Federal state budget educational institution of higher education "Ural state medical university" of the Ministry of Health of the Russian Federation

Department of normal physiology

APPROVED BY
Vice-Rector for educational activity
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«__» _____ 2025 г.

Fund of assessment tools for conducting intermediate certification in the discipline of Physiology (including maxillofacial physiology)

Specialty: 31.05.03 Dentistry
Higher education level: Specialist degree
Qualification: dentist

Ekaterinburg
2025

The fund of assessment tools for the discipline is compiled in accordance with the requirements of the Federal State Educational Standard of Higher Education specialty 05/31/03 Dentistry (specialty level), approved by Order of the Ministry of Science and Higher Education of the Russian Federation dated 08/12/2020 №984, and taking into account the requirements of the professional standard "Dentist", approved by order of the Ministry of Labor and Social Protection of the Russian Federation from May 10, 2016 № 227n.

Developer of the assessment fund:

Full name	Post	Academic degree	Academic title
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The Fund of Assessment Tools was reviewed by: Dmitry Grebnev, Doctor of Medical Sciences, Associate Professor, Head of the Department of Pathophysiology of the Federal State Budgetary Educational Institution of Higher Medical Education of the Ministry of Health of the Russian Federation

The evaluation fund was discussed and approved at the meeting of the Department of Normal Physiology on 05/21/2025 Protocol № 10

Discussed and approved by the Methodological Commission on June 06, 2025 Protocol № 1

1. Codifier for the discipline of Physiology (including maxillofacial physiology)

Competence category (group)	Code and name of the competence	The code and name of the competence achievement indicator	The index of the labor function and its content	Didactic Unit (DU)	Supervised learning elements of the discipline, formed as a result of			Methods of evaluating the results of mastering the discipline
					Knowledge	Skills	Skills	
Fundamentals of fundamental and natural science knowledge	OPK-9. He is able to evaluate morphofunctional states and pathological processes in the human body to solve professional problems.	And OPK-9.1 is able to analyze the structure, topography and development of cells, tissues, organs and organ systems in interaction with their function in norm and pathology, anatomical and physiological, age-sex and individual features of the structure and development of a healthy and diseased organism. OPK 9.2 is able to	Conducting an examination of the patient in order to establish a diagnosis (A/01.7)	DU 1 Physiology of excitable tissues	1. Physiology of excitable tissues, their functioning. 2. The laws of irritation of excitable tissues	1. To evaluate the parameters of regulation of the activity of excitable body tissues 2. Analyze and interpret the results of modern methods of laboratory functional diagnostics to identify pathological processes in excitable tissues	1. Knowledge of the medical and anatomical conceptual framework	Control on the topic "Excitable tissues": test, oral interview, workbook assessment

		evaluate morphofunctional and physiological parameters based on the results of a physical examination of the patient OPK 9.3. Is able to evaluate morphofunctional and physiological parameters based on the results of laboratory and instrumental examination of the patient. 9.4. Knows how to justify morphofunctional features, physiological conditions and pathological processes in the human body to solve professional problems		DU 2 Physiology of the central nervous system	1.Physiological features of the functioning of the central and peripheral nervous system. 2. Principles of evaluation of the parameters of the nervous system.	1. Assessment of the state of the autonomic and somatic nervous system 2. Assessment of the physiological state of the central nervous system	1. Using a neurological hammer to evaluate the reflex activity of the nervous system 2. Knowledge of the technique of electroencephalography	Central nervous system Physiology control: test, oral interview, workbook assessment
				DU 3 Physiology of sensory systems	1.Physiology of the body's sensory systems 2.Departments of analyzers, mechanisms of regulation of their work	1. Evaluate the physiological state of the body's sensory systems. 2. Evaluate visual acuity	1. Knowledge of methods for conducting visual acuity research, determining visual fields 2. Mastery of the method of assessing the thresholds of spatial tactile sensitivity 3. Medical and functional conceptual framework.	Control on the topic "Physiology of sensory systems":test, oral interview, workbook assessment

				DU 4 Physiology of higher nervous activity	1. The physiological foundations of thinking and consciousness. 2. Features of the analysis and synthesis of the mechanisms of system formation in the work of physiological systems. 3. Types of analytical and synthetic activity (conditioned reflexes, dynamic stereotype) 4. Modern methods of laboratory and diagnostic research of higher mental functions of a person	1. To analyze the course of physiological processes 2. To understand the mechanisms of formation of conditioned reflexes and dynamic stereotype. 3. Explain the principle of the most important research methods of higher mental functions	1. Studying the typological features of a person. 2. Medical and functional conceptual framework.	Control on the topic "Physiology of higher nervous activity":test, oral interview, workbook assessment

					used in medicine 1 Morphofunctional features of blood 2. Modern methods of laboratory and diagnostic examination of the blood system used in medicine 3. Basic physico-chemical parameters and biological constants of the blood system.			
				DU 5 Blood Physiology	1. The physiological foundations of thinking and consciousness. 2. Features of the analysis and synthesis of the mechanisms of system formatio	1. To evaluate the basic physico-chemical parameters and biological constants of the blood system, characterizing the functional state of a healthy person.	1. Mastery of basic hemogram analysis skills, determination of blood group affiliation. 2. Medical and functional conceptual framework.	Blood Physiology control: test, oral interview, workbook assessment

					n in the work of physiological systems. 3. Types of analytical and synthetic activity (conditioned reflexes, dynamic stereotype) 4. Modern methods of laboratory and diagnostic research of higher mental functions of a person used in medicine 1 Morphofunctional features of blood 2. Modern methods of laboratory and diagnostic examination of the blood system used in medicine			

					3. Basic physico-chemical parameters and biological constants of the blood system.			
				DU 6 Physiology of blood circulation	1. Morphofunctional features of the cardiovascular system. 2. Basic physico-chemical parameters and biological constants of the cardiovascular system 3. Modern methods of laboratory and diagnostic examination of the cardiovascular system used in medicine	1. To evaluate the basic physico-chemical parameters and biological constants of the cardiovascular system and the blood system, characterizing the functional state of a healthy person. 2. Is able to explain the principle of the most important methods of studying the blood system and the cardiovascular system of a	1. Basic skills of electrocardiogram and phonocardiogram analysis. 2.The technique of measuring blood pressure, pulse counting. 3. Medical and functional conceptual framework.	Control on the topic "Physiology of blood circulation": test, oral interview, workbook assessment

						healthy body 3. Differentiate the heart and blood vessels.		
				DU 7 Physiology of respiration and metabolism	1. Basic physico-chemical parameters and biological constants of the respiratory system 2. Departments of the respiratory system	1. To evaluate the basic physico-chemical parameters and biological constants of the respiratory system of the body, characterizing the functional state of a healthy person. 2. Explain the principle of the most important methods of studying the functions of the respiratory system of a healthy body 3. Differentiate the sections of the respirator	1. Analysis of data from basic clinical ,physiological and laboratory studies of the respiratory system of the body.	Control on the topic "Physiology of respiration and metabolism": test, oral interview, workbook assessment

						y tract		
				DU 8 Physiology of digestion	1. Basic physico-chemical parameters and biological constants of the digestive system of the body, including the features of the oral cavity, characterizing the functional state of a healthy person	1.To evaluate the basic physico-chemical parameters and biological constants of the digestive system of the body, the oral cavity and the maxillary system, characterizing the functional state of a healthy person.	1. Analysis of data from basic clinical ,physiological and laboratory studies of metabolism, the digestive system of the body, characterizing the functional state of a person A medico-functional conceptual framework.	Control on the topic "Physiology of digestion": test, oral interview, workbook assessment

2. Assessment tools for intermediate certification

2.1. Test tasks

Read it and choose the correct answer.

What is auxotonic muscle contraction?

1) increased tone with constant length

2) reducing the length while maintaining the same tone

*3) decrease in length and increase in tone

4) Length reduction and tone reduction

5) increase in length and decrease in tone

What effects does irritation of the sympathetic nerves have on the work of the heart?
1) positive ino-, chrono-tropic, negative bathmo- and dromo-tropic
2) negative inotropic, chronotropic, positive bathmotropic and dromotropic
*3) positive ino-, chrono-, bathmo- and dromotropic effects
4) negative ino-, chrono-, bathmo- and dromotrope effects
5) has no effect

Which of the components of an emotional reaction is least controlled by consciousness?
1) subjective feelings
2) subjective experiences
3) somatic reflexes
*4) vegetative reflexes
5) behavioral reactions

What phenomenon characterizes the shift of the Price-Jones curve for red blood cells to the right?
*1) macrocytosis
2) microcytosis
3) normocytosis
4) erythrocytosis
5) erythropenia

Read the text and match the elements from the two columns:

1. Peace potential	A. A short-term change in the membrane potential propagating along the membrane
2. Potential actions	B. A change in the membrane potential, in which the inner side of the membrane becomes more positive relative to the outer one.
3. Depolarization	C. A return of the membrane potential to its initial level after depolarization
4. Repolarization	D. An increase in the negative charge on the inner side of the membrane relative to the initial level
5. Hyperpolarization	E The state of the membrane, in which the inner side of the membrane has a negative charge relative to the outside

Answers: 1 – E; 2 – A; 3 – B; 4 – C; 5 – D

1. The threshold of irritation	A. The maximum number of action potentials that a tissue can generate per unit of time
2. The refractory period	B. The ability of a tissue to transmit excitation along its structure
3. Conductivity	C. The ability of a tissue to respond to irritation by generating an action potential
4. Excitability	D. The minimum strength of the stimulus required for the occurrence of an action potential
5. Lability	E. The period of time during which the excitable tissue is unable to generate a new action potential

Answers: 1 – D, 2 – E, 3 – B, 4 – C, 5 – A

1. Cardiac output	A. The phase of the cardiac cycle, during which the myocardium contracts and blood is released into the vessels
2. Blood pressure	B. The amount of blood released by the heart into the vessels in one minute
3. Systole	C. The amount of blood released by the ventricle of the heart in one contraction
4. Diastole	D. The phase of the cardiac cycle, during which the myocardium relaxes and the chambers of the heart are filled with blood
5. Minute volume of blood circulation	E. The pressure that the blood exerts on arterial walls

Answers: 1 – C, 2 – E, 3 – A, 4 – D, 5 – B

1. Peripheral resistance	A. Receptors located in the walls of blood vessels that respond to changes in pressure
2. The conduction system of the heart	B. The resistance that blood vessels exert to blood flow
3. Baroreceptors	C. The ability of the heart to generate electrical impulses without external stimuli
4. Venous return	D. The complex of structures of the heart that ensure the generation and conduction of electrical impulses
5. Heart automation	E. The amount of blood returning to the heart through the veins

Answers: 1 – B, 2 – D, 3 – A, 4 – E, 5 – C

Read the text and set the correct sequence.

Phases of the action potential of the neuron axon:
1. Negative trace potential
2. Positive trace potential
3. Repolarization
4. Depolarization

The correct order:
1. Depolarization
2. Repolarization
3. Negative trace potential
4. Positive trace potential

Phases of the action potential of the working cardiomyocyte of the left ventricle:
1. Fast final repolarization
2. Depolarization
3. Initial repolarization
4. Delayed repolarization (plateau)

The correct order:
1. Depolarization
2. Initial repolarization
3. Delayed repolarization (plateau)
4. Fast final repolarization

The conduction system of the heart is:
1. Purkinje Fibers
2. Atrioventricular node
3. A bundle of Gis
4. Sinoatrial node

The correct order:
1. Sinoatrial node
2. Atrioventricular node
3. A bundle of Gis
4. Purkinje Fibers

Functional classification of vessels:
1. Exchange rates
2. Capacitive
3. Collective
4. Resistive
5. Elastic-stretchable

The correct order is:
1. Elastic-stretchable
2. Resistive
3. Exchange rates
4. Collective
5. Capacitive

Read the question and answer it:
What is the hematocrit index?
Right answer: This is the ratio of the volume of shaped elements to the volume of blood.

When is the blood supply to the left ventricular myocardium?
The correct answer is: Mainly during diastole.

What is the mechanism by which gases pass from the alveoli of the lungs into the blood and back? Right answer: By the mechanism of diffusion.

What is the caloric equivalent of oxygen?
Right answer: This is the amount of energy generated by absorbing 1L of O2.

Read the task and answer the question.

Task 1. Exhaled air contains 4.53% carbon dioxide and 15.93% oxygen. What is the value of the respiratory coefficient (DC)?
Answer: DC = 0.9.

Task 2. In 5 minutes, the subject exhaled 30 liters of air into the Douglas bag. The oxygen content in the exhaled air is 16.93%. What is the value of the minute volume of absorbed oxygen (MOPK)?

The answer is: MOPK = 240 ml

Task 3. The minute volume of absorbed oxygen is 240 ml (0.24 liters). The arteriovenous oxygen difference is 0.045 (4.5 ml per 100 ml of blood). Determine the minute volume of blood (IOC)?
Answer: IOC = 5.333 liters

Task 4. The athlete ran 10 km at a speed of 12 km / h, having consumed 597.6 calories. Determine the working gain if the basic metabolism (OO) is 1,639 kcal/day?
Answer: the working increase will be 540.92 kcal.

2.2. Topics of the abstract papers

- The interaction of the organs of the maxillofacial region with various body systems
- Non-drug rehabilitation
- Age-related features of the maxillofacial region
- Adaptation and compensation in dentistry.
- Medical aspects of emotions. Emotional stress.
- Deontological aspects in the work of a dentist
- Chronophysiology
- Physiology of the endocrine glands

2.3. Control questions for self-study

Fundamentals of neurohumoral regulation of physiological functions.

1. Self-regulation of physiological functions. Principles of humoral and reflex regulation of functions, neurohumoral regulation.
2. The hypothalamus. Its involvement in the regulation of autonomic functions. Hypothalamic-pituitary relationship.
3. Hormones of the pituitary gland, its functional connections with the hypothalamus and participation in the regulation of endocrine glands.
4. The general properties of hormones and the mechanisms of their interaction with "target cells".
5. Hormone-forming function of the gastrointestinal tract.
6. The role of calcium and phosphorus in the body. Humoral regulation of their content in the blood.
7. Endocrine function of the pancreas.
8. Male and female sex hormones, their physiological role.
9. Endocrine function of the parathyroid glands. Regulation of calcium and phosphorus ions in the body.
10. Endocrine function of the adrenal glands. The physiological role of adrenal hormones.

Physiology of excretion

1. Features of water-salt metabolism. The main mechanisms of its regulation.
2. Kidneys. Formation of primary urine. Ultrafiltrate, its quantity and composition. Clinical methods of filtration assessment.
3. Physiological mechanisms of secondary urine formation. Its composition and properties.
4. Regulation of the excretory function of the kidneys. The effect of blood pressure in the glomeruli and blood supply to the tubules on urine formation.

Evaluation criteria

The result is evaluated as "credited" or "not credited", knowledge of the discipline is counted if there is a positive answer to 71% or more of the test tasks in this discipline.

1. A positive response to less than 71% of the test tasks indicates a lack of competence in the discipline.
2. A positive response to 71-80% of the test tasks indicates a low level of competence formation in the discipline.
3. A positive response to 81 – 90% of the test tasks indicates an average level of competence formation in the discipline.
4. A positive response to 91-100% of the test tasks indicates a high level of competence formation in the discipline.

71-80% of correct answers are satisfactory. 81-90% of correct answers are good. 91% or higher is excellent.

An algorithm for determining a student's rating in a discipline.

The intermediate certification of students is carried out in accordance with the developed point-rating system for assessing students' academic achievements.

1. Rules for the formation of discipline assessment within the framework of the current academic performance control

1.1. As part of the ongoing monitoring of academic performance in the discipline, the teacher organizes and carries out a cumulative assessment in the process of boundary control by evaluating the knowledge, skills, and elements
of competencies acquired by students on the following topics:

1.2.

2 semester

Physiology of excitable tissues.
Physiology of the central nervous system.
Physiology of sensory systems.
Physiology of higher nervous activity.

3 semester

Blood physiology. Physiology of humoral regulation.
Physiology of blood circulation.
Physiology of respiration and energy metabolism.
Physiology of digestion and excretion.

The student's assessment for modular control includes:

- oral interview from 1 to 3 points;
- computer testing from 71% to 100% - 1 point;
- keeping a workbook – 1 point.

The assessment based on the results of border control takes place on a five-point scale. Positive grades are: "excellent", 5 points; "good", 4 points; "satisfactory", 3 points.

The result of the current monitoring of academic performance in the discipline are the grades received by the student for all the boundary controls in the semester, provided for by the discipline's work program.

1.3 The final result of the current control of academic performance in the semester is expressed in rating points as a percentage of the sum of positive marks on the boundary controls received by the student in the semester, to the maximum possible number of points based on the results of all boundary controls in the semester.
Flow control = ∑ (a1+a2+... ai) / ∑ (m1+m2+...+mi) x 100%, where

Flow control – the total number of rating points based on the results of the current control in the semester;
a1, a2, ai – positive marks (3, 4, 5) obtained by the student based on the results of the boundary controls provided for in the work program of the discipline in the semester;
m1, m2, mi – maximum marks (5) for the same boundary controls provided for in the work program of the discipline in the semester.

The result of the current academic performance monitoring is the number of rating points received by the student during the semester, in the range of 40-100.
The average value of a student's rating points in a discipline in semesters = rating points of 1 semester + rating points of 2 semesters divided by the number of semesters.

1.4. The maximum amount of rating points that a student can score in a discipline in a semester based on the results of the current academic performance control is 100 rating points.

The minimum amount of rating points that a student must score in a discipline in a semester based on the results of the current academic performance control is 40 rating points.

Students who have scored 40 rating points, but do not have positive results on all boundary controls in the discipline in the semester, are allowed to take the exam. In this case, as part of the examination control, the student will be offered additional questions on the subject of failed boundary controls in the semester.

1.5. By the decision of the department, a student who has demonstrated an increased level of knowledge during the course of mastering the discipline can receive an excellent grade in the automatic format without passing an exam. Reasons for giving an "excellent" grade in the automatic format:
- a high level of academic achievement demonstrated at the boundary controls in the discipline (grades "excellent" or "excellent" and "good" with the final result of the current academic performance control of at least 95%), mandatory attendance at lectures with the provision of a summary to the teacher

And

- participation in the research work of the Department (SS) with subsequent registration of the results in the form of articles, abstracts, presentation at scientific and practical conferences; participation in the educational and methodological work of the department; winners of Olympiads, competitions at the University, region or the Russian Federation representing the Department of Normal Physiology of the Federal State Budgetary Educational Institution of Higher Medical Education of the Ministry of Health of the Russian Federation.

The final decision is made by the department based on the achievements presented. This Regulation does not provide for a grade below "excellent" in the automatic format.

1.6. The procedure for completing missed classes in the semester.

Students are required to master the educational program in good faith, including attending classes provided for in the curriculum or individual curriculum, and independently preparing for classes.

Students who have missed practical classes in the semester are required to complete them before the start of the examination session.

The department is obliged to provide an opportunity to work out the missed classes before the start of the examination session. The work schedule should be drawn up during the first two weeks of the beginning of each semester for the current semester, brought to the attention of students, including posted in the electronic information and educational environment of the University.

Missed lectures are not processed.

The head of the department informs the director of the Institute about the attendance of practical classes and the current academic performance of students at least once a month.

1.7. The procedure for obtaining rating points is established if the student has not received the minimum minimum rating points (40 points) required for admission to the exam.

1.8. The department develops and organizes the procedure for obtaining rating points to a set minimum, including sets dates, determines the form of its conduct, appoints responsible teachers.

1.9. Students whose rating in the discipline in the semester did not exceed the established minimum and who underwent the procedure for obtaining rating points lose the right to take an exam or a test in the "automatic" format.

1.10. Assessment criteria for boundary controls, their number, form of assessment, content, examples of assessment tools for boundary controls are determined by and it is approved at a meeting of the department for which the discipline is assigned. This information should be presented in the discipline's work program.

2. Rules for the formation of an assessment of a discipline in the framework of an interim assessment

2.1. As part of the intermediate certification in the discipline, the teacher organizes and performs a cumulative assessment during the examination control by evaluating the knowledge, skills, and elements of competencies acquired by students.

The examination control in the discipline is conducted in the format of an oral interview and consists of 4 ticket questions. The answer to each question is evaluated according to the evaluation criteria: "excellent" 5 points, "good" 4 points, "satisfactory" 3 points, "unsatisfactory".

The final grade in the discipline is formed as an arithmetic average for 4 questions only in case of a positive result for each of them. If the student's answer to one or more questions is rated "unsatisfactory", an exam grade of "unsatisfactory" is given.

The exam grade is the final grade for the discipline. This grade is displayed in the record book, the exam sheet and in the diploma supplement.

The assessment scale is based on the following criteria and scores:

"Excellent" – 5 points	The student demonstrates deep knowledge of the main processes of the subject area being studied, the answer is characterized by the completeness of the topic disclosure; owns the terminological apparatus; the answer is logical and consistent; knows how to explain the essence of phenomena, processes, events in a reasoned manner, analyze, draw conclusions and generalizations, give examples; knows how to justify the choice of a method for solving a problem, demonstrates its solving skills

"Good" – 4 points	The student demonstrates at a basic level knowledge of the main processes of the subject area being studied, the answer is characterized by the completeness of the disclosure of the topic; owns the terminological apparatus; is fluent in monologue, but allows inaccuracies in the answer; is able to explain the essence of phenomena, processes, events, draw conclusions and generalizations, give reasoned answers, give examples; however, allows inaccuracies in the answer; there are difficulties in answering the questions
"Satisfactory" – 3 points	The student demonstrates insufficient knowledge to explain the observed processes of the subject area under study, the answer is characterized by insufficient completeness of disclosure of the topic on the main issues of theory and practice, errors are made in the content of the answer; the student demonstrates the ability to give reasoned answers and give examples at a threshold level
"Unsatisfactory" – 2 points	The student demonstrates poor knowledge of the subject area being studied, and lacks the ability to analyze and explain the observed phenomena and processes. The student makes serious mistakes in the content of the answer, demonstrates a lack of understanding of the problem. Many of the requirements for the assignment have not been met. The student lacks the ability to argue answers and give examples.

2.2. A point-rating system for assessing students' academic achievements in each discipline is introduced at the beginning of the semester.

At the first lesson, the department informs students about the criteria for evaluating students' academic achievements in a particular discipline during the current and examination control, the number of boundary controls per semester and the timing.

Making changes and additions to the point-rating system for assessing students' academic achievements in a discipline whose study has already begun is not acceptable.

2.3. The examination grade in the discipline is given on a five-point scale. The grade "unsatisfactory" is placed on the exam sheet. This fact indicates the presence of academic debt in this discipline.

The student has the right to retake the intermediate certification in the relevant discipline no more than twice within the time limits set by the University.

2.4. A student who has failed to arrive at the examination control according to the schedule of the examination session for a valid reason has the right to retake it in an individual direction in accordance with the established procedure.