**Al-Farabi Kazakh National University Biology and biotechnology faculty**

**Department of Biophysics, Biomedicine and Neurosciences**

**Program of final examination on SPTPB 5207**

**«Modern problems of theoretical and practical biology»**

Speciality Code «7M01504 -Biology» Education From full time, Master s degree, Compulsory subject

From of education - day

9 credit

 1 course

 Spring semester

**Almaty, 2023 y.**

Program of final examination on the discipline “Modern problems of theoretical and practical biology” was made by Ashirova Zh., Ph.D., senior teacher of the department of biophysics, biomedicine and neurosciences

Based on the working curriculum on the specialty 7M01504-Biology

Considered and recommended at the meeting of the department of biophysics and biomedicine.

from «29» august 2023 year, protocol № 3

Head of department, c. b. s., Professor A.M. Kustubaeva

**The KAZAKH NATIONAL UNIVERSITY of al-Farabi**

**Faculty biology and biotechnology Methodological recommendations for Final Exam**

**«SPTPB 5207» - «Modern problems of theoretical and practical biology»**

**Exam Type:** Offline (Traditional format), Writing

Exam format-offline

Conducted in writing: IS Univer

Recording control - offline proctoring.

Duration - 120 minutes for 3 questions, 1

Conducting rules:

General Exam Rules

The exam is held according to the schedule recommended by the faculty during the session. In order to verify the identity of the master student taking the exam, the teacher on duty checks the relevant documents (identity card or passport). If another person took the exam, the on-duty teacher draws up an act of violation of the rules. In the case of taking an exam at the university, 15 minutes before the start of the exam, the teacher on duty signs the arrival list with the seat numbers of the students and seats them. In the autonomous mode, it is necessary to start the exam in a timely manner and after the full recording of the exam answers, hand over the exam tickets to the duty officer and leave the exam with the teacher's permission.

 During the exam, the teacher on duty monitors the order of the students in accordance with the approved instructions.

 In the case of taking a written exam at the university, in a special examination room (with camera surveillance), the examiner sits down in the designated place, a sealed envelope is opened in front of the examiners, the teacher on duty distributes tickets to the examiners. Students are issued a ticket with 3 questions. Students must master video, presentation, lecture materials on predetermined topics. In the answer, it is necessary to reveal the theoretical content and practical basis of the topic.

 The deciphered exam answers are received by the checking teacher and evaluate the response work in a special room with a camera according to the grading scale. Graded exam answers will be returned to the registrar's office. The grades set in the answers to the exam by the registrar's office are assigned by the students to the checking teacher by filling in the dossier (sheet) with points-points indicating the surname and initials. The checking teacher puts down points on the electronic document-information in the "Univer" system, prints out the document-information on paper, signs and transfers to the registrar's office.

 The time for scoring (points) in the consolidated summary sheet (Sheet) of the written exam is 48 hours.

 During the exam, it is forbidden to use a crib, mobile phone, dictionary, calculator, talk to each other, etc. In case of non-compliance with this provision, the student is removed from the exam, an appropriate act is drawn up and an “F” (unsatisfactory) mark is given for the subject.

 A student who repeatedly violates the rules of the exam may be expelled from the university by the decision of the ethics faculty council in accordance with the rules of the internal procedure of KazNU named after Al-Farabi.

**Topics of the final exam in the discipline «Digital content in biology education»**

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| 1. **Theoretical biology is the basis of biological sciences.**
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| **2.** Laws for the organic world system. Laws of biological evolution |
| 1. Current theoretical laws for the individual development of the organism. Physiological and biochemical meaning of life. Genetic-cybernetic meaning of life
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| 4. Physiological and biochemical meaning of life. Genetic-cybernetic meaning of life |
| 5. Genetic-cybernetic meaning of life |
| 6. Planet Life and Human.  |
| 7. Scientific, philosophical and religious views on life. Current concepts of consciousness and thinking  |
| 8. Time is considered as the basis of theoretical biology.  |
| 9. Сhronobiology, chronomedicine. Hierarchy of rhythm in a multicellular organism. |
| 10. Hierarchy of rhythm in a multicellular organism. |
| 11 Basic laws of ecology.  |
| 12.The concept of the noosphere. Scientific and technical revolution and global environmental crisis.  |
| 13. Cybernetics. Biometrics, its place in theoretical biology |
| 14 The Law of Homogeneity and Diversity of Life, or St. Hilaire's Law. Principles of the Global Law of Life, or Vernadsky's First Law |
| 15 The law of fitness for an organic purpose or Aristotle's law. The law of natural selection or Darwin's law |
| 16 The law of natural selection or Darwin's law |
| 17 Law of ontogenetic aging and renewal or Crank's law of unity of ontogenesis or Driesch's law |
| 18. The law of the chemical structure of living things or Engels' first law. The law of systematic structure of biochemical processes or Bertalanffy's law |
| 19 The law of systematic structure of biochemical processes or Bertalanffy's law |
| 20 The law of biological phenomena in agreement with information, or Waddington's law. Law of continuity and discreteness of biological information, or Morgan-Ephrussi law. |
| 21 The law of the biosphere role of consciousness or Vernadsky's second law. |
| 22 Environmental influence on biological rhythm.  |
| 23 Chronobiology and light absorption of biosystems. World crises and cybernetics. |
| 24 The role of biology in the development of philosophy. The work of Erwin Bauer.  |
| 25 Phenotype theory and information theory. |
| 26 The physical basis of coding and robustness in biological evolution. Causes and effects in biology |
| 27 Physiological features of organisms of elderly people. Solar system and earth. Paths of evolution.  |
| 28. Melatonin secretion in various physiological and pathological conditions.  |
| 29 Effect of melatonin on biological rhythms of the body. Rhythms of human ability to work.  |
| 30 Blood coagulation rhythms. Rhythms of cell growth. |
| 31 Chronoadaptation and transmeridional flights. Rhythms of metabolism. Rhythms of hormone activity. Rhythms of general activity.  |
| 32 Chizhevsky's works on solar activity, rhythms of solar activity. Roles of behavior and movement in the evolution of organisms.  |
| 33 Crises in the world. Meaning, applications, achievements of cybernetics |

**Evaluation criteria**

Below are the minimum scores in percentages:

95% - 100%: A 90% - 94%: A-

85% - 89%: B+ 80% - 84%: B 75% - 79%: B-

70% - 74%: C+ 65% - 69%: C 60% - 64%: C-

55% - 59%: D+ 50% - 54%: D- 0% -49%: F

EVALUATION CRITERIA

"EXCELLENT" - the student has knowledge of the subject in the full scope of the curriculum, comprehends the discipline deeply enough; independently, in a logical sequence and exhaustively answers all the questions of the ticket, while emphasizing the most essential, is able to analyze, compare, classify, generalize, concretize and systematize the studied material, highlight the main thing in it: establish cause-and-effect relationships; clearly forms answers, freely reads the results of analyzes and other studies and solves situational problems of increased complexity; familiar with the main literature

"GOOD" - the student has knowledge of the discipline in almost the entire scope of the program (there are gaps in knowledge only in some, especially complex sections); does not always highlight the most significant, at the same time does not allow serious errors in the answers; able to solve light and moderate situational problems; is able to interpret laboratory and instrumental studies in excess of the mandatory minimum.

"SATISFACTORY" - the student owns the main body of knowledge in the discipline; shows difficulty in independent answers, operates with inaccurate formulations; in the process of answering, mistakes are made on the merits of the questions. The student is able to solve only the easiest problems, owns only the mandatory minimum of research methods.

"UNSATISFACTORY" - the student has not mastered the required minimum knowledge of the subject.

**References**

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