al-Farabi Kazakh National University

Faculty of Biology and Biotechnology

Department of Biodiversity and Bioresources

Program of final exam by discipline

### BOT1204 «Botany»

**Speciality 6B101102 – «Pharmacy»** **1 course, 2 semester**

Almaty, 2024

### Program of final exam by discipline BOT1204 «Botany» in speciality Speciality 6B101102 – Pharmacy was compiled by lecturer Zaparina Yelena

Reviewed and approved at a meeting of the Department of Biodiversity and Bioresources

From " " \_\_ 2024, Protocol

Head of the Department \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Kegenova G.B.

Reviewed and approved at the meeting of the methodical council of biology and biotechnology faculty

From "" 2024, Protocol

**FORM OF FINAL EXAM IN DISCIPLINE - WRITTEN EXAM:**

**TRADITIONAL - ANSWERS TO QUESTIONS**

The format of the final exam of the discipline - is written offline; proctoring and checking for cheating will be carried out. The goal of the task is to identify the expected results of teaching the discipline.

**EXAM PROCEDURE**

**IMPORTANT** - the exam is held on a schedule that must be known in advance as the students as the teachers.

**Variants of tasks**

Exam questions will be divided on the three blocks.

Exam paper will contain three questions, by one from each block.

**Evaluation criteria**:

Questions from the first block – 30 points

Questions from the second block – 30 points

Questions from the third block – 40 points

**Requirements for the design of the work.** The answers to the tickets should correspond to the content of the question and most fully reflect the results of training.

**Fulfillment steps:** A complete answer to the ticket is made on the day of the exam at the appointed time.

**PROGRAM  
final exam in the discipline «Botany»**

**Module 1. Plant anatomy**

**1.** Explain the structure of the plant cell. Membrane bound & non-membrane bound organelles.

**2.** Anatomical organization of plant tissues. Classification of plant tissue. Features of the structure of cells of meristematic tissues. Meristematic tissue. Primary and secondary meristems. Dermal tissues system: formation and structural features of primary and secondary dermal tissues. Vascular tissue system: origin, structure, location in the body of plants. Mechanical ground tissues: emergence, location in the body of plants, structural features.

**3.** The anatomical organization of the stem of herbaceous plants. The structure of the stem monocots. Anatomical organization of the stem of cereals. A variety of types of structure of the stem of dicotyledonous herbaceous plants.

**4**. Anatomical organization of the stem of woody plants. Histological composition of secondary bark and wood. Formation of the bark. Features of the structure of the stem of conifers.

**5.** Anatomical organization of the leaf. Features of the anatomical organization of a typical leaf. The influence of external factors on the structural organization of the leaf.

**6.** The primary and secondary structure of the roots. The primary structure of the root. The formation and functioning of secondary tissues. The secondary structure of the root.

**Module 2. Plant morphology**.

**1.** The vegetative organs of higher plants. Root morphology. Determination of the root, its function, types of roots according to the nature of growth and origin. Types of root systems depending on habitat conditions. Mycorrhiza. Metamorphosis of the root.

**2.** The morphology of the shoot and the stem. The definition of shoot, the stem as an element of shoot. Buds, types of buds arrangement and leaf arrangement. Types of branching shoots. Metamorphosis of shoots and stems. Types of shoots.

**3.** The vegetative organs of higher plants. Leaf morphology. Leaf - an element of shoot. Functions of leaf, origin. Growth and development of leaf. Three categories of leaves. Metamorphosis of leaves.

**4.** Generative organs of higher plants. Flower. Flower as an organ of sexual reproduction. Androecium and gynoecium, micro and macrosporogenesis. Double fertilization. Inflorescence morphology. Definition, the value of inflorescences. Classification inflorescences.

**5.** The Fruit and Seed. Seed development, seed types: seeds without endosperm, with endosperm and perisperm. The development and structure of the fruit. Classification of fruits. Fruits and seeds adaptations to the dispersion.

**Module 3. Plant systematic**

1. The general characteristics of Algae. The general characteristic of algae. Major divisions of algae (Cyanophyta, Chlorophyta, Phaeophyta). (Cyanophyta).
2. General characteristics of the kingdom of Fungi. Fungi classification, major divisions of fungi (Chytridiomycota, Zygomycota, Ascomycota, Basidiomycota, Deuteromycota . Oomycetes (water molds*).*

General characteristics of Lichens. Morphological types. Symbiotic character of lichen.

1. Nonvascular plants.General characteristic of the Mosses. Classification, phylum Marchantiophyta and Bryophyta. Main representatives, their characteristics.
2. Pteridophyta (ferns and allies). General characteristic. Class Lycopodiopsida (lycophytes) and its general characteristic. *Lycopodium* ( “club moss”), features of morphology and reproduction. Heterospory in *Selaginella.*
3. Class Equisetopsida(horsetails), general characteristic. Features of morphology and reproduction.
4. General characteristic of Class Polypodiopsida (Ferns). Features of morphology and reproduction. Heterosporous Water Ferns.
5. General characteristic of Gymnosperms.Division Pinophyta (Coniferophyta).Features of morphology and reproduction.
6. Division Angiospermae. Structure of flower. Families Asteraceae, Ranunculaceae, Fabaceae. Rosaceae.
7. Class Monocotyledones (Liliopsida), families Liliaceae, Poaceae, Cyperaceae.

**Grading Criteria:**

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

B (75-89%) - the student knows the study material; does not make serious mistakes in answering; the student is able to apply the acquired knowledge in practice.

C (60-74%) - student knows only basic material, does not always give a clear and complete answer.

D (50-59%) - the student has some idea of the studied material; cannot answer the questions completely and correctly, he/she makes serious mistakes while answering.

**Procedure for checking for plagiarism (if any)**

Originality - not less than 60%

Borrowing - no more than 40%

**The main sources:**

1. Crang**,** Richard,Lyons-Sobaski**,** Sheila**,** Wise, Robert. Plant Anatomy. Springer. – 2018. – 732 p.
2. Shipunov A. Introduction to Botany. 2018. – 181 p. http://ashipunov.info/shipunov/school/biol\_154/ eBook
3. Raven P., Evert R.F., Eichhorn S.E. Biology of Plants. By W. H. Freeman and Company 2013. – 864 p.
4. Milena Martinková, Martin Čermák, Roman Gebauer, Zuzana Špinlerová. Plant Botany.An introduction to plant anatomy, morphology and physiology. Brno, 2014. 103 p. eBook
5. Michael G. Simpson. Plant Systematics*.* Third Edition. Elsevier. – 2019. – 754 p. eBook
6. Charles B. Beck. An Introduction to Plant Structure and Development. Cambridge University Press. 2011. – 465 p. eBook

**Additional sources:**

<http://elibrary.kaznu.kz/ru/>

https://study.com/academy/topic/introduction-to-plant-anatomy.html <https://botanydepot.com/2021/01/20/videos-plant-systematics-lectures-by-bruce-kirchoff/>

<https://cms.botany.org/media/collection/id.24.html>

<https://www.brainkart.com/subject/Plant-Anatomy_249/>

https://www.easybiologyclass.com/plant-anatomy-online-tutorials-lecture-notes-study-materials/

https://study.com/academy/topic/plant-anatomy-morphology.html