**Al-Farabi Kazakh National University**

**Faculty of Biology and Biotechnology**

**Department of Molecular Biology and Genetics**

**Final exam program by discipline**

PMB " Problems of Modern Biology"

Educational program in the specialty 8D05101 " Biology"

Doctor’s degree 1 year, 1 semester,

autumn semester 2022-2023 academic year

**Almaty**

The program of the final exam of the discipline PMB “Problems of Modern Biology” of the specialty "8D05101 - Biology" was compiled by Amirova Aigul Kuzembaevna Ph.D.

Reviewed and approved at a meeting of the Department of Molecular Biology and Genetics

From "\_\_\_" \_\_\_ 2022, protocol No. \_\_

Acting Head of the Department \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Lovinskaya A.V.

**The form of the final exam on the discipline** – written, “Univer”

**The purpose of the assignment** is to assess the students' knowledge and understanding of the topics covered in this discipline; to recreate the conditions under which they will be able to assess the problem, analyze ways to solve the problem and apply the knowledge gained in practice; Test their ability to reason for their answers.

**Type of options -** tickets.

There will be 3 questions on the ticket.

**Time to exam** **-** 2 hours.

**Evaluation criteria:** Block I - 30 points, Block II - 30 points, Block III - 40 points.

The first block includes questions of cognitive (knowledge) competence, which assess the knowledge and understanding of the object of study. This task allows you to demonstrate knowledge in the field of the genetic foundations of biotechnology, achievements and prospects for the development of biotechnology and genetic engineering, practical significance in various fields of science, production and industry, based on modern advanced textbooks, manuals and other literary sources. Valued at 30 points.

The second block includes questions that reveal functional competence, which assess the ability to apply, analyze information and systematize the results of scientific research by processing literature data. This task is aimed at identifying the ability to apply their knowledge, formulate and justify arguments and solve problems within the field of study. Valued at 30 points.

The third block includes questions of systemic competence, which reveal the ability to synthesize and evaluate information. This question is an applied task related to the use of biotechnological methods, which are aimed at testing practical skills.

A (90-100%) - the student carefully studied the educational material; consistently and comprehensively answers the questions posed; freely applies the acquired knowledge in practice.

B (75-89%) - the student knows the educational material; does not make serious mistakes when answering; he can apply the acquired knowledge in practice.

С (60-74%) - the student knows only the basic material, does not always give an answer clearly and completely.

D (50-59%) - the student has separate ideas about the material being studied; cannot fully and correctly answer the questions posed, when answering, he makes gross mistakes.

**Exam questions**

**Block I**

1. History and methodology of biology science.

2. Biology as a science. Scientific Research Methods.

3. What is the New Biology? Problems of modern biology.

4. The New Biology’s Great Potential.

5. Individual development of organisms.

6. The main problems of developmental biology.

7. Questions and problems of development theories of evolution.

8. Origin of life.

9. The development of organisms on the planet.

10. The problem of creating sufficient food potential for the growing population of the Earth.

**Block II**

1. A new biology approach to the food challenge.

2. The development of genetic engineering methods.

3. Genetic engineering in the future.

4. Advantages and disadvantages of genetic engineering.

5. Decoding the genomes of plants, animals and humans.

6. The prospect of Human genome project.

7. Rational organization of human life.

8. Development of the problem of life extension.

9. The study of the structure of macromolecules and the identification of its influence on their functions – key problems of modern biology.

10. Development of new anti-aging drugs and technologies.

**Block III**

1. The main biomolecules. Structure and functions of macromolecules.

2. Problems of regulation of intracellular processes.

3. Regulation of cell functions.

4. Biological aging. Various theories of aging.

5. Theories about the reasons of aging and solutions of this problem.

6. The study of the mechanisms of brain activity.

7. Cognition of the laws of thinking and memory processes.

8. Biosphere and humanity. Prediction the future of the planet and humanity.

9. Climate change and its impact on natural and economic systems.

10. Biology and astronautics. Biology and problems of technology.

11. Reproduction and modeling of biological processes and design of new technical systems and devices.

12. The study of the biosphere as a dialectical unity of living and non-living nature.

**REFERENCES AND RESOURCES**

**Literature:**

1.Космин, В. В. Основы научных исследований (Общий курс) [текст] : учеб. пособие . - 2-е изд. - M. : Риор, 2014. - 214 с.

2. Герасимов, Борис Иванович. Основы научных исследований. - Москва ; Москва : Издательство "ФОРУМ" : ООО "Научно-издательский центр ИНФРА-М", 2013. - 272 с.

3. Леонова, Ольга Владимировна. Основы научных исследований. - 1. - Москва : Московская государственная академия водного транспорта (МГАВТ), 2015. - 72 с.

4. Шкляр, Михаил Филиппович. Основы научных исследований. - Москва : Издательско-торговая корпорация "Дашков и К", 2018. - 208 с.

5. Shanti Bhushan Mishra and Shashi Alok Handbook of research methodology. – India 2017. – 28 p.

6. В. А. Бакулев, Н. П. Бельская, В. С. Берсенева Основы научного исследования. - Екатеринбург: Изд-во Урал. ун-та, 2014. – 64 c.

**Internet resources:**

Internet resources (at least 3-5)

http://elibrary.kaznu.kz/ru

https://www.goodreads.com/

https://www.coursera.org/

https://www.edx.org/