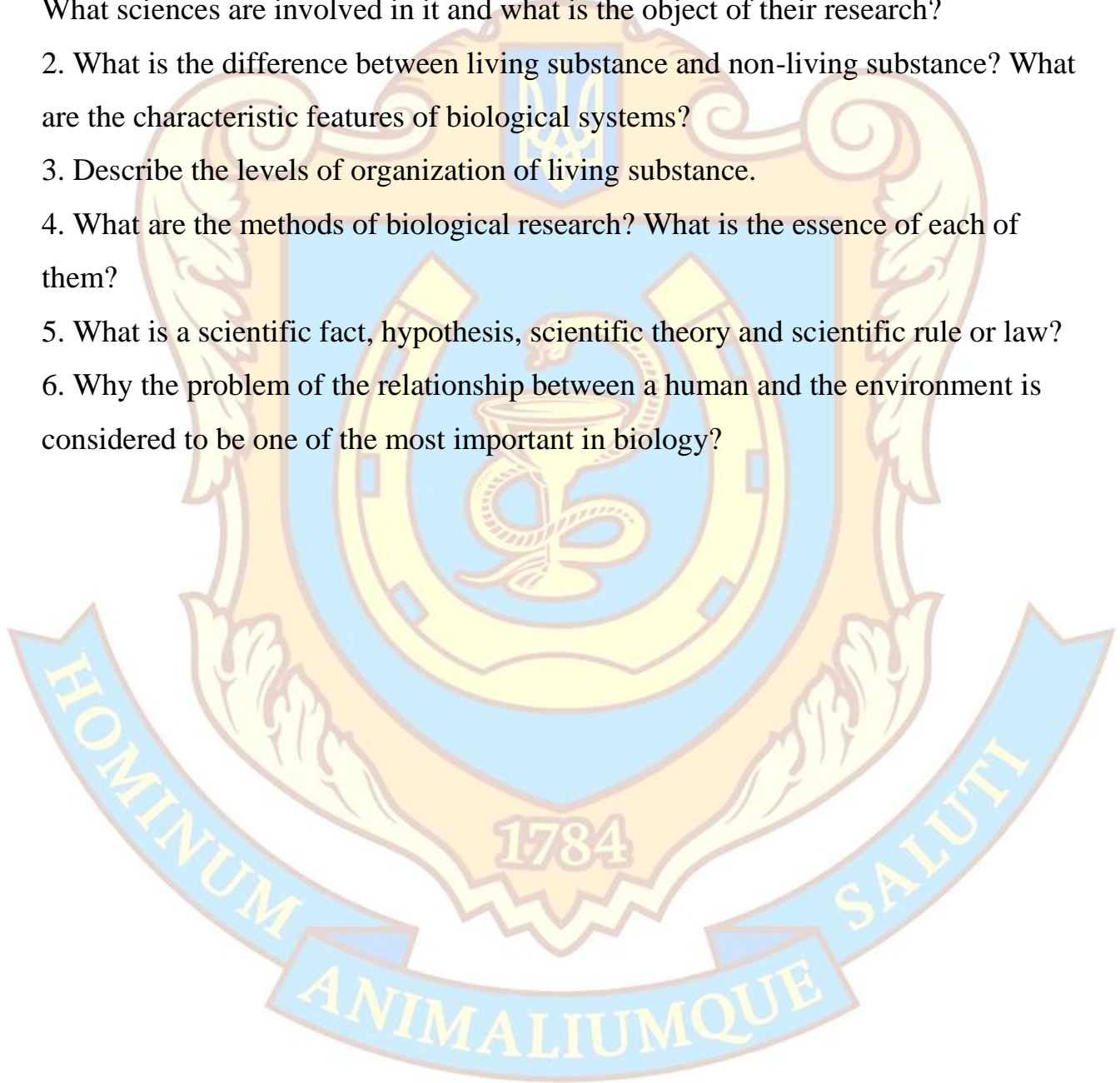


BIOLOGY (Bachelor's degree)

The list of questions for entrance test

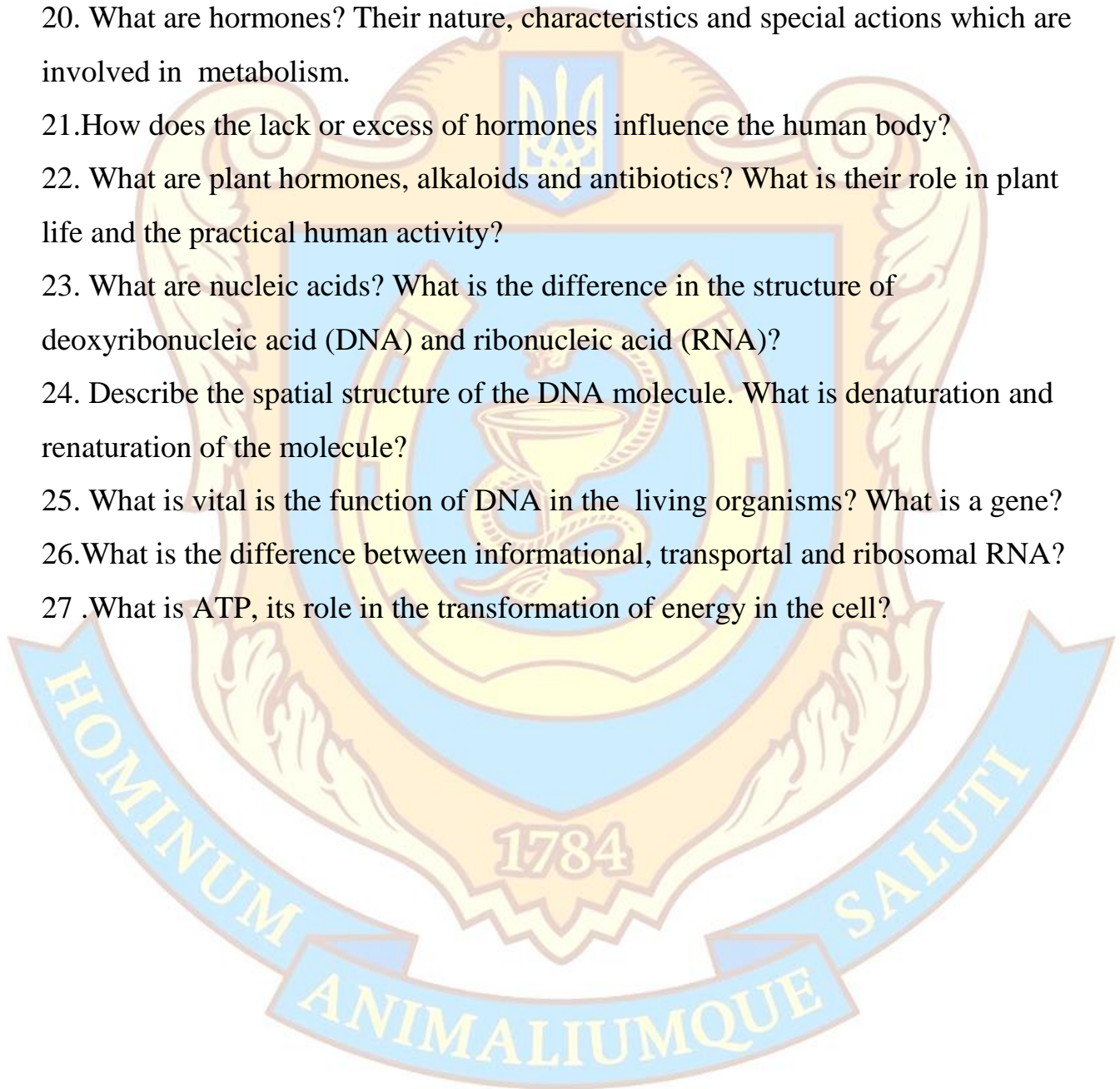
1. Biology - the science of wildlife, a brief history of its origin and development. What sciences are involved in it and what is the object of their research?
2. What is the difference between living substance and non-living substance? What are the characteristic features of biological systems?
3. Describe the levels of organization of living substance.
4. What are the methods of biological research? What is the essence of each of them?
5. What is a scientific fact, hypothesis, scientific theory and scientific rule or law?
6. Why the problem of the relationship between a human and the environment is considered to be one of the most important in biology?



THE MOLECULAR LEVEL OF LIFE AND CHEMICAL COMPOSITION OF CELLS

1. What does biochemistry science study?
2. What are the chemical elements that form the living organisms belonging to the macro cell, their quantitative value and role in cellular processes?
3. What chemical elements are related to microelements and their importance to organisms?
4. What is ultra microelements and their role in living organisms?
5. Chemical properties and functions of water.
6. How important it is to maintain vital processes in the cell with salt?
7. What are the differences between organic and inorganic matter? What is biopolymers, monomers and biologically- active substances?
8. What are the properties and function of living organisms, the carbohydrates, classification and chemical composition?
9. Lipids, their classification and properties. What role do they perform in living organisms?
10. What are the proteins? What is the structure of amino acids? List the basic amino acids, which are the part of the protein. Indispensable and replaceable amino acids.
11. What is the peptide relationship and polypeptide chain?
12. Describe the primary, secondary and quaternary structure of proteins.
13. What are the characteristic features of proteins?
14. What is the denaturation, renaturation and destruction of proteins?
15. What is the role of proteins in the process of vital activity that occurs in living organisms?
16. Enzymes and their role in metabolism.
17. What substances are referred as biologically active?

18. The vitamins, their classification, origin and value in the metabolism.
19. What diseases may occur when there is a lack or excess of vitamins in the human body?
20. What are hormones? Their nature, characteristics and special actions which are involved in metabolism.
21. How does the lack or excess of hormones influence the human body?
22. What are plant hormones, alkaloids and antibiotics? What is their role in plant life and the practical human activity?
23. What are nucleic acids? What is the difference in the structure of deoxyribonucleic acid (DNA) and ribonucleic acid (RNA)?
24. Describe the spatial structure of the DNA molecule. What is denaturation and renaturation of the molecule?
25. What is vital is the function of DNA in the living organisms? What is a gene?
26. What is the difference between informational, transportal and ribosomal RNA?
27. What is ATP, its role in the transformation of energy in the cell?



CELLULAR LEVEL OF LIFE

Cytology

1. Why is a living cell called the smallest structural and functional unit of living organisms? What are the similarities and differentialities in structure of unicellular, colonial and multicellular organisms?
2. What are the main principles of the cell theory?
3. What are the methods for studying cells? Describe them.
4. What are the living organisms that belong to the prokaryotes? What are the peculiarities of structure of prokaryotic cells? How is asexual reproduction and syngensis in prokaryotes made?
5. What is the biological significance of sporification and nistana of bacteria?
6. What are the differences between the structure of prokaryotic cells and eukaryotes?
7. General plan of structure of eukaryotic cells.
8. Surface device, its structure.
9. What structure do the biological membranes have? The functions of membranes.
10. How are the active and passive transport is formed through the outer membrane?
11. How is the phagocytosis and pinocytosis made?
12. On what account do the biological membranes perform signal and protective functions?
13. What structures are referred to over membrane components? Structure and function of the cell wall in plants. Features of the structure of fungi and bacteria.
14. What is glycocalyx?
15. The phenomenon of plasmolysis and deplasmolisis in plants.
16. What structure do the micro thread and microtubules have? What function do they perform in the cell? Why is in the cells of unicellular organisms pelicula is

under the membrane ?

17. What structural components are the part of the cytoplasm?

18. Cytosol, its physical and chemical composition and properties.

19. What organelles are related to single-membrane ?

20. Endoplasmic reticulum , its structure and role in maintaining vital processes which have occurred in the cell.

21. The structure and function of the Golgi complex.

22. Lysosomes, their types and functions of each.

23. Vacuoles, their types and value for living organisms.

24. What cell organelles are referred to double-membrane?

25. What is the mitochondria, its structure and role in the energy metabolism of organisms?

26. Plastids, their types, structure and role of chloroplasts, chromoplasts and leucoplasts plants?

27. Why mitochondria and plastids are capable of autonomy?

28. Describe the structure of the kernel. What function does the kernel perform?

29. What is a karyotype? What is a chromosome? What is haploid, diploid and polyploid set of chromosomes, homologous and not homologous chromosomes?

Why sex chromosomes in order of organisms are hetero-hromosome?

30. Name the organelles that belong to the group of non-membrane .

31. What are the ribosomes, their role in the metabolism of plastic?

32. Cell inclusion, their types and importance for plants and animals.

33. Describe the organelle of movement in unicellular organisms.

34. What is the difference in the structure of plant cell from animal cell?

35. The division of cells. Mitotic cell division, its stages.

36. Meiosis, its stages and importance of living organisms.

METABOLISM AND THE ENERGY OF CONVERSION IN ORGANISM

37. What is metabolism, its two sides and their importance for living organisms?

38. What groups are divided into living organisms by nourishment and energy sources?

39. Energy metabolism, its stages. The preparatory phase, the role of enzymes in the cleavage of biopolymers.

40. What is the oxygen-free (anaerobic) phase of energy metabolism in the cell where is it located? Glycolysis, its biological significance.

41. The essence of the fermentation, its types, energy balance and importance in the food industry.

42. Where and under which conditions is the oxygen (aerobic) phase of energy exchange carried out? What is the nature and the biological significance of the Krebs cycle?

43. What are the processes occurring in the inner membrane of mitochondria? Describe how the synthesis of ATP is carried out.

44. What is the energy balance of the final phase of the power exchange and complete cleavage of one molecule of glucose?

45. Plastic exchange or assimilation, name its main processes.

46. Biosynthesis of protein. What cell organelles contain information about the primary structure of proteins, and in which biosynthesis is directly occurring?

47. What is the genetic code, its properties? The concept of the gene. Structural and regulatory genes. Exons and introns.

48. Name the main stages of protein biosynthesis in succession. What is the role of RNA molecules in this process?

49. Describe the process of transcription. What is the replication?

50. How is the process of translation occurs? On what organelles do the cells do the synthesis of polypeptide chain? Why do there codon and anticodon exist? What is

a complex initiative? What triplets signal the end and beginning of the polypeptide chain synthesis?

51. Where is the final stage of protein molecule synthesis occurs?

52. What is the difference in the synthesis of carbohydrates in autotrophic and heterotrophic organisms?

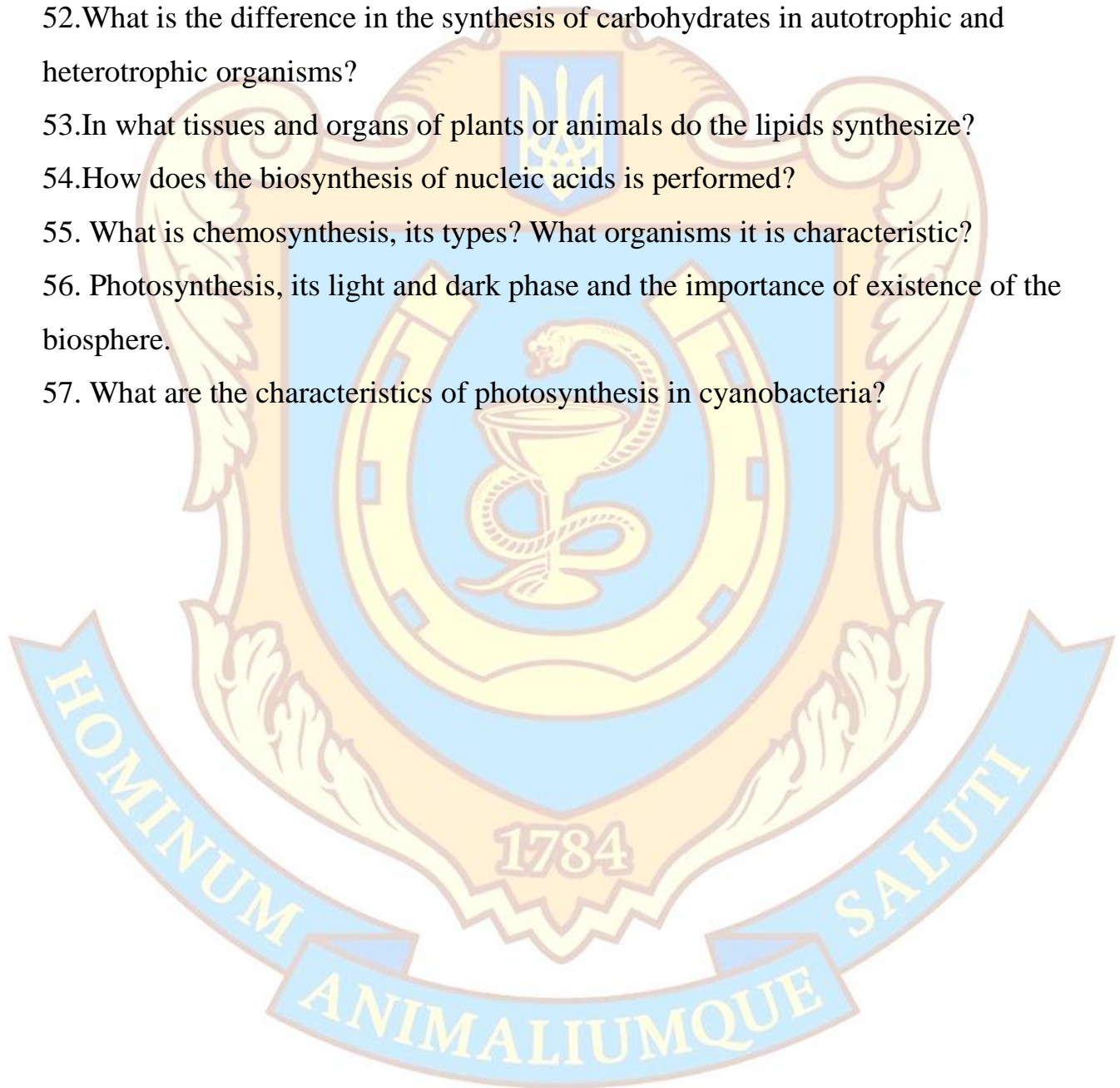
53. In what tissues and organs of plants or animals do the lipids synthesize?

54. How does the biosynthesis of nucleic acids is performed?

55. What is chemosynthesis, its types? What organisms it is characteristic?

56. Photosynthesis, its light and dark phase and the importance of existence of the biosphere.

57. What are the characteristics of photosynthesis in cyanobacteria?



Non-cellular forms of life

1. Viruses as non-cellular life forms, their place in the system of organic world.

Features of their structure and function. What is the mechanism of penetration of viruses in cells and how do viruses reproduce?

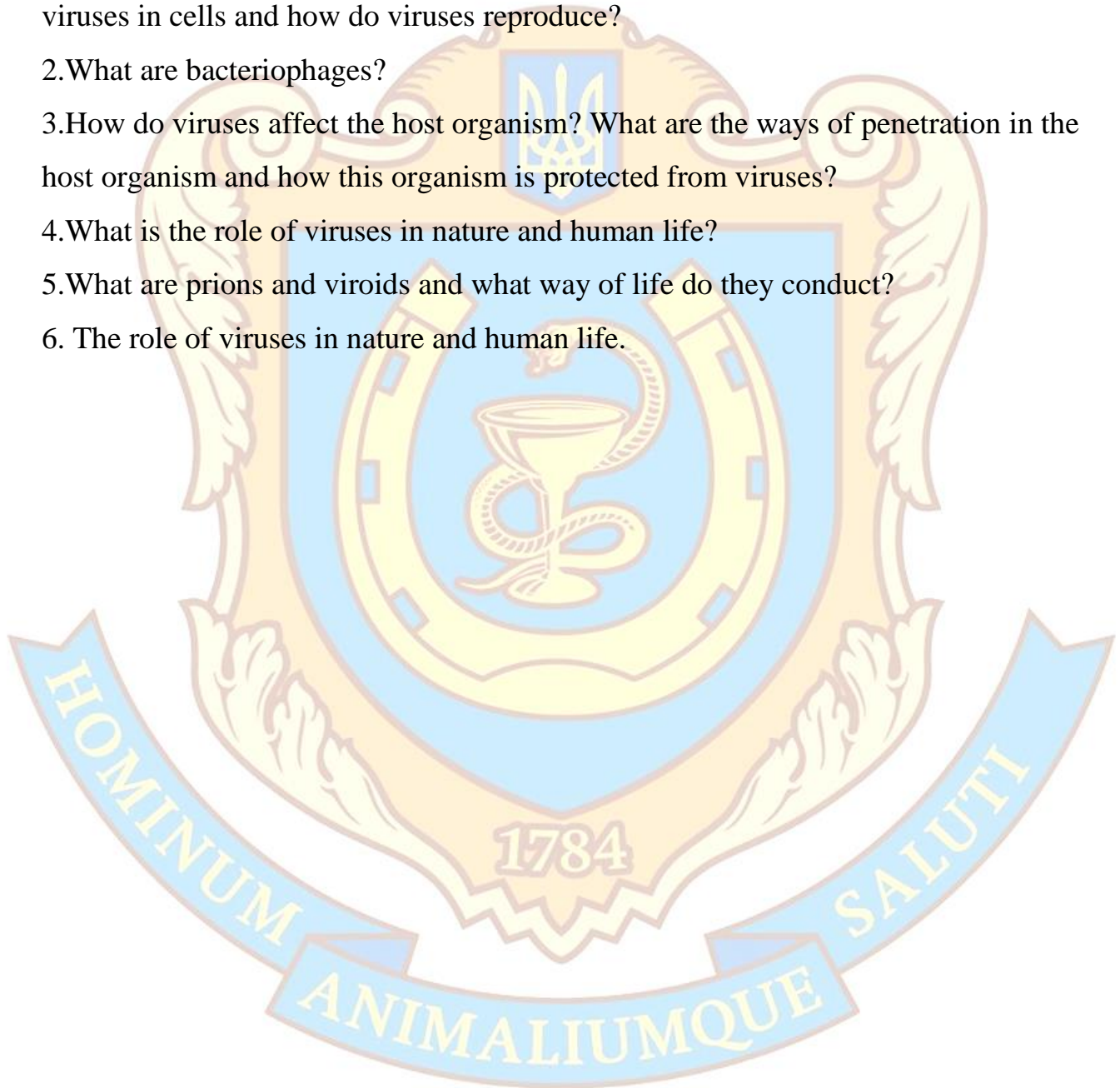
2. What are bacteriophages?

3. How do viruses affect the host organism? What are the ways of penetration in the host organism and how this organism is protected from viruses?

4. What is the role of viruses in nature and human life?

5. What are prions and viroids and what way of life do they conduct?

6. The role of viruses in nature and human life.



Levels of Organization of living things Prokaryotes

7. Monera Kingdom, structural features and representatives.

8. Describe the classification of bacteria in the way of nutrition?

9. What ways of reproduction of bacteria do you know and what is their essence?

How is the exchange of genetic information in bacteria conducted?

10. What is a suspended animation?

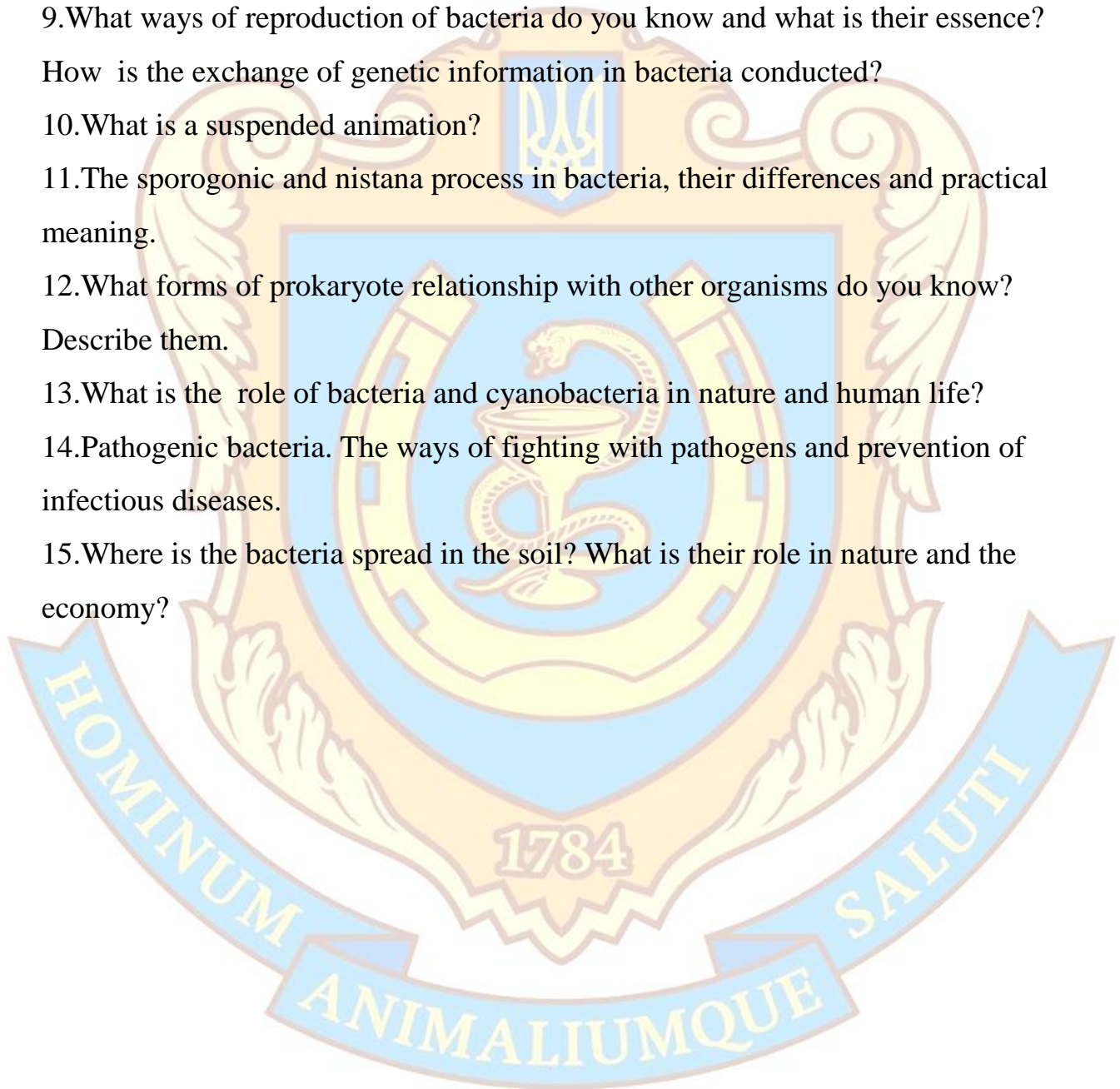
11. The sporogonic and nistana process in bacteria, their differences and practical meaning.

12. What forms of prokaryote relationship with other organisms do you know? Describe them.

13. What is the role of bacteria and cyanobacteria in nature and human life?

14. Pathogenic bacteria. The ways of fighting with pathogens and prevention of infectious diseases.

15. Where is the bacteria spread in the soil? What is their role in nature and the economy?



PLANTS

16. What does the science of botany study?, Its sections and correlation with other sciences.

17. Which cells belong to the prokaryotic and eukaryotic, their structure and characteristics of life. What organisms are peculiar for them ?

18. How are the functionally active parts of living cells called? Can you list them?

19. What are the common features and differences in the structure of plant and animal cells?

20. Plastids, their types, structure and value of cell plastids of each type.

21. From what is the cell wall built?, Its repeated chemical modification and importance for plants?

22. Vacuoles, their role in the life of the plant. Name the chemical composition of the cell sap.

23. Define the plant tissue. What groups are they divided according to their physiological and morphological classification? Meristem, its structure and importance in the life of the plant.

24. Epidermis cells, their division into groups depending on the origin.

25. What are the major tissue types divided according to the functions performed.

26. Mechanical and vascular tissues, The peculiarities of their structure and importance for plants.

27. What are the main organs of the body of Streptophyta? What is their function?

28. What are modifications of root developed as a result of laying in it nutrients? In what plants are they formed.

29. Root symbiosis with bacteria (bacteriorhiza) and fungi (mycorrhiza). Its biological and practical meaning.

30. What the roots for the origin do you know and where do they develop on the plant?

31. What are the types of root systems, and on what grounds do they differ? What are the typical representatives.?

32. Name the morphological and genetic root zones consistently and what functions do they perform?

33. Describe the initial anatomic structure of the root. What parts does it consist of?

34. What is a shoot, its structure (node, internode and leaf axils)?

35. The concept of living -forms of plants.

36. Bud, its structure, types and value for the plants.

37. What function does the stem perform in the body of the plant?. What types of stems are distinguished by the form of growth and the cross-cut? Give the examples of plants.

38. Describe the secondary anatomic structure of woody plant stems. What are the annual rings of the wood and how are they formed?

39. What overground and underground modifications of shoot do you know and on what plants do they develop? Their practical value.

40. What is the value of the leaf for plant life?

41. Features of morphological structure of the leaf. What kind of leaf blade is distinguished in simple leaves? Give examples.

42. The peculiarities of structure of compound leaf, its types and examples.

43. What types of simple leaves are differentiated by degree of dissection of leaf plate? Give examples.

44. Describe the anatomical structure of the leaf.

45. What is the essence of the process of photosynthesis?

46. What modifications of leaves do you know? Give examples.

47. What is vegetative reproduction? What is its value in horticulture, floriculture and agriculture?

48. What is the value of the flower in the plant life?

What are the components of the structure of the flower. What is perianth, its types and value for plants.

49. What androecium? The structure of the stamens and pollen grains.

50. What plants are called monoecious and dioecious Give examples

51. What structure does the pistil have and the ovul which is located in it?

52. Describe the structure of octocyclic embryonic sac.

53. Inflorescence. The peculiarities of the structure of simple and complex inflorescences. Give examples.

54. The process of pollination, its types. Cross-pollination, its types For which representatives of flora is it peculiar?

55. Selfing, its distribution and role in the nature. The Reasons for using artificial pollination?

56. Why is fertilization in plants called dual and how does it happen?

57. What structure does the seed have which is characteristic for double-seed plants?

58. What is the structure of the one-seed plants?

59. From which organ of the flower is the fruit shaped? Its structure and what function does it perform?

60. Describe the peculiarities of morphological classification of fruits, and name the examples of plants.

61. What is the essence of modern systematics of organic world? What is binary nomenclature and for what purpose is it used?

62. Describe the current system of classification of algae.

63. Green Algae. Structure and development cycle of Chlamydomonas, Chlorella and spirogyra, their distribution and importance.

64. Filamentous algae, and structural features of reproduction, distribution and value.

65. What departments are characterized as: brown, red, diatom algae, especially their life and structure. Representatives and practical value.

66. What is the feature of higher plants, their classification, the peculiarities of distribution on the planet.

67. Describe the department of mossy on the example of cuckoo flax. Distribution of mosses and practical value.

68. What are the structural features of the development cycle and sphagnum moss. How is the peat formed? Its value to humans.

69. What are the characteristic features of structure and development cycle of such representatives: the Horsetail (on the example of the field horsetail). Its value.

70. Describe the Lycopodiopsida on the example of *Lycopodium clavatum*.

71. What features in the cycle of reproduction are characteristic to fern representatives?

72. Describe the cycle of gymnosperms on the example of a pine. The structure of the male cone and pollen, female cone and seed germ. Fertilization and seed formation, its structure.

73. What are the representatives of conifers that are common in our region and their value for natural biogeocenosis? The value of coniferous in the farm.

74. What is the advantage of angiosperm plants over other parts of the plants? Specify the characteristic members of this department

75. Describe the classes of Monocotyledon and Dicotyledon plants.

76. Brassicaceae family, its general characteristics, the scientific names of representatives and their economic importance.

77. Rosaceae family, its general characteristics, the scientific names of representatives and their economic importance.

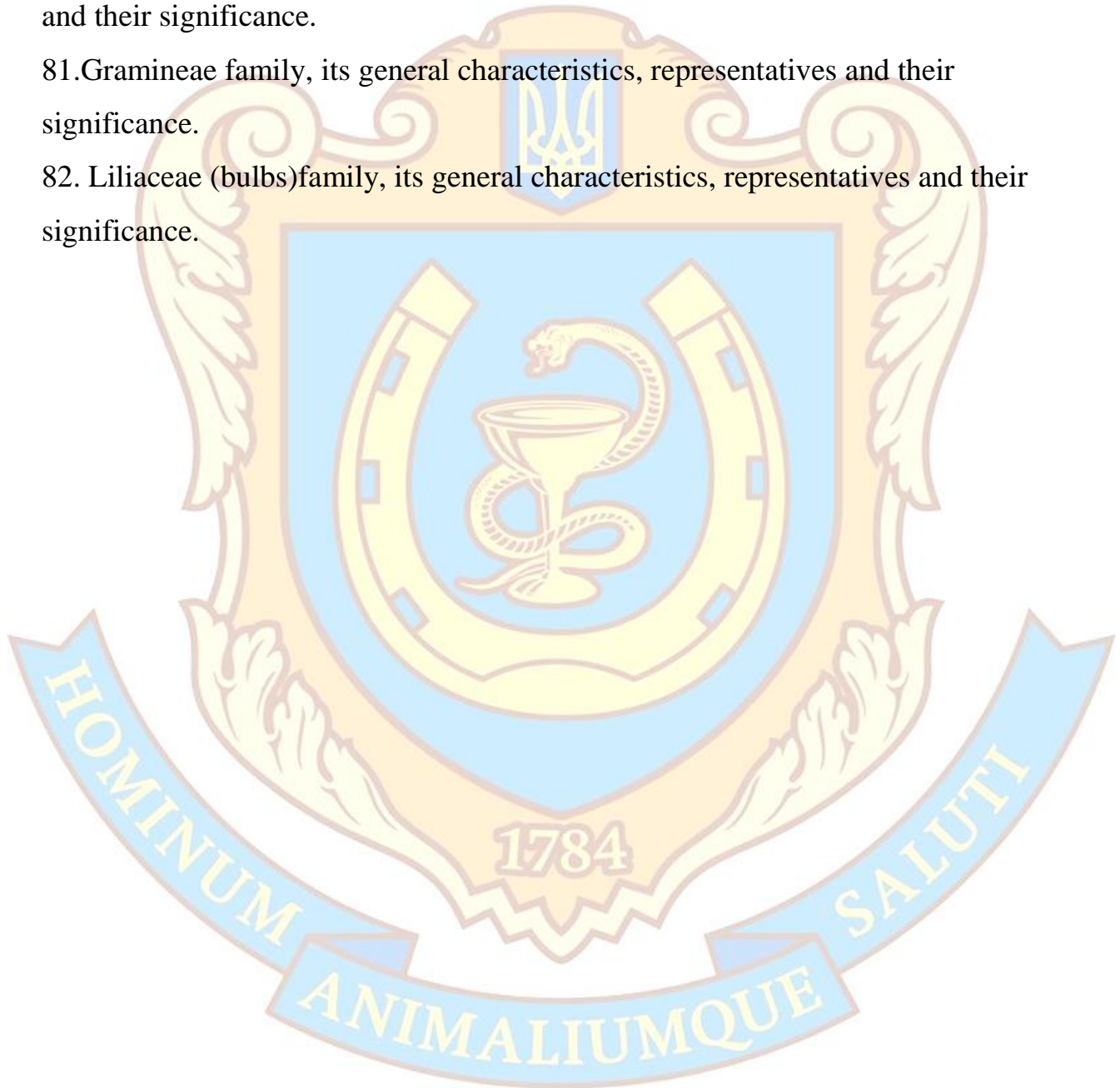
78. Fabaceae family, its general characteristics, the scientific names of representatives and their economic importance.

79.Compositae family, its general characteristics, representatives and their significance.

80.Solanaceae and cruciferae family, their general characteristics, representatives and their significance.

81.Gramineae family, its general characteristics, representatives and their significance.

82. Liliaceae (bulbs)family, its general characteristics, representatives and their significance.



Fungus. Lichenes

83. On which groups is the fungus divided by the way of nutrition?

84. What forms of reproduction are typical for fungus?

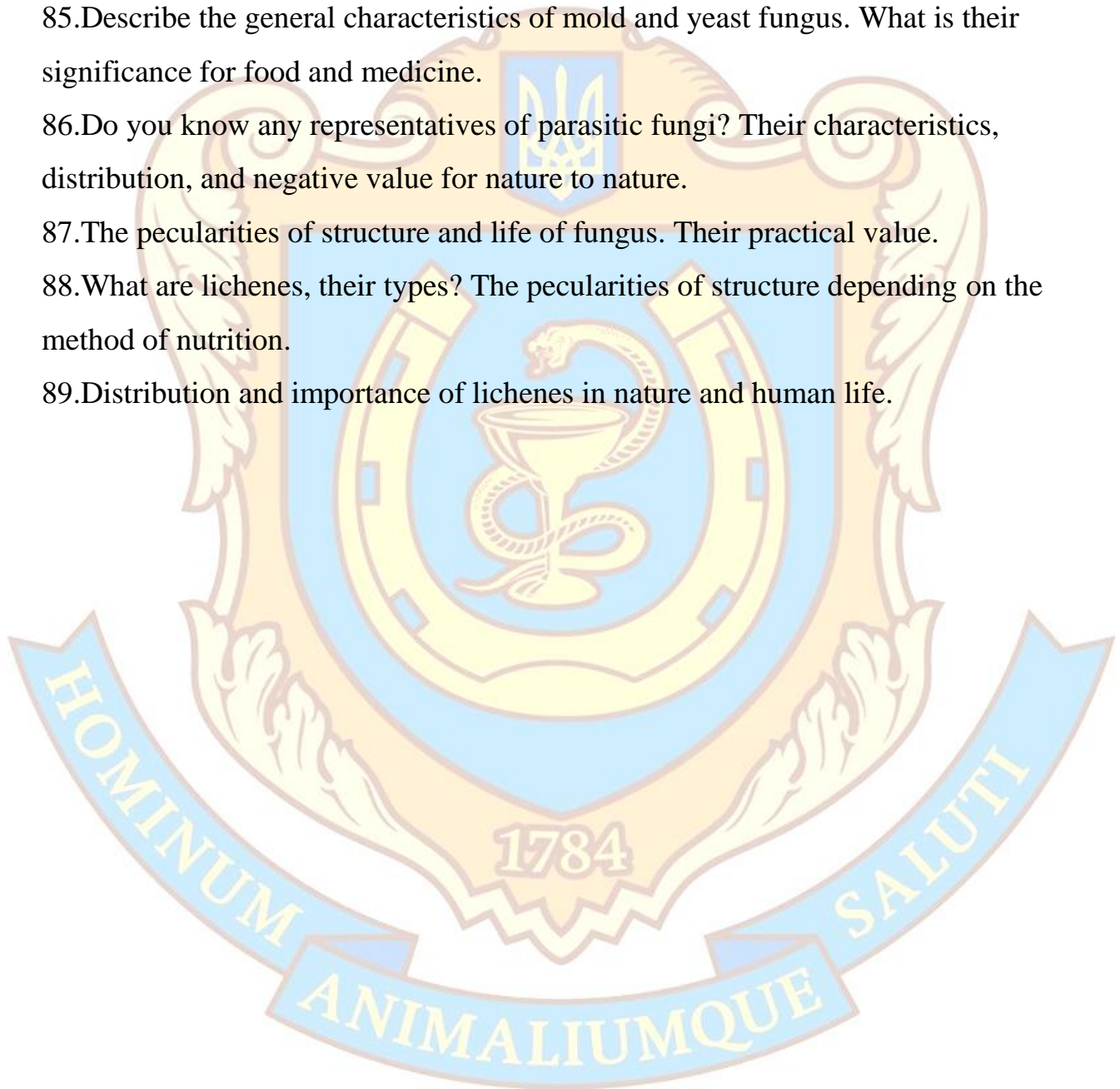
85. Describe the general characteristics of mold and yeast fungus. What is their significance for food and medicine.

86. Do you know any representatives of parasitic fungi? Their characteristics, distribution, and negative value for nature.

87. The peculiarities of structure and life of fungus. Their practical value.

88. What are lichenes, their types? The peculiarities of structure depending on the method of nutrition.

89. Distribution and importance of lichenes in nature and human life.



ANIMALIA

1. What are the main taxonomic units of natural systems of fauna.
2. What are the characteristics of unicellular animals?
3. How and what do the protists do? Types of nutrition of protist.
4. What are the known methods of reproduction in unicellular animals?
5. Describe the types of asexual reproduction in unicellular animals.
6. Types of sexual reproduction of unicellular animals. Examples.
7. What ways of adaptation does the protist have in order to survive in adverse environmental conditions? What is the meaning of nistana in protist living?
8. What is taxis? Types of taxis. Examples.
9. What are the features of large and small kernel in *Paramecium caudatum*?
10. What is regeneration? Give examples.
11. What types of digestion are observed in diploblastic animals?
12. Name the system of organs which are formed in flatworm?
13. How the structure of the nervous system of flatworm is different from the structure of the nervous system of coelenterates.
14. What adjustments to the parasitic lifestyle emerged in cestoda worms?
15. Describe the class of cestoda worms. Name the representatives of this class.
16. Describe the structure and the life cycle of *taeniarhynchus saginatus*.
17. Describe the structure and the life cycle of *taenia solium*.
18. What are the measures of fight and prevention from diseases being caused by heminth?
19. List the characteristics of the Nematodes type.
20. Name the nematodes - human and animal parasites.
21. Name root knot nematod and what is their damage for Plant cultivation?
22. Describe the role of earthworms in soil formation processes.
23. What are the characteristic features of annelid?

24. How important is annelid for human and nature?
25. The peculiarities of structure of mollusc. The main classes of mollusc type.
26. Gastropoda molluscs – interim nourishment of parasitic worms and pests of plants.
27. Characteristic features of crustaceans representatives.
28. The peculiarities of structure and reproduction of crustaceans. Their importance
29. Describe the basic features of Arthropoda type. What subtypes and classes does this type share?
30. Describe the class of arachnids. What are representatives that belong to this class?
31. What types of evolution of insects you know? Examples.
32. List the insects with complete and incomplete metamorphosis. Name representatives.
33. What types of ticks are pathogens of human and domestic animals.
34. Insects - pests of agricultural crops.
35. Describe the external and internal structure of insects ..
36. The main structural features of amphioxus. The value of O.O.Kovalevskoho study of learning Cephalochordata animals.
37. Describe the features of the structure of the nervous system of fish and their behavior.
38. Give the general characteristics of fish sub-class and their taxonomy.
39. What is the structure of the circulatory system in cartilaginous and bony fish?
40. What is the economic importance of fish?
41. Give a general description of the amphibia class.
42. Name the orders that belong to Amphibia class and their representatives.
43. Describe the circulatory system of amphibians.
44. Describe the changes that have taken place in the sense organs of amphibians

in connection with their coming out to land.

45.Reproduction and evolution of amphibians.

46.Name the order of reptiles and their representatives. Their Value.

47.What species of reptiles do you know?

48.Compare the mechanism of breathing of frogs and lizards.

49.Name the signs of suitability of birds to fly.

50.Give the general characteristics of Aves Class.

51.Describe the mechanism of double breathing in birds.

52.Features of breeding birds. Give examples.

53.Describe the skeleton of birds.

54.What environmental groups of birds do you know?

55.The poultry category. Poultry.

56.What are the characteristic features of the structure of the mammal class in connection with their way of life.

57.What progressive features are characteristic for mammals?

58.How the digestive system of mammals is built?

59.Describe the nervous system and sense organs of mammals.

60.The respiratory system of mammals.

61.The peculiarities of structure of genitourinary system of mammals.

62.Name the order of mammals. Representatives and their value.

63. Describe the order of rodents. What is their importance in nature and human life?

64.Mammals - pests of agriculture.

65.What are the representatives of predatory order and give them a description.

66.Describe the skeleton of mammals.

HUMAN BIOLOGY

- 1.The concept of physiological and functional systems. What is the versatility of organs and physiological systems?
2. Neurohumoral regulation of physiological functions of the human body. What functions does the nervous system have?
- 3.What is a reflex, what kinds of reflex do you know ? What is the reflex arc?
- 4.Features of functioning autonomic (vegetative) nervous system. The hypothalamus - as the highest integrative center of autonomic functions.
- 5.What is the function of humoral regulation? Hormones and their performance.
6. Name the endocrine and exocrine glands. The role of pancreas.
- 7.What do pituitary hormones do?
- 8.Thyroid and parathyroid hormones and their regulating effect on physiological processes.
- 9.Hormones of cerebral and adrenal cortical layers of suprarenalis and their role in the organism.
- 10.The value of the blood in the body. Structure of blood, blood plasma.
- 11.The structure and function of red blood cells. What is the role of hemoglobin, what is anemia?
- 12.Describe the process of blood coagulation. Blood.types, Blood Transfusion. What is Rh factor?
- 13.White blood cells, their structure and function. What is leukocytosis and leukopenia?
14. Define the concept of "immunity". What function do the T-lymphocytes perform? Describe the types of immunity.
15. The value of circulation. The properties of the heart muscle. What is the role of automaticity of the heart?
- 16.What is the cardiac cycle? The concept of systolic and cardiac output

17. How is the heart self-regulating? Nervous and humoral regulation of the heart.

18. How is the immediate flow of blood through the vessels supplied? Circulatory system and pulmonary circulation.

19. Blood pressure. What is the role and difference of the pressure in different parts of the cardiovascular system? What is meant by the definition of "arterial pulse"?

20. What is a heart arrhythmia? What vascular diseases do you know?

21. General characteristics of the processes of respiration. The significance of breathing for the human organism

22. Gas exchange in lungs and tissues. The Composition of inhaled, exhaled and alveolar air. How blood is saturated with oxygen and gets rid of carbon dioxide?

23. What is vital lung capacity? What is the device which measures the lung capacity is called?

24. How is nervous and humoral regulation of respiratory movements put into practice? Describe the main respiratory reflexes.

25. The value of digestion. What are the main functions of the digestive system?

26. The peculiarities of digestion in the oral cavity and stomach. How is salivation put into practice? The regulation of gastric juice.

27. Digestion in the small intestine. What are the main functions of the small intestine? What is the role of bile in digestion?

28. How is the absorption of nutrients put into practice in the intestine? What is the role of microorganisms in the large intestine?

29. The biological significance of metabolism and energy. What is the functional significance of nutrients in the organism?

30. What is the role of proteins in the body? How is the exchanging of proteins put into practice?

31. How is the exchanging of carbohydrates put into practice? How is the constant level of glucose regulated in blood?

32. Exchange of fat. What is the role of fat in the organism?
33. What is the role of water in the organism? The value of minerals in the organism. Nervous and humoral regulation of metabolism.
34. Vitamins, their importance in metabolism. How to preserve vitamins in food?
35. What does the allocation of metabolic products from the organism? The mechanism of formation of urine in the kidneys. What is primary and secondary urine?
36. The functions of the skin. The role of the skin in the heat regulation. What is thermoregulation?
37. Give the definition of "sensory systems". Classification of sensory systems.
38. The significance of sight. What does the membrane of the eye do? What does the pupil do? What causes the development of hyperopia? What is astigmatism?
39. Auditory sensory system and its significance. How are the sound waves converted into nerve impulses? The Hygiene of hearing.
40. Describe the taste and olfactory sensory systems. How are the odors perceived? How does the sense of taste appear?
41. Describe the sensory systems of balance, movement, touch, temperature and pain.
42. The general concept of higher nervous activity. What are conditioned and unconditioned reflex activities? The main method of studying higher nervous activity.
43. What is the difference between conditioned and unconditioned reflexes? What is the mechanism of formation of conditioned reflexes?
44. Types and forms of conditioned reflexes. What are conditioned reflexes of higher order?
45. The Inhibition of conditioned reflexes. What are the kinds of internal inhibition? The relationship of excitation and inhibition in the cortex of the brain.

46. What is the dynamic stereotype? Describe the first and second signal systems of a human.
47. What types of memory do you know? What is the difference between human and animal memory? The development of the memory.
48. Emotions and motivation. What is the difference between human and animal emotions?
49. Biological bases of psychophysiological individuality. What is the relationship between the types of nervous system and temperament?
50. What is the biological significance of a dream? What phases of sleep, do you know?
51. The structure of male and female genitalia. Maturing of gametes. What is the significance of sex steroids?
52. Fertilization and prenatal development. What is placenta and its role in the development of the fetus?
53. The age-specific development of the human. What is the impact on growth of hypophysis hormones? What does the science of gerontology study?



Reproduction and individual development of organisms

1. What is propagation? What types of reproduction are known in living organisms?
2. What asexual propagation characteristics do you know?
3. Describe the types of vegetative reproduction in plants and animals.
4. What is Polyembryony and parthenogenesis?
5. The biological significance of asexual and vegetative reproduction and parthenogenesis.
6. What is a cell cycle? Interphase, its periods. Mitosis, its phases and biological significance.
7. What is sexual reproduction? What are the forms of the sexual process?
8. What cells are called sex cells and what is their structure?
9. What shows the division of sex and hermaphrodite phenomenon in plants and animals? What is their biological significance?
10. Meiosis, its essence. The biological significance of meiosis and its role in the life cycle of living organisms.
11. During meiosis haploid germ sex cells are formed as a result of what?
12. What is gametogenesis? How do the processes of formation of spermatozoons and ovules occur in animals?
13. Fertilization, its types. What is external and internal fertilization? Why the process of fertilization in plants is called double ?
14. Ontogenesis, its periods and stages.
15. What stages are extracted in the process of embryonic development of an animal? What is cell-division of zygote? Explain the process of formation of the embryo at the stage of blastula and gastrula? What is the difference between blastula and the morula?
16. What is the differentiation of cells? What is the process of organogenesis and histogenesis in the embryo animal?

17. What are the types of postembryonic development of an animal?

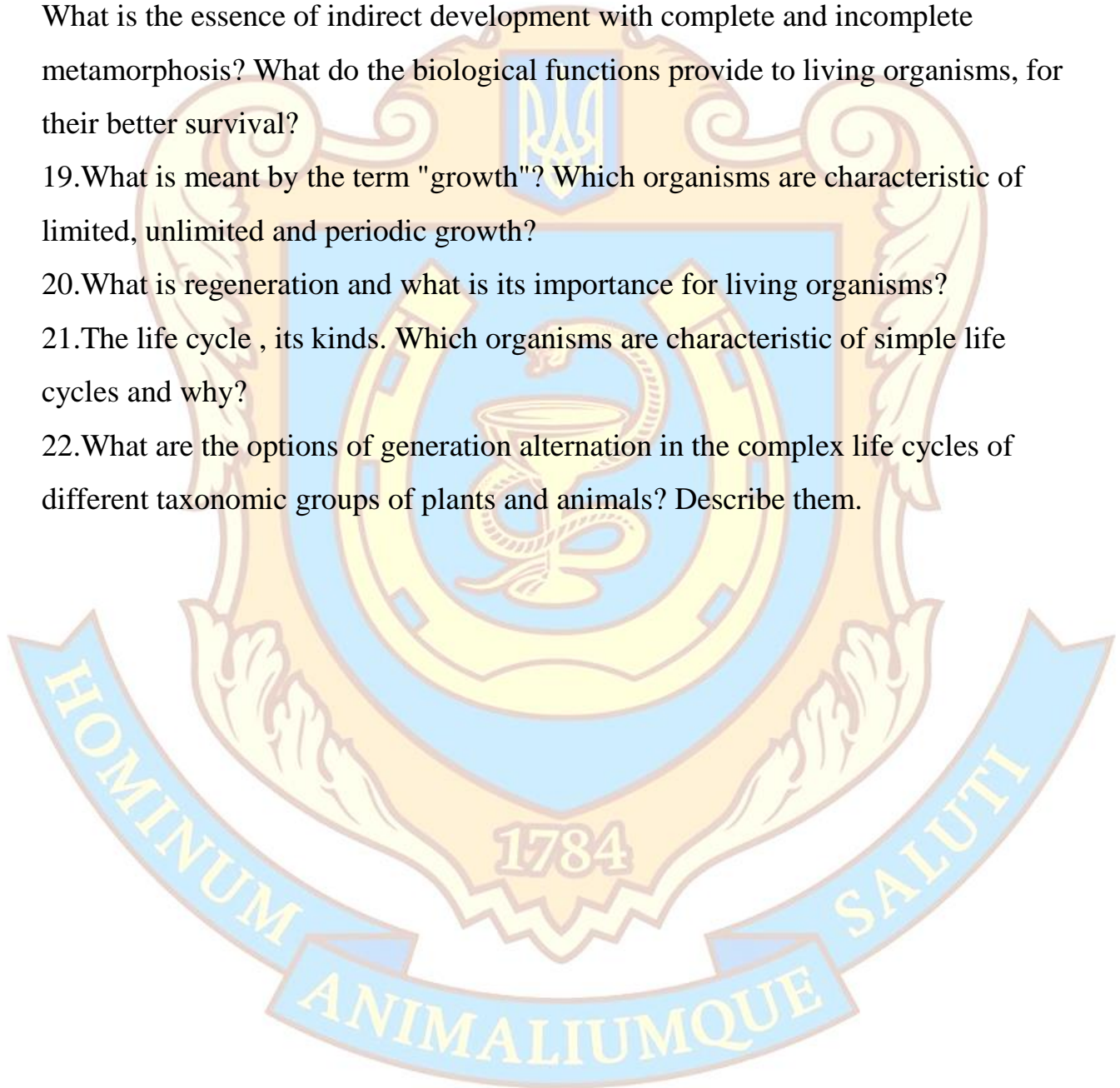
18. How is the direct postembryonic development put into practice in different groups of animals? What is Parthenogenesis, embryonation and embryogenesis? What is the essence of indirect development with complete and incomplete metamorphosis? What do the biological functions provide to living organisms, for their better survival?

19. What is meant by the term "growth"? Which organisms are characteristic of limited, unlimited and periodic growth?

20. What is regeneration and what is its importance for living organisms?

21. The life cycle, its kinds. Which organisms are characteristic of simple life cycles and why?

22. What are the options of generation alternation in the complex life cycles of different taxonomic groups of plants and animals? Describe them.



GENETICS. THE BASIS OF SELECTION

23. What does the science of genetics study?
24. The gene as basic unit of heredity, allelic genes and dominance genetics.
25. What is the genotype and phenotype, heredity and genetic variability?
26. Describe the research methods used in genetics.
27. What is the significance of genetics in practical human activity?
28. What research has Gregor Mendel conducted? What is a pure line, homozygous and heterozygous individuals, mono-, di- and polyhybrid cross?
29. State the law of Segregation (the first law of Mendel).
30. What is the essence of the second law of Mendel (Law of Independent Assortment)?
31. On the example of Mendel's third law (the law of dominance).
32. What is the essence of the law of purity of gametes?
33. Describe on the example cytological basics and the statistical law of heredity. What is the Punnett Square and how is it used?
34. Recombination and its role in the inheritance of traits.
35. What phenomenon is called incomplete dominance? How is the interim nature of inheritance displayed?
36. What is a test cross and when is it used?
37. What are the known lethal genes? Give an example of crossing related to the lethal gene.
38. What are the provisions of law based on independent assortment states?
39. Which genes form a genetic linkage group? How and when was the phenomenon of genetic linkage discovered?
40. What is crossing over, its role in genetic linkage?
41. How are genetic maps of chromosomes made?
42. Put the main provisions of the chromosome theory of heredity.

43. How and when is the gender in different groups of organisms determined?

What chromosomes are called sex?

44. Give examples non chromosome sex determination.

45. What is the mechanism of chromosomal sex determination?

46. In which animals the females or males are heterochromosome?

47. What is the ratio of males and females stored in the population?

48. What is a sex-linked inheritance? How some disease linked to sex are transmitted by humans?

49. Explain what is a gene and its kinds.

50. The genome and its organization in different organisms.

51. What is the cytoplasmic (outside nuclear) inheritance and how it manifests in plants and other living organisms?

52. How do nonallelic genes interact and what effect does it have on the phenotype of an individual?

53. How is the inheritance of blood group put into practice?

54. Give an example of epistasis interaction of genes.

55. How is a complementary interaction of genes in a phenotype shown?

56. How is multiple action of genes shown?

57. What is basis of genotype integrity?

58. Variability, its types.

59. What is a phenotypic plasticity and what properties does it inherent?

60. What is the rate of reaction? Why is the variation range and variation curve used? The biological significance of variability modification.

61. What has linked the emergence of combinational variability?

62. What is mutational variability? What mutations are distinguished depending on the impact on the livelihoods of organisms?

63. What are genomic, chromosomal and gene mutations?

64. What impact on living organisms do different origin mutational factors have?

65. What is a spontaneous mutation? Are the living organisms capable of resisting mutations?

66. Describe the properties of mutations. What is their significance in nature and human life?

67. What is the essence of the law of homologous orders of genetic variability? What is its theoretical and practical importance?

68. Selective breeding as a science, its objectives and methods. What is breed, plant cultivar, stamm of microorganisms?

69. Describe the techniques used in breeding.

70. What is the hybridization and its types? Intraspecific crossing, its types. Explain the phenomenon of heterosis.

71. Remote hybridization, its advantages and disadvantages. Why hybrids are often sterile and how to overcome it.

72. What are centers of origin and diversity of cultivated plants allocated M.I. Vavilov?

73. Why is it difficult to determine the areas of origin and domestication of domestic animals? What pets, birds and insects were domesticated by people and who were their ancestors? What are the main directions of their selection?

74. Describe the types of plant selective breeding.

75. What are the features of selective breeding?

76. Describe the types of selective breeding in microorganisms. What is its significance for practical human activity?

77. What does the science of biotechnology study, what is its practical application?

78. What are genetic and cellular engineering, their objectives, methods and practical meaning?



ABOVE-ORGANISM LEVEL OF LIFE

PRINCIPLES OF ECOLOGY

- 1.The science of ecology, its object and purpose. Sections of Ecology, its tendency and research methods.
- 2.Environmental factors, their classification and effect on the organism. What is adaptation?
- 3.What is the essence of optimum law? What is the limit of endurance?
- 4.What is the law of interaction and mutual compensation of environmental factors?
- 5.What are the factors that determine the boundaries of dissemination of living organisms? Give examples. What is the essence of the law of tolerance?
- 6.What are biotic factors? What are the interactions of living organisms with each other? Give examples.
- 7.Competition, its types and value in nature.
8. Predation, its biological role.
- 9.In what do neutral relationships appear between living organisms?
- 10.What is the difference between mutualism and symbiosis? Give examples.
- 11.What is the peculiarity of parasitism?
- 12.What is the peculiarity of Commensalism? In what appears symbiosis?
- 13.What is allelopathy? For what living organisms is it characteristic?
- 14.How do living organisms adapt to the different impacts of climatic factors, including temperature? What animals belong to poikilothermy and homeothermy?
- 15.Thermoregulation and its types.
- 16.What organisms belong to crymophylactic and thermophilic? What is suspended animation and for what organisms is it characteristic?
- 17.What adaptations occur in living organisms under various humidity conditions of habitat?

18. What is the impact of the sun's rays with different wavelengths on living organisms?
19. What kinds of animals belong to diurnal, nocturnal and crepuscular? why?
20. The value of the gas composition of the atmosphere for the inhabitants of the land?
21. What are the types of adaptive biological rhythms?
22. What is infradian, ultradian, tidal and lunar seasonal adaptive biological rhythms? What is the biological clock?
23. What is the biological significance of photoperiodism?
24. What are the ways of adapting organisms to changes in environment?
25. What is the habitat of the organism? Describe the land-air environment. What factors play a major role in dissemination of organisms in this environment? How do these factors affect the lives of the organisms?
26. Water Environment and its properties.
27. Name and describe the major groups of aquatic organisms, plankton, benthos, Nekton, periphyton and neuston.
28. What characterizes the soil as a habitat of living organisms and what are the adaptive signs of organisms living in the soil environment?
29. Why are living organisms called as special habitat?
30. Species, its environmental characteristics. What is the ecological niche and place of habitat existence?
31. The life form. Which life forms are distinguished among the plants and animals? Give examples.
32. What is the population and which indicators describe its condition? Describe them.
33. Describe gender, spatial and age structure of the population.
34. What ethological structure of the population?

35. What are seasonal and non seasonal population waves, their impact on population size?
36. What is the size, solidity and population density? What determines the growth of the population? What is the capacity of the environment?
37. How are changes in population affected by intensity actions of climatic factors and the relationship with the populations of other species?
38. Does the territorial behavior of animals have an effect on the density of the population and why? Give proofs.
39. What is the population homeostasis?
40. What is the difference between the ecosystem and biogeocoenosis?
41. What are the indicators characterizing biocenose? Why phytocoenosis defines the boundaries of biocenose? What determines species diversity of ecological community? What is the dominant species? How to determine the biomass and biocenose productivity?
42. What determines spatial and species structure of biocenose?
43. Ecological structure of biocenose. What are autotrophs?
44. On what groups are divided heterotrophic organisms? What are saprophages, predators and parasites? What organisms belong to mixotroph?
45. What are phytophagous and polihagy?
46. Describe mutually beneficial, neutral and antagonistic relationships that exist between populations of organisms in the biocenose.
47. Biogeocoenosis and its structure. What components are the parts of the abiotic elements?
48. What is the biotic part of biogeocoenose? Why are producers underlying in biocenose?
49. What are the properties of biocenosis that were formed in the course of their evolutionary formation? Describe them.

50. What is a food chain? From what trophic levels do they consist? Why green plants are paramount in power circuits and in which direction the flow of energy is made in food chains?

51. What is the difference between grazing and detritus food chain? Give examples. What is a web trophic?

52. How is the transformation and absorption of energy at each stage of its transmission in biogeocoenose put into practice?

53. How is the transformation and absorption of energy obtained from food Consumer and order?

54. What is the rule of ecological pyramid? What does the pyramid of biomass energy and numbers? Make a pyramid of each type.

55. What causes cyclic and progressive changes occurring in biogeocoenose?

56. What is ecological succession? Primary ecological succession. Explain how does secondary ecological succession appear?

57. How are stable mature biogeocoenoses formed? Describe the main stages of ecological succession.

58. What is agrocenosis? From what links are they formed and how?

59. Describe the membranes that surround the Earth.

60. V.I Vernadskyi and his theory of the noosphere. In what areas ecological thinking should be directed?

61. What is a living matter and its properties?

62. What are gas, redox and concentration functions of a living matter?

63. What is the biogenic and abiogenic migration of atoms?

64. How is the circulation of water made in the biosphere?

65. Describe oxygen circulation in the biosphere.

66. What is typical for circulation of carbon?

67. Describe the circulation of nitrogen in the biosphere.

68. How do sedimentary rocks form? What is the role of the living organisms in soil formation processes?

69. How does the gas composition of the atmosphere depend on the activity of living organisms?

70. List the problems that were generated by human activity in the biosphere.

71. Is there a problem of overpopulation on the planet? Explain the answer.

72. What is the current state of our planet's soils? How does the erosion occur in them?

73. What is the threat of rapid urbanization?

74. Why deforestation has negative consequences? What caused the disappearance of species of plants and animals?

75. What are the problems associated with the use of energy?

76. What is the impact of human activities on the state of air pollution?

77. What is the impact of human activities on the state of contamination of the hydrosphere?

78. What caused the climate change on the planet? What are the negative consequences ?

79. Are there any ways to avoid global ecological crisis?

80. How a sustainable society can be built?

81. Show how to apply the human's ecological knowledge into practice?

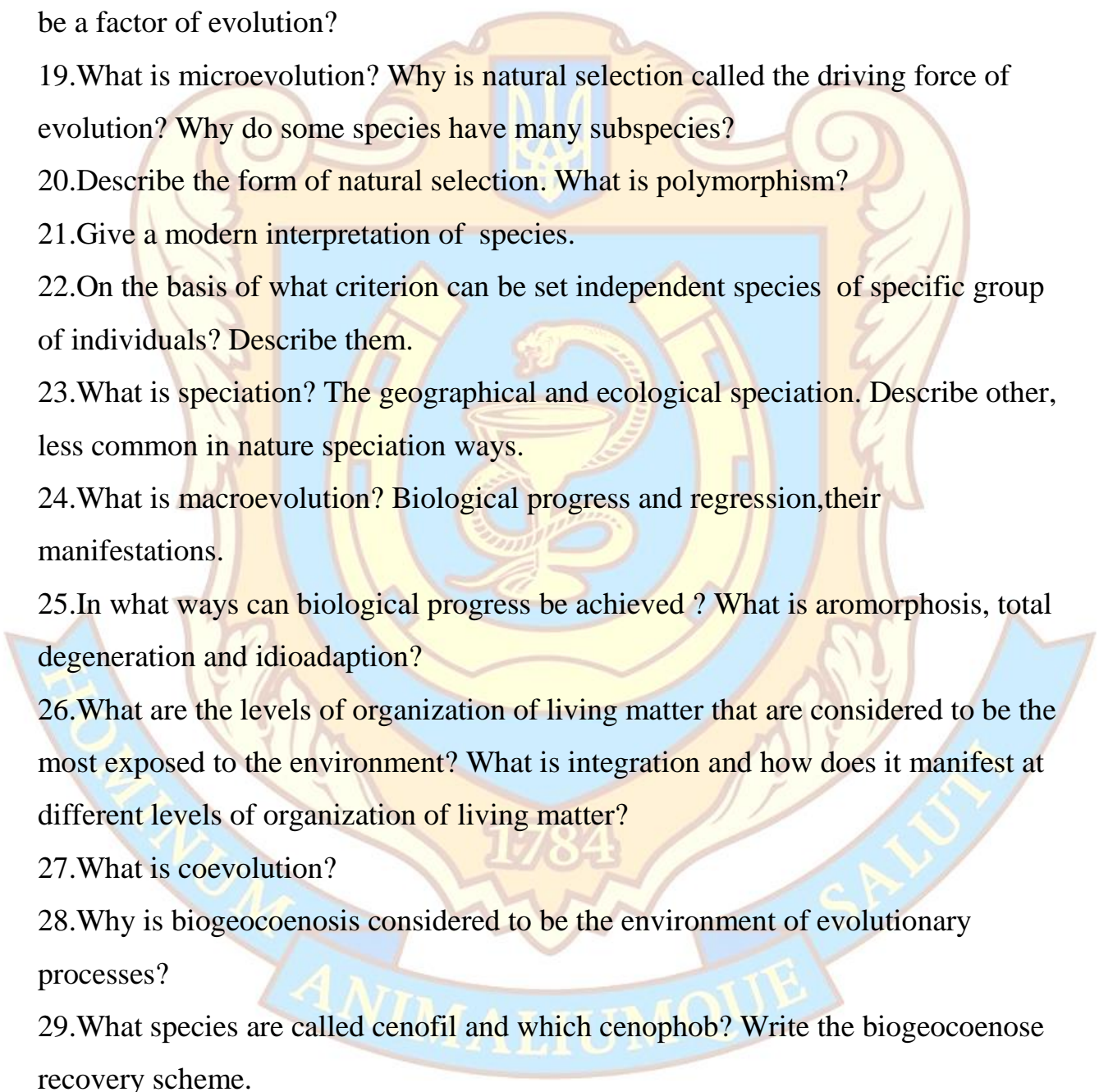
82. List the main areas of conservation of species diversity of organisms?

83. What is the Green and Red Book of Ukraine?

84. Give a brief description of the most protected areas that exist in Ukraine.

THE BASICS OF EVOLUTIONARY THEORY. HISTORY DEVELOPMENT OF ORGANIC WORLD.

1. Evolution and its modern interpretation. The main provisions of J.B. Lamarck's evolutionary hypothesis.
2. What discoveries prompted the rapid development of biology in the first half of the nineteenth century?
3. List the main provisions of Charles Darwin's theory of evolution.
4. In what appears the defined (not inherited) and uncertain (hereditary) variability?
5. The struggle for existence, its types and role in the evolution of living organisms.
6. How does the impact of inanimate nature forces affect the evolution of living organisms?
7. Why natural selection, according to Darwin was considered to be an evolution factor? What is evident sexual selection? What is divergence?
8. Phylogeny and phylogenetic series. What is monophyly?
9. What is the essence of the biogenetic law?
10. On specific examples explain the adaptation of species of animals and plants to specific environmental conditions of life. What is mimicry?
11. Explain the terms of homology, analogy, rudiments and atavism? What is their value for phylogenetic studies?
12. What is the basic unit of evolution? What is species?
13. What are the main provisions of the synthetic theory of evolution.
14. What does the population genetics study? How do mutations occur in the phenotype?
15. How is the reserve created in population genetic variability and its role in shaping of the gene pool of a population when changing environmental conditions? What is a foehn?

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16. Why is population considered to be the basic unit of evolution?
17. In what appears the genetic drift?
18. What is isolation and what types do you know? Why is isolation considered to be a factor of evolution?
19. What is microevolution? Why is natural selection called the driving force of evolution? Why do some species have many subspecies?
20. Describe the form of natural selection. What is polymorphism?
21. Give a modern interpretation of species.
22. On the basis of what criterion can be set independent species of specific group of individuals? Describe them.
23. What is speciation? The geographical and ecological speciation. Describe other, less common in nature speciation ways.
24. What is macroevolution? Biological progress and regression, their manifestations.
25. In what ways can biological progress be achieved? What is aromorphosis, total degeneration and idioadaptation?
26. What are the levels of organization of living matter that are considered to be the most exposed to the environment? What is integration and how does it manifest at different levels of organization of living matter?
27. What is coevolution?
28. Why is biogeocoenosis considered to be the environment of evolutionary processes?
29. What species are called cenophil and which cenophobic? Write the biogeocoenose recovery scheme.
30. What is the difference between coevolution and not coevolution? What are intrazonal biocenoses?
31. What is the role of species in the biosphere?

32. What are the factors of evolution, its species? What are the kinds of natural factors. The role of genetic variation, natural selection and the struggle for existence in evolution.

33. What factors of evolution have an influence on the evolution at molecular and cellular level?

34. Why are natural selection and the struggle for existence called the driving forces of evolution?

35. How is the sustainability supported by population size? What is the total fertility and total mortality rate? What is the elimination of natural mortality distinguished ?

36. What is the significance of combined factors in evolution? How is the population density self-regulated?

37. List the interspecific factors. How do they affect the number of population? How does the anthropogenic factor act?

38. Explain the term "the rate of evolution".

39. What is the essence of the neocatastrophism theory. What types are called cenophil and which cenophob?

40. How is the biogetsenosis crisis shown, what are its causes? What are biospheric crisis?

41. What is the essence of the saltation theory?

42. What types are called endemic? What are floristic and faunal kingdoms of land.

43. The role of biogeographical regionalization in the development of evolutionary views.

44. What are the reasons leading to the extinction of species during evolution?

45. What is the principle of evolutionary hypothesis of interrupted equilibrium?

What are its main provisions?

46. What are the main taxonomic units of taxonomy of living organisms? What is the binary nomenclature? Give examples.

47. On what basis is the artificial and natural system of the classification of living organisms constructed ?

48. What is the essence of abiogenic hypothesis of the origin of life on Earth?

49. What are the main provisions of Oparin-Haldane hypothesis?

50. Describe the scheme of life origin hypothesis of panspermia.

51. How life developed in the Archean era? How did the evolution of prokaryotes happen?

52. What influenced the progress of formation of living organisms in the Proterozoic era? How did the eukaryotes appear? When did marine biocenoses conceive?

53. What influenced the evolutionary progress of establishment in the Palaeozoic era? Describe the early life of this era - in the Cambrian and Ordovician.

54. How did the mastery of life by living organisms on land in the Devonian and Silurian Paleozoic era occur?

55. What changes have occurred in the development of flora and fauna in the Carboniferous period of the Paleozoic era?

56. What has caused the change in species composition of plants and animals in the Permian period of the Paleozoic era? What plants and animals began to dominate at this time on land and why?

57. What new things happened in the Mesozoic era? What organisms were common in the Triassic period?

58. How did the evolution of animal life happen in the Jurassic period? What caused the biospheric crisis in this period?

59. What features characterized life in the Cretaceous period? What progress emerged in the evolution of the plant world? What impact did it have on wildlife?

60. When did the Cenozoic begin? What biocenoses were formed under the influence of climate change in the Paleocene, Eocene and Oligocene epoch of the Paleogene period of the Cenozoic era?

61. How did life develop in the Neogene period? What groups of animals were formed in this period?

62. What characterized life in anthropogenic period? How did human evolution pass? What is the role in this process of work?

