

Al-Farabi Kazakh National University
Faculty biology and biotechnology
Department of biophysics, biomedicine, and neuroscience
Department of Biotechnology

APPROVED by
Dean of Faculty

_____ Zayadan B.K.
" _____ " _____ 2020

FINAL EXAM PROGRAM ON THE DISCIPLINE

«FRZh3215» - «Plant and Animal Physiology»

Specialty «6B05103, Biotechnology»

Course – 2
Semester – 4
Number of credits – 5

Almaty 2020

Program of the final exam on the discipline is elaborated by Datkhabayeva G.K., PhD, senior lecture of the Department of biophysics, biomedicine, and neuroscience, and Kenzhebaeva S.S., doctor of biological science, professor of the Department of Biotechnology.

Considered and recommended at the meeting of the department _____
from «_____» _____ 20____year, protocol №_____

Head of department _____ Kustubayeva A.M.

Recommended by methodical bureau of the faculty
«_____» _____ 20____year, protocol №_____

Chairman of the method bureau of the faculty _____ Nazarbekova S.T.

Exam schedule: The exam is held according to the schedule of the winter session of the Faculty of Biology and Biotechnology.

The form of exam:

Test on the SDO Moodle platform.

There are four types of tests in equal proportions:

- 1) multiple choice (choice of one or more correct answers among 5 or more options),
- 2) correct/incorrect (define if the test statement correct or wrong),
- 3) matching,
- 4) choice of missed words.

Exam duration: 90 minutes for 40 test questions, 1 attempt.

Control of exam process - online proctoring. Test results can be revised based on proctoring data. If a student violates the rules of the examination, his result will be annulled. During the exam it is not allowed to leave the computer, get up and go out. It will be considered as a violation.

30 minutes before the start of the testing, students must prepare for the exam in accordance with the requirements of the instruction on proctoring.

Previously, students should assimilate the instructions for proctoring and passing through the online-tests which are available on the IS Univer and SDO Moodle platforms.

After completing the tests it is necessary to press the icon “submit everything and complete the test”, the system automatically gives the result, checking the correctness of the answers

The maximum score for the exam is 100 points, each question is evaluated with 2,5 points.

Topics for the final exam correspond to the syllabus of the discipline and cover issues considered in lectures, seminars, as well as tasks submitted to the SIW (students' independent work).

THE EXAM WILL INCLUDE THE FOLLOWING ISSUES OF THE COURSE:

Homeostasis and Fluid Compartments. Regulation of Homeostasis
Transporters, Pumps, and Channel. Solute and Water Transport
The Nervous System. Neurons and glia.
Compartmentalization of ions and charge. Membrane Potentials. Excitable cells
and Signaling. Graded Potentials and Action Potentials.
Intercellular contact. Methods of Communication.
Central and Peripheral Nervous systems.
The Senses. Vision. Hearing and Vestibular System. Chemical Senses.
The Somatic Nervous System. Control of Voluntary Movement.
Muscle. Skeletal Muscle. Tension and Metabolism. Smooth Muscle. Cardiac
Muscle.
E-C coupling and Force Generation Module.
The Cardiovascular System. The Respiratory System.
The Endocrine System. The Reproductive System.
The Gastrointestinal System. General structure and function.
The urinary System. Kidney structure and function. Filtration Rate and Regulation.
Reabsorption and Secretion. Regulation of Fluid Balance. pH Balance. Acid-Base
Homeostasis. Acid-Base Disturbances.
Physiology of the plant cell.
The functions of cell organelles.
Plant water exchange at levels of the whole plant, organs, cells.
Photosynthesis.
Photosynthetic apparatus plants.
The functions of photosynthetic plastid pigments.
Importance of non-cyclic and cyclic flow of electron of photosynthesis.
Light and dark stages of photosynthesis.
Photosynthetic phosphorylation.
Significance of respiration, respiratory substrate.
The functions of glycolysis.
Alternatives after glycolysis.
The importance of oxidation-reduction reactions.
Cycle Krebs (Citric acid or TCA Cycle).
The proteins complexes of mitochondrial electron transport chain, oxidative
phosphorylation.
Energy recovery from the oxidation of sucrose.
The importance of plant mineral nutrition.
Significance of macro- and microelements in the plants life.
Regulation of plants growth and development.
The main factors affecting these procuresses.
Hormones system of plants.
Regulation of cell cycle.
Mechanisms of plants adaptations to abiotic and biotic stresses.

LITERATURE

Main

Baktybaeva L.K., Zhamanbaeva G.T. Base of physiology. Laboratory practicum. Kazakh university, Almaty, 2017.

William J.Kovacs. Textbook of endocrine physiology – 1st ed., 2011 Includes bibliographical references and index. ISBN 0-7216-0240-1

Human Physiology. Editors: Robert F. Schmidt PhD., Professor Dr.Dr. Gerhrad Thews. ISBN: 978-3-642-73833-3

Tuleukhanov, S.T.. Fiziologiya cheloveka i zhyvotny`kh.- Almaty`, 2001

Nozdrachev A.V. Fiziologiya cheloveka.- M., 2003 Biochemistry and molecular Biology of Plants, 2nd Edition Bob B. Buchanan, (Editor), Wilhelm Gruissem (Editor), Russell L. Jones (Editor). 2015. 1280 p.

Medvedev S.S. Fiziologiya rastenij Uchebnik — SPb.: BKhV-Peterburg, 2012. — 512 s.

J. A. Bryant and D. Francis (2015). The plant cell cycle. Annals of Botany 107: 1063.

Atabayeva S., Kenzhebayeva S., Blavanchinskaya L. Stress physiology. ISBN978-601-04-1098-5. 2015, 84 p

Yakushkina N.I., Bakhtenko E.J. Plant physiology. 2018. 466 p.

Additional:

Fundamental neuroscience. © 2008, Elsevier Inc. 1277 p.

Editors: **Segev**, Nava (Ed.) Trafficking Inside Cells Pathways, Mechanisms and Regulation 2009.

Kristiina Himanen (2015). Cell cycle regulation during plant growth and development, Jörg D. Becker (2012) Decision- Making in the Plant Cell Cycle.Canal BQ-n.9.

Internet resources

[https://meduniver.com/Medical/Physiology/;](https://meduniver.com/Medical/Physiology/)

<http://www.bio.bsu.by/physioha/files/sandakov-kursleky.pdf>

<https://www.khanacademy.org/science/biology/cellular-molecular-biology/mitosis/a/cell-cycle-phases>

http://plantphys.info/plant_physiology/cellcycle.shtml

<http://www.britannica.com/EBchecked/topic/623731/vascular-system>

<http://www.britannica.com/UpBeat-37879-Basic-Plant-Physiology-Parts-Flowering-Functions-Roots-Types-phy-Education-ppt-powerpoint.htm>

<https://biologydictionary.net/photosynthesis/>

<https://www.nature.com/articles/nature02598>

<https://www.wyzant.com/resources/lessons/science/biology/photosynthesis/light-dark-reactions>

<https://eschooltoday.com/learn/light-and-dark-reactions/>

The score scale

Letter grade	Number grade	Percentage content (%)	Traditional grade
A	4,0	95-100	Excellent
A-	3,67	90-94	
B+	3,33	85-89	Good
B	3,0	80-84	
B-	2,67	75-79	
C+	2,33	70-74	
C	2,0	65-69	Satisfactorily
C-	1,67	60-64	
D+	1,33	55-59	
D-	1,0	50-54	
FX	0,5	25-49	Unsatisfactory
F	0	0-24	

EVALUATION CRITERIA

«EXCELLENT» - the student possesses knowledge of the subject in full volume of the curriculum, deeply enough comprehends discipline; independently, in a logical sequence and exhaustively answers all questions of the ticket, thus emphasized the most essential, is able to analyze, compare, classify, generalize, concretize and systematize the studied material, to allocate in it the main thing: to establish causal relations; accurately forms answers, freely reads results of analyses and other researches and solves situational problems.

"GOOD" - a student has knowledge of the discipline almost to the full extent of the program (there are knowledge gaps only in some, especially complex sections); does not always highlight the most significant, however, does not make serious mistakes in the answers; is able to solve light and medium gravity situational problems; is able to interpret laboratory and instrumental research in excess of the mandatory minimum.

"SATISFACTORY" - a student possesses the main volume of knowledge in the discipline; shows difficulties in independent answers, operates with inaccurate formulations; in the process of answers mistakes are made in the essence of questions. The student is able to solve only the easiest tasks, has only the obligatory minimum of research methods.

"NON - SATISFACTORY " - the student has not mastered the required minimum knowledge of the course.