Assessment tools for certification in the discipline «Physiology» for students 2025 year of admission of the educational program Pharmacy Specialist in the specialty 33.05.01 Pharmacy form of study full-time for the 2025-2026 academic year

1. Assessment tools for conducting current certification in the discipline

1.1. Assessment tools for conducting certification in seminar-type classes

Attestation in seminar-type classes includes the following types of tasks: testing, solving situational problems, and interviewing on control questions.

1.1.1. Examples of test tasks

Verifiable indicators of competence achievement: УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1.

1. THE DURATION OF ONE HEART BEAT AT A PULSUS OF 75 PER MINUTE IS
a) 0,1 s
b) 0.7 Ms
c) 0,8 s
d) 0,1 min

2. THE KIDNEYS PERFORM THE FOLLOWING FUNCTIONS IN THE HUMAN BODY
a) removal of metabolic products
b) participation in water-salt metabolism and osmoregulation
c) participation in erythropoiesis
d) participation in maintaining homeostasis

3. FACTORS CONTRIBUTING TO THE FORMATION OF PRIMARY URINE ARE
a) high pressure in the glomerular capillaries (75 mmHg)
b) filter pressure inside the glomerular capsule (20 mmHg)
c) oncotic pressure of blood due to proteins (30 mmHg)
d) all of the above is correct

4. GLUCOSE CONTENT IN BLOOD PLASMA IS
a) 4,-5 mg %
b) 4,4-6,7 mmol/l
c) 4,4-5,5 g/l
d) 80-120 %

5. ENZYMES THAT ENABLE PARENTERAL DIGESTION ARE
a) pancreatic enzymes adsorbed in the glycocalyx of the small intestine epithelium
b) enzymes of epithelial cells fixed on the membrane of enterocytes
c) enzymes contained in bile
d) enzymes of bacteria fixed in the glycocalyx of the intestinal wall

6. IN THE RESEARCH OF VISUAL ACUITY, IT WAS FOUND THAT THE PATIENT CAN SEE REMOTE OBJECTS WELL, BUT IT IS DIFFICULT FOR HIM TO READ A BOOK WITH A SMALL PRINT. YOU WILL PRESCRIBE THE GOGGLES TO HIM
a) convex lenses
b) concave lenses
c) lenses with different optical powers in the center and on the periphery

7. TO WIDE THE PUPIL IN ORDER TO EXAMINE THE BACK OF THE EYE, YOU INJECT GLASSES
a) m-cholinergic stimulant (m-cholinomimetic)
b) n-cholinergic stimulant (n-cholinomimetic)
c) m-cholinergic blocker (m-cholinolytic)
d) n-cholinergic blocker (n-cholinolytic)

8. IF A DISTURBANCE IS DETECTED DURING TONAL AUDIMETRY IN THE 15,000-20,000 HZ DIAPASON, IT IS MOST LIKELY A DISTURBANCE
a) the entire cochlea
b) a part of the cochlea
c) the ossicles of the middle ear
d) one of the semicircular canals
e) the utricle
f) the saccule

9. TO ASSESS THE DEGREE OF FUNCTIONAL DAMAGE TO THE RECEIVING CORTEX, THE FOLLOWING SHOULD BE USED
a) audiometry
b) perimetry
c) assessment of speech functions
d) examination of motor coordination

10. IF THE EAR IS AFFECTED BY A CONTINUOUS SOUND, THEN
a) hearing sensitivity decreases
b) hearing sensitivity increases
c) hearing sensitivity does not change
d) there is a long echo in the ear

1.1.2. Examples of situational tasks

Verifiable indicators of competence achievement: УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1.

Task 1.

To replenish the fluid deficit in the body, the patient was given an intravenous infusion of 400 ml of isotonic glucose solution. Why is the concentration of this solution (5%) higher than the concentration of glucose in the blood plasma?

Solution. The osmotic pressure of blood plasma (P0) is created by all the substances dissolved in it, in proportion to their molar concentrations. More than 90% of P0 is created by Na+ and Cl- ions, while glucose accounts for less than 1% of P0. Therefore, a solution containing only glucose at the same concentration as in plasma (about 0.1%) will be sharply hypotonic. Its administration will lead to osmotic hemolysis and edema.

Task 2.

The patient's hemoglobin and blood content is 90 g/L. What changes in the blood composition could cause this?
Solution. The normal hemoglobin content in the blood is 130-150 g/L. There are two fundamentally different ways to reduce this value:
1) a decrease in the amount of hemoglobin, for example, due to a disruption in its synthesis caused by a deficiency of Fe.
2) an increase in the volume of blood plasma - "dilution of the blood" (hemodilution), for example, when intravenous plasma substitutes are administered.

Task 3.
It is known that the transmission of excitation in a synapse consists of several stages. In an experiment, the application of a chemical substance to neuromuscular synapses resulted in the cessation of transmission of excitation from the nerve to the skeletal muscle. When acetylcholine was injected into the affected area, the transmission of excitation through the synapse was not restored. However, the introduction of the enzyme acetylcholinesterase restored the transmission of excitation.

Questions:

1. List the possible mechanisms for terminating excitation in a synapse?

2. What is the mechanism of action of the studied substance on the neuromuscular synapse?

1.1.3. Examples of security questions for an interview

Verifiable indicators of competence achievement: УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1

1. I. P. Pavlov's doctrine on analyzers. The structure of an analyzer.
2. General principles of the structure and functioning of analyzers.
3. The main functions of analyzers.
4. Physiology of receptors. Classification of receptors.
5. Adequate and inadequate stimuli of receptors. The mechanism of excitation of receptors.
6. Receptor and generator potential.
7. Coding in receptors. Distinguishing signals. Absolute and differential thresholds of sensation. Adaptation of analyzers.
8. Transmission and conversion of signals. Coding of information. Detection and recognition of images.
9. Optical system of the eye.
10. Accommodation. Abnormalities of refraction. Perception and processing of signals in the retina. Conduction and cortical parts of the analyzer.
11. Perception of color, light and dark adaptation, perception of space.

1.2. Assessment tools for students' independent work

The assessment of independent work includes testing.

1.2.1. Examples of single-response test questions

Verifiable indicators of competence achievement: УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1.

1. Changes in the EEG that occur in a sleeping person during slow-wave sleep...
a) alpha rhythm prevails;

b) beta rhythm prevails;
c) theta rhythm prevails;
d) delta rhythm prevails.

2. The biological significance of emotions is that they are a means of…
a) assessing the internal metabolic needs of the body;
b) assessing external influences;
c) communicating;
d) all of the above is true.

3. The following memory characteristics are distinguished…
a) capacity;
b) duration;
c) reproduction;
d) all of the above.

4. Short-term memory is based on...
a) the reverberation of impulses in neural circuits;
b) changes in the structure of RNA;
c) changes in the structure of DNA;
d) all of the above is true.

5. Types of motivations that are unique to humans and not found in animals:
a) biological;
b) social;
c) spiritual;
d) all of the above are correct.

6. The links that make up the functional structure of a behavioral act:
a) the reinforcement link;
b) the internal inhibition link;
c) the feedback link;
d) the action result acceptor link.

7. A characteristic feature of the paradoxical sleep phase is...
a) high-amplitude activity on the EEG;
b) slow-wave activity on the EEG;
c) high-frequency low-amplitude activity on the EEG;
d) all of the above.

8. The predominant EEG rhythm with a frequency of 10 Hz and the state of the brain that it indicates is...
a) beta rhythm during active activity;
b) alpha rhythm during calm wakefulness;
c) theta rhythm during the transition to sleep;
d) delta rhythm during slow-wave sleep.

9. The predominant EEG rhythm with a frequency of 20 Hz and the state of the brain that it indicates is...
a) beta rhythm during active activity;
b) alpha rhythm during calm wakefulness;
c) theta rhythm during transition to sleep;

d) delta rhythm during slow sleep.

10. The predominant EEG rhythm with a frequency of 6 Hz and the state of the brain that it indicates is...
a) beta rhythm during active activity;
b) alpha rhythm during calm wakefulness;
c) theta rhythm during transition to sleep;
d) delta rhythm during slow-wave sleep.

1.2.2. Examples of multiple-choice and/or matching and/or sequencing test questions

Verifiable indicators of competence achievement: УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1

1. The importance of sleep for the body is:
a) processing day information;
b) emotional discharge;
c) restoration of the body's performance;
d) memorization of information.

2. Properties of nervous processes underlying the division of animals and humans into types of VND:
a) the strength of the excitation process;
b) the strength of the inhibition process;
c) the mobility of nervous processes;
d) memory.

3. There are the following types of sleep:
a) hypnotic;
b) narcotic;
c) periodic seasonal;
d) periodic daily.

4. The afferent synthesis link is formed from the following components:
a) an unconditioned stimulus;
b) dominant motivation;
c) environmental afferentation;
d) memory.

5. There are the following types of memory:
a) declarative;
b) iconic;
c) visual and tactile;
d) short-term.

6. The first signs of the development of the second signal system appear...
a) at birth;
b) at the age of 1 month;
c) in the first half of the first year of life;
d) in the second half of the second year of life.

7. The following characteristics of unconditioned reflexes are distinguished:
a) innate;

b) constant;
c) individual (acquired);
d) require adequate stimulation for their existence.

8. The following characteristics of conditioned reflexes are distinguished:
a) acquired;
b) non-constant (temporary);
c) species;
d) any stimulus can be a signal of a conditioned reflex.

9. The following rules for the formation of conditioned reflexes are distinguished:
a) they are developed on the basis of unconditional reflexes;
b) the preceding (by a few seconds) conditioned stimulus;
c) repetition of a combination of conditional and unconditional stimuli;
d) the conditioned stimulus should be stronger than the unconditional one.

1.2.3. Examples of open-ended tasks (open-ended questions)

Verifiable indicators of competence achievement: ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1.

1.A person's abstract thinking is impaired. Which hemisphere's function is malfunctioning?

2. Damage to which parts of the cerebral cortex leads to a person's irresponsibility and inability to perform a series of consistent actions to achieve a goal in changing life situations?

3. The functions of the first signal system of reality predominate in humans. What kind of thinking does this person have?

4. It is known that lymph has a lower content of coagulation factors and platelets, and therefore clots more slowly than blood. However, the fibrinolytic activity of lymph is significantly higher than the fibrinolytic activity of blood. How can we explain this "discrepancy" in characteristics?

5. The systolic blood flow is 75 ml, and the heart rate is about 65 beats per minute. Calculate the minute volume of blood.

2. Assessment tools for intermediate certification in the discipline.

Intermediate certification is conducted in the form of an exam.

The list of questions for preparation for intermediate certification:

№	Questions for preparation for intermediate certification	Verifiable indicators of competence achievement
1.	Excitable tissues. General and specific properties of excitable tissues.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
2.	Modern concepts of membrane structure and function. Ion channels, their classification, and role. Transport of substances through biological membranes.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
3.	Bioelectric phenomena in living tissues. Resting membrane	УК-1.1.1, УК-1.2.1,

	potential. Method of its registration.	УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
4.	Excitation. Action potential, its phases.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
5.	Stimulus, classification. Types of electrical responses of excitable tissues (electrotonic potential, local response, action potential). Mechanism of their occurrence.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
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.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
7.	The laws of irritation: the law of force, the law of "all or none" and its relative nature.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
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.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
9.	Polar law of irritation. Physiological electrotone. Cathodic depression.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
10.	Receptors. Classification. Mechanism of converting stimulus energy into a nerve impulse. Properties of receptors.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
11.	Classification of nerve fibers. Propagation of excitation along unmyelinated and myelinated nerve fibers. Laws of nerve conduction. Lability.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
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.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
13.	Smooth muscles and their morphological and physiological features.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
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.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
15.	Single muscle contraction, its phases. Summation of contractions. Conditions of summation.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
16.	Tetanic contraction, types of tetanus. Optimum and pessimum	УК-1.1.1, УК-1.2.1,

	frequencies of stimulation.	УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
17.	Synapse. Classification. Structure. Features of excitation transmission in an electrical synapse.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
18.	The mechanism of excitation transmission in a chemical synapse. Properties of chemical synapses. Pathways of pharmacological regulation of synaptic excitation transmission.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
19.	Myoneural synapse, structure. Mechanism of excitation transmission in it. Terminal plate potential.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
20.	Inhibitory synapses, inhibitory mediators, and their receptors. The role of inhibitory synapses. Pharmacological blockade of inhibitory synapses.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
21.	Methods of studying the functions of the central nervous system.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
22.	A neuron, its physiological properties, and classification. Features of the occurrence and propagation of excitation in a neuron.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
23.	Synapses in the central nervous system. Structure, classification, and functional properties.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
24.	Reflex. Classification of reflexes. Reflex arc. Main components of the reflex arc. Reflex time, factors affecting the reflex time. Reflex receptive field.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
25.	The nervous center. The main properties of the nervous centers. Ways of pharmacological correction of the tone of the nervous centers.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
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.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
27.	Central inhibition. Basic functions of the inhibition process. Types of inhibition in the CNS.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
28.	Spinal cord: morpho-functional features, Bell-Magendie law, properties of spinal cord neurons, and basic functions of the spinal cord.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
29.	Metencephalon: medulla oblongata, pons. Basic functions of	УК-1.1.1, УК-1.2.1,

	the metencephalon.	УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
30.	Cerebellum. Functions of the cerebellum.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
31.	The midbrain. The reticular formation. The descending and ascending influences of the reticular formation of the brainstem.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
32.	The diencephalon (thalamus, hypothalamus) and its functions.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
33.	The most important subcortical (basal) nuclei. Functions of the subcortical nuclei.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
34.	The limbic system of the brain. Functions of the limbic system.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
35.	The somatic and autonomic nervous systems, their anatomical and functional differences. The structural organization of the autonomic nervous system.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
36.	Structural and functional features of the sympathetic division of the autonomic nervous system.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
37.	Structural and functional features of the parasympathetic part of the autonomic nervous system.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
38.	The metasympathetic division of the autonomic (vegetative) nervous system.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
39.	Ganglia of the autonomic nervous system. Features of excitation in the ganglia of the autonomic nervous system.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
40.	Autonomic reflexes and centers for regulating autonomic functions.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
41.	Cholinergic receptors, their types, localization. Cholinergic receptor activators and blockers. Effects of the interaction of the acetylcholine mediator with cholinergic receptors.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
42.	Adrenoreceptors, their types, and localization. Adrenoreceptor	УК-1.1.1, УК-1.2.1,

	activators and blockers. Effects of norepinephrine interaction with adrenoreceptors.	УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
43.	Cholinergic and adrenergic structures in the body. Pharmacological pathways for regulating the autonomic synapses.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
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.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
45.	The hypothalamic-pituitary system and its functions. The pituitary gland and its hormones.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
46.	Thyroid gland and its hormones, hyper- and hypofunction.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
47.	Endocrine functions of the pancreas.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
48.	Hormones of the adrenal cortex. Their role in regulating metabolism and body functions.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
49.	Functions of the adrenal medulla. The role of adrenaline in the body.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
50.	Sensory systems. General principles of analyzer structure. Basic functions and properties.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
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.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
52.	Visual analyzer. Perception and processing of signals in the retina. Conduction and cortical parts of the visual analyzer.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
53.	Pain analyzer. Nociceptive and antinociceptive systems. Pathways for correcting pain sensitivity.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
54.	Unconditioned and conditioned reflexes. Formation and biological significance of conditioned reflexes.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
55.	The doctrine of higher nervous activity. The role of I.P.	УК-1.1.1, УК-1.2.1,

	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.	УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
56.	Inhibition of conditioned reflexes and its types. Modern ideas about the mechanism of internal inhibition.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
57.	Features of human higher nervous activity. Types of higher nervous activity. I and II signal systems.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
58.	Basal metabolism and factors affecting its value. Methods for determining the correct values of basal metabolism. The body surface rule.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
59.	Physiology of thermoreceptors. Principles of body temperature regulation. Thermoregulation centers.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
60.	Physiological nutritional standards. Principles of food composition. The role of proteins, fats, and carbohydrates in human nutrition. The importance of vitamins.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
61.	Breathing, its significance. Respiratory organs. The main stages of breathing.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
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.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
63.	Gas exchange in the lungs. Partial pressure of gases (O2 and CO2) in the alveolar air and tension of gases in the blood. Basic patterns of gas transfer through the membrane.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
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 O2 and CO2 transport.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
65.	Vital capacity of the lungs and its components. Methods for determining them. Residual volume.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
66.	Respiratory center. Modern ideas about structure and localization. Automatism of the respiratory center.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
67.	Respiratory regulation. Nervous and humoral mechanisms. The role of the sensory apparatus. Basic respiratory reflexes.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1,

		ОПК-2.3.1
68.	The internal environment of the body. The blood system. The functions of blood.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
69.	Amount and composition of blood. Composition of blood plasma.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
70.	Physical and chemical properties of blood. Hemolysis and its types.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
71.	Red blood cells, number, functions. Erythropoiesis, its regulation. Hemoglobin, number, types, functions.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
72.	Leukocytes, number, typRed blood cells, number, functions. Erythropoiesis, its regulation. Hemoglobin, number, types, functions.s, functions. Leukocyte formula.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
73.	Platelets, number, functions. Regulation of thrombopoiesis.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
74.	Hemostasis. Coagulation and anticoagulation systems. Fibrinolysis.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
75.	Blood groups and Rh factor. Blood transfusion rules. Blood substitutes and their types.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
76.	Heart, structure, and functions. Factors that ensure the movement of blood in the right direction.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
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.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
78.	Electrical processes in the heart muscle. Action potential of cardiomyocytes, its phases, and origin. Features of cardiac muscle excitability. Refractory period.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
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.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
80.	The cardiac cycle, its periods, and phases.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-

		2.1.1., ОПК-2.2.1, ОПК-2.3.1
81.	Intracardial regulation. Cellular, intercellular, and intracardial mechanisms.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
82.	Innervation of the heart. The effect of sympathetic and parasympathetic nerves on the heart.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
83.	Humoral regulation of the heart. The effect of hormones, electrolytes, and metabolites on heart function.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
84.	The vascular system in the body and its main functions. Classification of blood vessels.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
85.	Hemodynamics. Factors that determine the movement of blood through the vessels. Basic indicators of hemodynamics.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
86.	Nervous mechanisms of vascular tone regulation. The concept of vascular tone and its types. Basal tone and its origin.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
87.	Central reflexes. The most important reflexogenic zones, chemo- and baroreceptor mechanisms. Conjugate reflexes – Danini-Ashner, Golts.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
88.	Blood pressure. Factors affecting blood pressure. Methods of recording blood pressure.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
89.	The vasomotor center, its structure, and functions.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
90.	Humoral regulation of vascular tone.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
91.	General characteristics of digestion, organs, and functions of the gastrointestinal tract.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
92.	Digestion in the oral cavity. Saliva, composition, and regulation of salivation.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
93.	Types of digestion. Cavitary and membrane digestion. Absorption.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-

		2.1.1., ОПК-2.2.1, ОПК-2.3.1
94.	Motility of the gastrointestinal tract.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
95.	Digestion in the stomach. Composition and properties of gastric juice. Regulation of gastric secretion. Adaptive nature of gastric secretory activity.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
96.	Digestion in the duodenum. The role of the liver and pancreas in the digestive process.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
97.	The liver, its structure, and functions.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
98.	The role of bile in digestion, its composition. The mechanism of bile secretion, its reflex and humoral regulation.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
99.	Properties and composition of intestinal juice. Regulation of intestinal secretion.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
100.	Excretory organs and their significance. Kidneys, functions, and structure.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
101.	The structure of the nephron and its blood supply.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
102.	The process of urine formation: glomerular filtration, tubular reabsorption, and tubular secretion.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
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.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
104.	Diuresis. The amount, composition, and properties of urine. Urination.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1
105.	Regulation of kidney activity.	УК-1.1.1, УК-1.2.1, УК-1.3.2, ,ОПК-2.1.1., ОПК-2.2.1, ОПК-2.3.1

Intermediate certification includes the following types of tasks: interview.

2.1. Example of an exam card:

Exam card № 10

Exam questions:

1. Excitable tissues. General and specific properties of excitable tissues.

2. Structural and functional features of the sympathetic part of the autonomic nervous system.

3. Red blood cells, number, functions. Erythropoiesis, its regulation. Hemoglobin, number, types, functions.

The full set of assessment tools for the discipline is available in the EIOS of the Volgograd State Medical University of the Russian Ministry of Health at the following link:

https://elearning.volgmed.ru/enrol/index.php?id=903

Considered at the meeting of the department of Normal physiology «20th» of May 2025, protocol № 10.

Head of the Department of Normal physiology S.V.Klauchek