

**Assessment tools for conducting attestation in discipline «Physiology»
for students of 2025, 2026 year of admission
under the educational programme 33.05.01 Pharmacy,
specialisation (profile) Pharmacy (Specialist's degree),
form of study full-time for the 2026-2027 academic year**

Assessment tools for conducting continuous assessment during classes (CA), evaluating the independent work of students (IW), and conducting intermediate certification (IC), allowing to verify the students' acquisition of the knowledge (k) / abilities (a) / skills (s) stipulated by the discipline program:

UC-1.1.1. To know the historical milestones in the development of society, the principles of critical analysis, and the methods of critical analysis and assessment of modern scientific and practical achievements

Educational Program (EP) Learning Outcomes (Competences)	Competence Achievement Indicators	Discipline Learning Outcomes
UC-1. Able to conduct a critical analysis of problem situations using a systematic approach and to develop an action strategy.	UC-1.1. To know: UC-1.1.1. To know the historical milestones in the development of society, the principles of critical analysis, and the methods of critical analysis and assessment of modern scientific and practical achievements.	k-1. To know the main stages in the development of physiology as a science, research methods, and scientific and practical achievements in the field of physiology.

№	Discipline section forming this KAS (module)	Task type	Task content	Correct answer	Which type of control		
					CA	IW	IC
1.	Module 1. General Physiology	1. Choice of	Choose three correct	1) P.K. Anokhin	yes	yes	no

Module 1. General Physiology Modular Unit 1. Introduction to normal physiology. Modular Unit 2. Physiology of excitable tissues. Modular Unit 3. Physiological properties of nerves and synapses. Modular Unit 4. Physiological properties of skeletal muscles and smooth muscles. Modular Unit 5. General principles of the central nervous system. Modular Unit 6. Physiology of the autonomic nervous system. Module Unit 7. Physiology of the endocrine glands. Module Unit 8. Physiology of sensory systems. Module Unit 9. Physiology of higher nervous activity and behavior. Module Unit 10. Characteristics of human higher nervous activity. Module Unit 11. Metabolism and energy. Thermoregulation. Physiology of nutrition. Module 2. Special physiology. Module Unit 12. Physiology of the heart. Modular unit 13. Methods of	several correct answers	answers out of six. Russian scientists who made a significant contribution to the development of reflex theory: 1) P.K. Anokhin 2) M.V. Lomonosov 3) V.I. Vernadsky 4) I.P. Pavlov 5) I.M. Sechenov 6) I.I. Mechnikov	4) I.P. Pavlov 5) I.M. Sechenov			
	2. Situational tasks/cases	Excitability is one of the main properties of nervous and muscle tissues. It was experimentally established that after applying suprathreshold stimulation to an isolated nerve and a strip of frog myocardium, action potentials occurred, during which excitability changed. What recording method was used to study the action potentials in the nerve and the strip of myocardium?	microelectrode technology	yes	yes	no

	heart examination. Modular unit 14. Regulation of heart activity. Modular unit 15. Basic principles of hemodynamics. Module Unit 16. Regulation of vascular tone. Module Unit 17. Regional circulation. Lymph and lymphatic circulation. Module Unit 18. Physiology of the excretory system. Module Unit 19. Physico-chemical properties of blood. Module Unit 20. Formed elements of blood. Module Unit 21. Hemostasis system. Module Unit 22. Physiology of external respiration. Gas exchange in the lungs. Module Unit 23. Gas transport by blood. Gas exchange in tissues. Module Unit 24. Regulation of respiration. Module Unit 25. Physiology of digestion in the oral cavity and stomach. Module Unit 26. Digestion in the intestine. Absorption in various parts of the digestive tract.						
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UC-1.2.1. Able to collect and summarize data on current issues, including those related to his professional field, to search for information and solutions based on actions, experiments, and experience; to analyze a problematic situation as a system, identifying its components and the relationships between them.

Educational Program (EP) Learning Outcomes (Competences)	Competence Achievement Indicators	Discipline Learning Outcomes
UC-1. Able to conduct a critical analysis of problem situations using a systematic approach and to develop an action strategy.	UC-1.2. Able: UC-1.2.1. Able to collect and summarize data on current issues, including those related to his professional field, and to search for information and solutions based on actions, experiments, and experience; he can analyze a problem situation as a system, identifying its components and the relationships between them.	a-1. Able to use the basic concepts of general and specialized physiology when studying medical literature.

№	Discipline section forming this KAS (module)	Task type	Task content	Correct answer	Which type of control		
					CA	IW	IC
2.	Module 1. General Physiology Modular Unit 1. Introduction to normal physiology. Modular Unit 2. Physiology of excitable tissues. Modular Unit 3. Physiological properties of nerves and synapses. Modular Unit 4. Physiological properties of skeletal muscles and smooth muscles.	1. Choice of several correct answers	Choose three correct answers out of six. Which tissues are excitable? 1) nervous tissue 2) bone tissue 3) fibrous tissue 4) cartilage tissue 5) muscle tissue 6) glandular tissue	1) nervous tissue 5) muscle tissue 6) glandular tissue	yes	yes	no
		2. Questions	During nighttime sleep,	antidiuretic hormone	yes	yes	no

	Modular Unit 5. General principles of the central nervous system. Modular Unit 6. Physiology of the autonomic nervous system. Module Unit 7. Physiology of the endocrine glands. Module Unit 8. Physiology of sensory systems. Module Unit 9. Physiology of higher nervous activity and behavior. Module Unit 10. Characteristics of human higher nervous activity. Module Unit 11. Metabolism and energy. Thermoregulation. Physiology of nutrition. Module 2. Special physiology. Module Unit 12. Physiology of the heart. Modular unit 13. Methods of heart examination. Modular unit 14. Regulation of heart activity. Modular unit 15. Basic principles of hemodynamics. Module Unit 16. Regulation of vascular tone. Module Unit 17. Regional circulation. Lymph and lymphatic circulation. Module Unit 18. Physiology of	requiring a detailed response	the rate of urine formation is usually reduced, and the urine produced is more concentrated than during the day. Which hormone can influence vascular tone and the processes of urine formation?				
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the excretory system. Module Unit 19. Physico-chemical properties of blood. Module Unit 20. Formed elements of blood. Module Unit 21. Hemostasis system. Module Unit 22. Physiology of external respiration. Gas exchange in the lungs. Module Unit 23. Gas transport by blood. Gas exchange in tissues. Module Unit 24. Regulation of respiration. Module Unit 25. Physiology of digestion in the oral cavity and stomach. Module Unit 26. Digestion in the intestine. Absorption in various parts of the digestive tract.						
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UC-1.3.1. To have experience in forming evaluative judgments when addressing problematic situations, including professional ones; possesses the skill of developing a strategy to achieve a set goal as a sequence of steps, anticipating the outcome of each step and assessing its impact on the external environment of the planned activity and on the relationships between the participants in that activity.

Educational Program (EP) Learning Outcomes (Competences)	Competence Achievement Indicators	Discipline Learning Outcomes
UC-1. Able to conduct a critical analysis of problem situations using a systematic approach and to develop an action strategy.	UC-1.3. To have: UC-1.3.1. To have experience in forming	s-1. To have the skill to collect, store, search for, and process information about biological systems.

	evaluative judgments when addressing problematic situations, including professional ones; possesses the skill of developing a strategy to achieve a set goal as a sequence of steps, anticipating the outcome of each step and assessing its impact on the external environment of the planned activity and on the relationships between the participants in that activity.	
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№	Discipline section forming this KAS (module)	Task type	Task content	Correct answer	Which type of control		
					CA	IW	IC
3.	Module 1. General Physiology Modular Unit 1. Introduction to normal physiology. Modular Unit 2. Physiology of excitable tissues. Modular Unit 3. Physiological properties of nerves and synapses. Modular Unit 4. Physiological properties of skeletal muscles and smooth muscles. Modular Unit 5. General principles of the central nervous system. Modular Unit 6. Physiology of the autonomic nervous system. Module Unit 7. Physiology of the endocrine glands. Module Unit 8. Physiology of	1. Choice of several correct answers	Choose three correct answers out of six. The following characteristics of conditioned reflexes are distinguished: 1) innate; 2) constant; 3) individual; 4) unstable; 5) species- specific; 6) any stimulus can be a signal for a conditioned reflex.	3) individual 4) unstable 6) any stimulus can be a signal of a conditioned reflex	yes	yes	no
		2. Situational tasks/cases	Two dogs were brought to	the inhibition process	yes	yes	no

sensory systems. Module Unit 9. Physiology of higher nervous activity and behavior. Module Unit 10. Characteristics of human higher nervous activity. Module Unit 11. Metabolism and energy. Thermoregulation. Physiology of nutrition. Module 2. Special physiology. Module Unit 12. Physiology of the heart. Modular unit 13. Methods of heart examination. Modular unit 14. Regulation of heart activity. Modular unit 15. Basic principles of hemodynamics. Module Unit 16. Regulation of vascular tone. Module Unit 17. Regional circulation. Lymph and lymphatic circulation. Module Unit 18. Physiology of the excretory system. Module Unit 19. Physico-chemical properties of blood. Module Unit 20. Formed elements of blood. Module Unit 21. Hemostasis system. Module Unit 22. Physiology of		the laboratory for studying food- conditioned reflexes. Before the experiment began, one of them drank a large amount of water. Then the study began. Initially, the food- conditioned reflexes proceeded normally in both dogs. But after some time, the food- conditioned reflexes disappeared in the dog that had been drinking water. No random external influences were noted. What process in the CNS caused the disappearance of the food- conditioned reflexes?					
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	external respiration. Gas exchange in the lungs. Module Unit 23. Gas transport by blood. Gas exchange in tissues. Module Unit 24. Regulation of respiration. Module Unit 25. Physiology of digestion in the oral cavity and stomach. Module Unit 26. Digestion in the intestine. Absorption in various parts of the digestive tract.						
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GPC-2.1.1. To know methods for analyzing the pharmacokinetics and pharmacodynamics of a drug based on knowledge of the morphofunctional characteristics, physiological states, and pathological processes in the human body.

Educational Program (EP) Learning Outcomes (Competences)	Competence Achievement Indicators	Discipline Learning Outcomes
GPC-2. Able to apply knowledge of the morphofunctional characteristics, physiological states, and pathological processes in the human body to solve professional tasks.	GPC -2.1. To know: GPC -2.1.1. To know the methods of analyzing the pharmacokinetics and pharmacodynamics of a drug based on knowledge of the morphofunctional characteristics, physiological states, and pathological processes in the human body.	k-1. To know the basic patterns of development and functioning of the organism based on the structural organization of cells, tissues, and organs.

№	Discipline section forming this KAS (module)	Task type	Task content	Correct answer	Which type of control		
					CA	IW	IC

4.	Module 1. General Physiology Module 1. General Physiology Modular Unit 1. Introduction to normal physiology. Modular Unit 2. Physiology of excitable tissues. Modular Unit 3. Physiological properties of nerves and synapses. Modular Unit 4. Physiological properties of skeletal muscles and smooth muscles. Modular Unit 5. General principles of the central nervous system. Modular Unit 6. Physiology of the autonomic nervous system. Module Unit 7. Physiology of the endocrine glands. Module Unit 8. Physiology of sensory systems. Module Unit 9. Physiology of higher nervous activity and behavior. Module Unit 10. Characteristics of human higher nervous activity. Module Unit 11. Metabolism and energy. Thermoregulation. Physiology of nutrition. Module 2. Special physiology. Module Unit 12. Physiology of the heart.	1. Choice of several correct answers	Choose three correct answers out of six. What causes a decrease in vascular tone? 1) histamine 2) bradykinin 3) prostaglandins 4) corticosteroids 5) thyroxine 6) norepinephrine	1) histamine 2) bradykinin 3) prostaglandins	yes	yes	no
		2. Questions requiring a detailed response	It is known that acetylcholine is one of the main neurotransmitters of the nervous system. What postsynaptic receptors does acetylcholine act on when it is released into the synaptic cleft?	M- cholinoreceptors and N- cholinoreceptors	yes	yes	No

Modular unit 13. Methods of heart examination. Modular unit 14. Regulation of heart activity. Modular unit 15. Basic principles of hemodynamics. Module Unit 16. Regulation of vascular tone. Module Unit 17. Regional circulation. Lymph and lymphatic circulation. Module Unit 18. Physiology of the excretory system. Module Unit 19. Physico-chemical properties of blood. Module Unit 20. Formed elements of blood. Module Unit 21. Hemostasis system. Module Unit 22. Physiology of external respiration. Gas exchange in the lungs. Module Unit 23. Gas transport by blood. Gas exchange in tissues. Module Unit 24. Regulation of respiration. Module Unit 25. Physiology of digestion in the oral cavity and stomach. Module Unit 26. Digestion in the intestine. Absorption in various parts of the digestive						
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GPC-2.2.1. Able to explain the main and side effects of medications, the effects of their combined use and interaction with food, taking into account the morphofunctional characteristics, physiological states and pathological processes in the human body.

Educational Program (EP) Learning Outcomes (Competences)	Competence Achievement Indicators	Discipline Learning Outcomes
GPC -2. Able to explain the main and side effects of medications, the effects of their combined use and interaction with food, taking into account the morphofunctional characteristics, physiological states and pathological processes in the human body.	GPC -2.2. Able: GPC -2.2.1. Able to explain the main and side effects of medications, the effects of their combined use and interaction with food, taking into account the morphofunctional characteristics, physiological states and pathological processes in the human body.	a-1. Able to assess physiological states and processes in the human body when selecting medications.

№	Discipline section forming this KAS (module)	Task type	Task content	Correct answer	Which type of control		
					CA	IW	IC
5.	Module 1. General Physiology Modular Unit 1. Introduction to normal physiology. Modular Unit 2. Physiology of excitable tissues. Modular Unit 3. Physiological properties of nerves and synapses. Modular Unit 4. Physiological properties of skeletal muscles and smooth muscles. Modular Unit 5. General principles of the central nervous system.	1. Choice of several correct answers	Choose three correct answers out of six. The stomach absorbs: 1) medicinal substances 2) fats 3) water and salts 4) alcohol 5) vitamins 6) proteins	1) medicinal substances 3) water and salts 4) alcohol	yes	yes	no
		2. Situational tasks/cases	During the examination of the subject, it was found that the cholinergic	blocks M- cholinergic receptors	yes	yes	no

	Modular Unit 6. Physiology of the autonomic nervous system. Module Unit 7. Physiology of the endocrine glands. Module Unit 8. Physiology of sensory systems. Module Unit 9. Physiology of higher nervous activity and behavior. Module Unit 10. Characteristics of human higher nervous activity. Module Unit 11. Metabolism and energy. Thermoregulation. Physiology of nutrition. Module 2. Special physiology. Module Unit 12. Physiology of the heart. Modular unit 13. Methods of heart examination. Modular unit 14. Regulation of heart activity. Modular unit 15. Basic principles of hemodynamics. Module Unit 16. Regulation of vascular tone. Module Unit 17. Regional circulation. Lymph and lymphatic circulation. Module Unit 18. Physiology of the excretory system. Module Unit 19. Physico-chemical properties of blood.		transmission blocker atropine caused pupil dilation, an increase in the frequency and strength of heart contractions, and a decrease in gastrointestinal peristalsis. At the same time, the contractile function of the skeletal muscles did not change. What could be the possible reason for the different effects of atropine at the neuromuscular synapses of the somatic nervous system and at the synapses of the autonomic nervous system on internal organs?				
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Module Unit 20. Formed elements of blood. Module Unit 21. Hemostasis system. Module Unit 22. Physiology of external respiration. Gas exchange in the lungs. Module Unit 23. Gas transport by blood. Gas exchange in tissues. Module Unit 24. Regulation of respiration. Module Unit 25. Physiology of digestion in the oral cavity and stomach. Module Unit 26. Digestion in the intestine. Absorption in various parts of the digestive tract.						
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GPC-2.3.1. To be able to take into account the morphofunctional characteristics, physiological states, and pathological processes in the human body when selecting over- the- counter medications and other pharmacy products.

Educational Program (EP) Learning Outcomes (Competences)	Competence Achievement Indicators	Discipline Learning Outcomes
GPC -2. Able to apply knowledge of the morphofunctional characteristics, physiological states, and pathological processes in the human body to solve professional tasks.	GPC -2.3. To have: GPC -2.3.1. To have the skill to take into account morphofunctional characteristics, physiological states, and pathological processes in the human body when selecting over- the- counter medications and other pharmacy products.	s-1. To have the skill to take into account the patterns of functioning of individual organs and systems when selecting pharmacy products.

№	Discipline section forming this KAS (module)	Task type	Task content	Correct answer	Which type of control		
					CA	IW	IC
6.	Module 1. General Physiology Modular Unit 1. Introduction to normal physiology. Modular Unit 2. Physiology of excitable tissues. Modular Unit 3. Physiological properties of nerves and synapses. Modular Unit 4. Physiological properties of skeletal muscles and smooth muscles. Modular Unit 5. General principles of the central nervous system. Modular Unit 6. Physiology of the autonomic nervous system. Module Unit 7. Physiology of the endocrine glands. Module Unit 8. Physiology of sensory systems. Module Unit 9. Physiology of higher nervous activity and behavior. Module Unit 10. Characteristics of human higher nervous activity. Module Unit 11. Metabolism and energy. Thermoregulation. Physiology of nutrition. Module 2. Special physiology.	1. Choice of several correct answers	Choose three correct answers out of six. The secretion of pancreatic juice is stimulated by: 1) acetylcholine 2) cholecystokinin 3) secretin 4) serotonin 5) vasopressin 6) adrenaline	1) acetylcholine 2) cholecystokinin 3) secretin	yes	yes	no
		2. Situational tasks/cases	The body temperature of a healthy person was measured in the morning, on an empty stomach, and in a state of complete rest. The thermometry results are as follows: the temperature measured in the axillary region is +36.6°C, the rectal temperature is +37.1°C, and the sublingual temperature is +36.8°C. What temperature (of the core or the) does the temperature measured in	the body periphery	yes	yes	no

	Module Unit 12. Physiology of the heart. Modular unit 13. Methods of heart examination. Modular unit 14. Regulation of heart activity. Modular unit 15. Basic principles of hemodynamics. Module Unit 16. Regulation of vascular tone. Module Unit 17. Regional circulation. Lymph and lymphatic circulation. Module Unit 18. Physiology of the excretory system. Module Unit 19. Physico-chemical properties of blood. Module Unit 20. Formed elements of blood. Module Unit 21. Hemostasis system. Module Unit 22. Physiology of external respiration. Gas exchange in the lungs. Module Unit 23. Gas transport by blood. Gas exchange in tissues. Module Unit 24. Regulation of respiration. Module Unit 25. Physiology of digestion in the oral cavity and stomach. Module Unit 26. Digestion in		the axillary region reflect?				
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	the intestine. Absorption in various parts of the digestive tract.						
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2. Questions for intermediate certification:

1. Excitable tissues. General and specific properties of excitable tissues.
2. Modern concepts of membrane structure and function. Ion channels, their classification, and role. Transport of substances through biological membranes.
3. Bioelectric phenomena in living tissues. Resting membrane potential. Method of its registration.
4. Excitation. Action potential, its phases.
5. Stimulus, classification. Types of electrical responses of excitable tissues (electrotonic potential, local response, action potential). Mechanism of their occurrence.
6. The concept of excitability. The measure of excitability. The relationship between the phases of excitability and the phases of the action potential. The concept of the lability of excitable tissues.
7. The laws of irritation: the law of force, the law of "all or none" and its relative nature.
8. The law of "force-time", the concept of useful time, reobase, and chronaxia. The law of gradient. Accommodation, the speed of accommodation, and its measure.
9. Polar law of irritation. Physiological electrotonic. Cathodic depression.
10. Receptors. Classification. Mechanism of converting stimulus energy into a nerve impulse. Properties of receptors.
11. Classification of nerve fibers. Propagation of excitation along unmyelinated and myelinated nerve fibers. Laws of nerve conduction. Lability.
12. Classification of muscles. Functions and properties of skeletal muscles. Types and modes of muscle contractions (isotonic, isometric, and mixed). Muscle strength and function. The rule of average loads.
13. Smooth muscles and their morphological and physiological features.
14. The contractile apparatus of a muscle fiber. The ultramicroscopic structure of a myofibril at rest and during contraction. Contractile and regulatory proteins. The mechanism of muscle contraction and relaxation.
15. Single muscle contraction, its phases. Summation of contractions. Conditions of summation.
16. Tetanic contraction, types of tetanus. Optimum and pessimum frequencies of stimulation.
17. Synapse. Classification. Structure. Features of excitation transmission in an electrical synapse.
18. The mechanism of excitation transmission in a chemical synapse. Properties of chemical synapses. Pathways of pharmacological regulation of synaptic excitation transmission.

19. Myoneural synapse, structure. Mechanism of excitation transmission in it. Terminal plate potential.
20. Inhibitory synapses, inhibitory mediators, and their receptors. The role of inhibitory synapses. Pharmacological blockade of inhibitory synapses.
21. Methods of studying the functions of the central nervous system.
22. A neuron, its physiological properties, and classification. Features of the occurrence and propagation of excitation in a neuron.
23. Synapses in the central nervous system. Structure, classification, and functional properties.
24. Reflex. Classification of reflexes. Reflex arc. Main components of the reflex arc. Reflex time, factors affecting the reflex time. Reflex receptive field.
25. The nervous center. The main properties of the nervous centers. Ways of pharmacological correction of the tone of the nervous centers.
26. The basic principles of reflex activity coordination include divergence and irradiation of excitation and inhibition, convergence and common final pathway, positive and negative feedback, and the concept of the dominant.
27. Central inhibition. Basic functions of the inhibition process. Types of inhibition in the CNS.
28. Spinal cord: morpho-functional features, Bell-Magendie law, properties of spinal cord neurons, and basic functions of the spinal cord.
29. Metencephalon: medulla oblongata, pons. Basic functions of the metencephalon.
30. Cerebellum. Functions of the cerebellum.
31. The midbrain. The reticular formation. The descending and ascending influences of the reticular formation of the brainstem.
32. The diencephalon (thalamus, hypothalamus) and its functions.
33. The most important subcortical (basal) nuclei. Functions of the subcortical nuclei.
34. The limbic system of the brain. Functions of the limbic system.
35. The somatic and autonomic nervous systems, their anatomical and functional differences. The structural organization of the autonomic nervous system.
36. Structural and functional features of the sympathetic division of the autonomic nervous system.
37. Structural and functional features of the parasympathetic part of the autonomic nervous system.
38. The metasympathetic division of the autonomic (vegetative) nervous system.
39. Ganglia of the autonomic nervous system. Features of excitation in the ganglia of the autonomic nervous system.
40. Autonomic reflexes and centers for regulating autonomic functions.
41. Cholinergic receptors, their types, localization. Cholinergic receptor activators and blockers. Effects of the interaction of the acetylcholine mediator with cholinergic receptors.
42. Adrenoreceptors, their types, and localization. Adrenoreceptor activators and blockers. Effects of norepinephrine interaction with adrenoreceptors.
43. Cholinergic and adrenergic structures in the body. Pharmacological pathways for regulating the autonomic synapses.
44. Structural and functional organization of the endocrine system. Endocrine glands. Hormones. Classification of hormones. Basic mechanisms of hormone action. Antagonistic and synergistic effects of hormones.

45. The hypothalamic-pituitary system and its functions. The pituitary gland and its hormones.
46. Thyroid gland and its hormones, hyper- and hypofunction.
47. Endocrine functions of the pancreas.
48. Hormones of the adrenal cortex. Their role in regulating metabolism and body functions.
49. Functions of the adrenal medulla. The role of adrenaline in the body.
50. Sensory systems. General principles of analyzer structure. Basic functions and properties.
51. The auditory analyzer. The receptor, conductive, and cortical parts of the auditory analyzer. The mechanism of sound perception. The distinction of pitch and sound intensity.
52. Visual analyzer. Perception and processing of signals in the retina. Conduction and cortical parts of the visual analyzer.
53. Pain analyzer. Nociceptive and antinociceptive systems. Pathways for correcting pain sensitivity.
54. Unconditioned and conditioned reflexes. Formation and biological significance of conditioned reflexes.
55. The doctrine of higher nervous activity. The role of I.P. Pavlov and I.M. Sechenov in the creation of the doctrine of higher nervous activity, and its essence. The mechanism of the formation of conditioned reflexes.
56. Inhibition of conditioned reflexes and its types. Modern ideas about the mechanism of internal inhibition.
57. Features of human higher nervous activity. Types of higher nervous activity. I and II signal systems.
58. Basal metabolism and factors affecting its value. Methods for determining the correct values of basal metabolism. The body surface rule.
59. Physiology of thermoreceptors. Principles of body temperature regulation. Thermoregulation centers.
60. Physiological nutritional standards. Principles of food composition. The role of proteins, fats, and carbohydrates in human nutrition. The importance of vitamins.
61. Breathing, its significance. Respiratory organs. The main stages of breathing.
62. External respiration. The mechanism of inhalation and exhalation. The pressure in the pleural cavity, its origin, and its role in the mechanism of external respiration. Changes in the pressure in the pleural cavity during different phases of the respiratory cycle.
63. Gas exchange in the lungs. Partial pressure of gases (O_2 and CO_2) in the alveolar air and tension of gases in the blood. Basic patterns of gas transfer through the membrane.
64. Gas transport by blood. Oxygen capacity of blood. Dissociation curve of oxyhemoglobin, its characteristics, and oxygen capacity of blood. Carbon dioxide transport by blood, the importance of carbonic anhydrase, and the relationship between O_2 and CO_2 transport.
65. Vital capacity of the lungs and its components. Methods for determining them. Residual volume.
66. Respiratory center. Modern ideas about structure and localization. Automatism of the respiratory center.
67. Respiratory regulation. Nervous and humoral mechanisms. The role of the sensory apparatus. Basic respiratory reflexes.
68. The internal environment of the body. The blood system. The functions of blood.
69. Amount and composition of blood. Composition of blood plasma.
70. Physical and chemical properties of blood. Hemolysis and its types.
71. Red blood cells, number, functions. Erythropoiesis, its regulation. Hemoglobin, number, types, functions.

72. Leukocytes, number, types. Red blood cells, number, functions. Erythropoiesis, its regulation. Hemoglobin, number, types, functions, formula. Leukocyte formula.
73. Platelets, number, functions. Regulation of thrombopoiesis.
74. Hemostasis. Coagulation and anticoagulation systems. Fibrinolysis.
75. Blood groups and Rh factor. Blood transfusion rules. Blood substitutes and their types.
76. Heart, structure, and functions. Factors that ensure the movement of blood in the right direction.
77. Properties of the heart muscle. Automatism. The anatomical substrate and nature of automatism. The leading role of the sinoatrial node. The gradient of automatism.
78. Electrical processes in the heart muscle. Action potential of cardiomyocytes, its phases, and origin. Features of cardiac muscle excitability. Refractory period.
79. Contractility. Coupling of excitation and contraction processes in the cardiac muscle, and the role of extracellular calcium. Compliance with the "All or Nothing" law. Frank-Starling law. Mechanisms for ensuring the pumping function of the heart. Extrasystole.
80. The cardiac cycle, its periods, and phases.
81. Intracardial regulation. Cellular, intercellular, and intracardial mechanisms.
82. Innervation of the heart. The effect of sympathetic and parasympathetic nerves on the heart.
83. Humoral regulation of the heart. The effect of hormones, electrolytes, and metabolites on heart function.
84. The vascular system in the body and its main functions. Classification of blood vessels.
85. Hemodynamics. Factors that determine the movement of blood through the vessels. Basic indicators of hemodynamics.
86. Nervous mechanisms of vascular tone regulation. The concept of vascular tone and its types. Basal tone and its origin.
87. Central reflexes. The most important reflexogenic zones, chemo- and baroreceptor mechanisms. Conjugate reflexes – Danini-Ashner, Golts.
88. Blood pressure. Factors affecting blood pressure. Methods of recording blood pressure.
89. The vasomotor center, its structure, and functions.
90. Humoral regulation of vascular tone.
91. General characteristics of digestion, organs, and functions of the gastrointestinal tract.
92. Digestion in the oral cavity. Saliva, composition, and regulation of salivation.
93. Types of digestion. Cavitory and membrane digestion. Absorption.
94. Motility of the gastrointestinal tract.
95. Digestion in the stomach. Composition and properties of gastric juice. Regulation of gastric secretion. Adaptive nature of gastric secretory activity.
96. Digestion in the duodenum. The role of the liver and pancreas in the digestive process.
97. The liver, its structure, and functions.
98. The role of bile in digestion, its composition. The mechanism of bile secretion, its reflex and humoral regulation.
99. Properties and composition of intestinal juice. Regulation of intestinal secretion.

100. Excretory organs and their significance. Kidneys, functions, and structure.
101. The structure of the nephron and its blood supply.
102. The process of urine formation: glomerular filtration, tubular reabsorption, and tubular secretion.
103. The role of the kidneys in osmoregulation and volumoregulation. The role of the kidneys in regulating the ionic composition of blood. The role of the kidneys in regulating the acid-base balance. The metabolic function of the kidneys.
104. Diuresis. The amount, composition, and properties of urine. Urination.
105. Regulation of kidney activity.

3. Example of an examination ticket

Federal State Budgetary Educational Institution of Higher Education
"Volgograd State Medical University"
of the Ministry of Health of the Russian Federation

Discipline: Physiology

Specialist degree program in specialty 33.05.01 Pharmacy, specialization (profile) Pharmacy

Academic year: 2026 - 2027

Examination ticket No. 1

1. Synapses in the central nervous system. Structure, classification, functional properties.
2. Neural mechanisms regulating vascular tone. The concept of vascular tone, its types. Basal tone, its origin.
3. Diuresis. Quantity, composition, and properties of urine. Urination.

Head of the Department _____ S.V. Klauchek

The full volume of the fund of assessment tools for the discipline is available in the Electronic Information and Educational Environment (EIEE) of the FSBEI HE VolgSMU of the Ministry of Health of Russia.

Approved at the Department of Normal Physiology meeting
Minutes dated «25» May 2026 № 9

Head of the Department

A handwritten signature in blue ink, appearing to be 'S.V. Klauchek', written in a cursive style.

S.V.Klauchek