Questions from regulations

1. Renal mechanisms for control of blood volume and extracellular fluid volume, constituents of extracellular and intracellular fluids
2. Mechanisms and factors controlling genesis of red blood cells (hemopoiesis)
3. Vasomotor center, control mechanisms of the cardiovascular system
4. Regulation of the heart activity – cardiac output, venous return (intracardial mechanisms)
5. Regulation of the heart activity - extracardial mechanisms
6. Rapid and long – term control of arterial pressure
7. Control of blood flow
8. Respiratory center, control mechanisms of breathing
9. Regulation of respiration – reflex mechanisms
10. Chemical control of respiration, suprapontine mechanisms of the breathing
11. Gastrointestinal function – motility, secretion and nervous control
12. Review of the gastrointestinal hormones
13. Mechanisms of the thermoregulation
14. The role of the kidneys at homeostasis of the internal environment
15. Kidneys and endocrine functions, juxtaglomerular apparatus
17. Hormonal regulation of the nutrient metabolisms (metabolism of carbohydrates, lipids and proteins)
18. Regulation of the secretion and function of the mineralocorticoids
19. Regulation of the secretion and physiological functions of growth hormone and prolactin
20. The islets of Langerhans - endocrine function
21. Functional morphology of the hypothalamus - pituitary secretion
22. Physiology of the thyroid gland
23. Composition and function of the adrenal medullae
24. Physiology of the parathyroid glands
25. Hormonal regulation of ions and water in organism
26. Adrenocortical hormones
27. Hormones of the anterior pituitary gland
28. Endocrine function of epiphysis, thymus, heart, fat tissue
29. Hormones of the posterior pituitary gland
30. Reproductive and hormonal functions of female. Ovarian and menstrual cycles
31. Reproductive and hormonal functions of male. Endocrine function of testes
32. Endocrine function of liver, kidneys and brain
33. Pregnancy. Lactation and its control, composition of the milk
34. Overview of tissue hormones - characteristics
35. Overall control of motor movement
36. Regulation of muscle tone. Proprioceptive sensations
37. Motor functions of the spinal cord. The cord reflexes
38. Motor functions of the spinal cord, alpha and gamma motor neurons
39. Brain stem – control of motor function
40. Reflexes of posture and locomotion
41. Reticular formation structure and function
42. The basal ganglia and their motor functions
43. Contributions of the cerebellum to overall motor control
44. Cortical control of motor function
45. Comparison of the corticospinal (pyramidal) tract and extrapyramidal motor system
46. Regulation of the autonomic functions. Autonomic centers, spinal cord – brain
cortex

47. Functions of the hypothalamus
48. The sympathetic nervous system - preganglionic, postganglionic neurons, transmitter secretion, receptors on the effector organs
49. The parasympathetic nervous system - preganglionic, postganglionic neurons, transmitter secretion, receptors on the effector organs
50. Functions of the thalamus
51. Functions of the limbic system
52. Physiological anatomy of the cerebral cortex. Function of specific cortical areas
53. Association areas of the cerebral cortex. Higher intellectual functions of the prefrontal association areas. Dominant and nondominant hemisphere
54. Reflex and its single parts, somatic and autonomic reflexes
55. Unconditioned reflexes. Conditioned reflexes-distribution
56. Mechanisms of learning and memory
57. Behavioral and motivational mechanisms of the brain

Questions from the systematic physiology
1. Physiology of the cell
2. Transport of substances through cell membranes
3. Homeostasis
4. The body fluids compartments – constituents, measurement. Regulation of fluid exchange
5. Blood and homeostasis - blood as buffer system, blood sampling
6. Blood functions, general properties
7. Red blood cells - morphology, functions, determination of the red blood cell count. Examination of the hematocrit value, erythrocytes sedimentation rate.
9. Hemoglobin - molecule, types, amount, derivatives, methods of the examination
10. Leukocytes (white blood cells) – general characteristics, genesis, examination
12. Hemostasis events. Bleeding, blood clotting, examination of the clotting factors in blood
14. Blood types – ABO, Rh. Transfusion
15. Function of spleen
16. Nonspecific immune mechanisms (innate immunity)
17. Specific immune mechanisms (acquired immunity)
18. Basic principles of circulatory function
19. Physiology of the heart - functions, structures, physiology of cardiac muscle
20. Physiology of cardiac muscle – resting and action potentials in cardiac muscle. Refractory period of cardiac muscle
21. Conductive system of the heart
22. Characteristics of the normal electrocardiogram. Electrocardiographic leads
23. Recording and evaluation of EKG. Physiological electrocardiogram - values
24. Excitation-contraction coupling function of cardiac muscle
25. Heart cycle, volumes, systolic time intervals. Heart sounds, auscultation of the heart, phonocardiography
26. Cardiac work output (volume-pressure diagram, preload, afterload). Energy required for cardiac contraction
27. Cardiovascular autonomic reflexes
28. Physical characteristics of the circulation (interrelationships of pressure, flow, and resistance)
29. Blood pressure – arterial and venous pressures
30. Clinical methods for measuring systolic and diastolic pressures. Factors influencing blood pressure values
31. Characteristics of hemodynamics in the high-pressure system (arterial pressure system)
32. Hemodynamics in the low-pressure system. Capillary fluid exchange
33. Differences of the pulmonary, systemic and fetal blood circulation
34. Blood circulation in the skin, splanchnic region and skeletal muscle
35. The coronary circulation and control of coronary blood flow. Cerebral blood flow
36. Functions of the respiratory passageways – trachea, bronchi, and bronchioles
37. Overview of the respiratory system, pulmonary volumes and capacities
38. Mechanics of pulmonary ventilation. Hering's model of breathing. Valsalve's and Muller's experiments
39. Pleural, alveolar and transpulmonary pressures
41. Compliance of the lungs. Surfactant, surface tension and work of breathing.
43. Static and dynamic parameters of ventilation
44. Hypoxia, oxygen and hyperbaric oxygen therapy
45. Functions of the respiratory passageways - trachea, bronchi, and bronchioles. Artificial respiration
46. Normal respiratory functions of the nose, vocalization
47. Gastrointestinal physiology – function of the alimentary tract
48. Physiology of the mouth cavity
49. Physiology of stomach (digestion, resorption). Gastric secretion and its regulation. Sampling of the gastric juice
50. Pancreatic secretion. Regulation of pancreatic secretion
51. Bile – secretion, composition, regulation, function in fat digestion and absorption
52. Function of the small intestine, movements, secretions, absorption
53. Large intestine, functions, activity, defecation
54. Digestion and absorption of carbohydrates. Metabolism of carbohydrates, glycaemia
55. Digestion and absorption of lipids. Metabolism of lipids
56. Digestion and absorption of proteins. Protein metabolism
57. Dietary balances. Regulation of food intake and energy storage
58. Vitamins
59. Energetics and metabolic rate. Measurement of basal metabolic rate
60. Body temperature. Regulation of body temperature. Body temperature - measurement
61. Physiology of the skin. Activity of the sweat glands and neutralization ability of the skin
62. Overview of the composition and functions of the kidneys, renal circulation
63. The nephron – functional unit of the kidney
64. Glomerular filtration – determinants, physiological control, estimation
65. Activity of the renal tubule system. Countercurrent system. Urine formation.
66. Reabsorption and secretion along different parts of the nephron. Micturition
and micturition reflex
67. Quantification of kidney function – clearance methods. Examination of urine - amount, density, pH, sugar, pus, bile, proteins, blood
68. Skeletal muscle, properties, action potential, excitation-contraction coupling
69. Transmission of impulses from nerve endings to skeletal muscle fibers: the neuromuscular junction
70. Mechanics of skeletal muscular contraction, muscle fatigue. Muscle metabolic systems in exercise
71. Excitation and contraction of smooth muscle
72. Sports physiology. Bicycle ergometry
73. Central nervous system: Neuron - the basic functional unit
74. Resting membrane potential of neurons. Transduction of sensory stimuli into nerve impulses. Neuron action potential
75. Basic functions of synapses
76. Mediators
77. Physiological classifications and functions of nerve fibers
78. Transmission and processing of signals in nerve tracts
79. Stress
80. Biorhythms
81. Wakefulness and sleep. Brain waves in the normal electroencephalogram
82. Stimulus, receptors, properties, distribution
83. Physiology of taste and smell
84. Physiology of vision
85. Optics of vision. Errors of refraction. Determination of the near and far points, accommodation, visual acuity
87. Visual pathways, visual cortex. Fields of vision - Perimetry
88. The sense of hearing. Examination of the hearing
89. Functions of the middle and inner ear, auditory nervous pathways.
90. Vestibular sensations and maintenance of equilibrium. Examination of the vestibular apparatus
91. Vestibular pathways, center
92. Skin sensitivity, touch, pressure, thermal sensations
93. Pain sensation