL PROGRAM ACCORDING TO THE EDUCATIONAL PROGRAM 8D05102-BIOTECHNOLOGY**

**FOR THE ACADEMIC YEAR 2024-2025**

Field of education:

**8D05 Natural sciences, mathematics and statistics**

Code and classification of training areas:

**8D051 Biological and related sciences**

Group of educational programs:

**D050 Biological and related sciences**

**Ticket questions**

***Questions for the second block -***

***50 - for the SSP of natural-technical direction***

###001

Effect of different sources of carbon, nitrogen, vitamins and trace elements on microbial growth

###002

Effect of temperature on growth and physiological activity of fungi

###003

Ways of improving microbiological productions

###004

Degradation of xenobiotics by microorganisms

###005

Bioremediation of soils, perspectives of the method

###006

Biotechnology, ways of its development

###007

Market of advanced biotechnological drugs and products

###008

The latest achievements in the field of biotechnology

###009

Role of biotechnology in the modern world

###010

Genetically modified organisms in medicine, evolutionary perspectives

###011

Application of genetically modified organisms in agriculture

###012

Transgenic varieties of agricultural plants tolerant to herbicides

###013

Transgenic varieties of agricultural plants resistant to insect pests

###014

Transgenic varieties of agricultural plants resistant to viral diseases

###015

Transgenic varieties of agricultural plants with improved quality characteristics

###016

Genetic engineering of animals, current state and prospects of development

###017

Actual methods of genetic diagnostics and development prospects

###018

Importance of stem cells for molecular biotechnology, development prospects

###019

Monoclonal antibodies and their application in biotechnology

###020

Stem cells and their application in biotechnology

###021

 Prospects for the use of genetically modified organisms

 ###022

Possibilities of genetic engineering of plants to improve photosynthesis efficiency

###023

Possible pathways of microspore development in vitro

###024

 Possibilities of haploid technologies

###025

Obtaining plants resistant to various stress factors

###026

Transgenic plants and animals as bioreactors

###027

Innovations in biotechnology: procedure of commercialization and technology transfer

###028

Prospects for production and utilization of degradable polymers based on renewable natural sources

###029

Use of PCR in diagnostics of hereditary diseases

###030

Optimization of antibiotics production

###031

Development of new antibiotics

###032

Advantages of transgenic plants

###033

The relationship between the structure of nucleic acids and their functions in the body

###034

Importance of embryo storage

###035

Phospholipids as a major component of cell membranes

###036

Ability of polysaccharides with high viscosity to protect the body against pathogens

###037

Transcervical method of embryo retrieval from cow

###038

Regulation of calcium and sodium ion concentrations in the cell

###039

Interaction between normal ovulation, superovulation rate, and embryo washout rate

###040

Factors affecting the quality of transplantable embryos

###041

Cryopreservation of gametes and embryos of animals: significance and prospects

###042

Physico-chemical basis of freezing and thawing of gametes and embryos of animals

###043

Damaging factors during cooling and thawing of gametes and embryos

###044

Embryo bank: importance for animal husbandry, medicine and veterinary medicine

###045

Plasmids, their properties and use in genetic engineering

###046

Cultivation of artificially fertilized eggs

###047

Viability of embryos cultured outside the body

###048

Utilization of embryos obtained outside the body

###049

Use of hormones and their synthetic analogs in animal production

###050

 Obtaining cells from embryos