

**FEDERAL STATE BUDGET EDUCATIONAL
HIGHER EDUCATION INSTITUTION
"ROSTOV STATE MEDICAL UNIVERSITY"
MINISTRY OF HEALTH OF THE RUSSIAN FEDERATION**

FACULTY OF TREATMENT AND PREVENTION

Appraisal Fund
in the discipline "Normal physiology"

Specialty 05/31/01 General Medicine

1. Interim certification formtest and exam

2.Type of intermediate certificationintermediate certification of students in the form credit is carried out on the basis of current monitoring of progress, with a positive assessment in 4 final classes during the 3rd semester. Interim certification of students in the form of an exam takes place at the end of the 4th semester in the form of an interview.

3. List of competencies formed by the discipline or in formation which discipline is involved

Code competencies	Content competencies (results of mastering OOP)	Contents of the elements of competencies in the implementation of which the discipline participates
OPK 7	readiness for use basic physical chemical, mathematical and other natural sciences concepts and methods for solving professional tasks	capable of a systematic approach to understanding the physiological mechanisms underlying interaction with environmental factors and the implementation of adaptive strategies of the human body and the implementation of normal functions of the human body from the position of the theory of functional systems; capable of assessing patterns the functioning of various systems of the human body and the characteristics of intersystem interactions in the context of performing purposeful activities from the perspective of the doctrine of adaptation and cross-adaptation;
OPK-9	ability to evaluate morphofunctional, physiological states and pathological processes in the body person to solve professional tasks	trained methods and principles of research assessments state of regulatory and homeostatic body systems in experiment, taking into account their applicability in clinical practice; trained in methods for assessing a person's functional state, regulatory and homeostatic states during various types of purposeful activities;

1.Stages of developing competencies in the process of mastering educational programs

Competence	Disciplines	Semester
OPK-7	Physics mathematics	1
	medical informatics	2
	chemistry	1
	Biochemistry	2,3,4
	biology	1.2
	topographic anatomy	5.6
	histology, embryology, cytology	2.3
	fundamental medicine	7
OPK-9	anatomy	1,2,3
	topographic anatomy	5.6

	histology, embryology, cytology	2.3
	microbiology, virology	3.4
	immunology	10
	pharmacology	5.6
	pathological anatomy	5.6
	clinical pathological anatomy	eleven
	pathophysiology	5.6
	clinical pharmacology	12
	propaedeutics of internal diseases	5.6
	fundamental medicine	7
	vaccinology	3
	endovascular surgery	9-10

2. Stages of developing competencies in the process of mastering the discipline

Sections of the discipline	Codes generated competencies	
	OPK-7	OPK-9
Semester 3		
Section 1 General physiology.	+	+
Section 2 Physiology of sensory functions.	+	+
Section 3 Nervous and hormonal regulation of physiological functions.	+	+
Section 4 Physiological foundations of mental activity.	+	+
Semester 4		
Section 5 Physiology of the blood system.	+	+
Section 6 Physiology of the respiratory system.	+	+
Section 7 Physiology of blood circulation and lymph circulation.	+	+
Section 8 Physiology of metabolism, thermoregulation, nutrition and digestion.	+	+
Section 9 Physiology of excretion.	+	+

3. Current control

Forms of control from discipline RPD	Approximate (standard) tasks, quantity
Oral survey, interview, written knowledge test	test questions on the topics of the section
Tests	10 questions
Situational tasks	3 tasks with standard answers
Practical skills	2 skills

Test control

- An analyzer is a system that includes:
 - sense organs;
 - pathways and projection fields of the cerebral cortex; B. receptor section and conductive section;
 - peripheral (receptor), conductive and cortical sections.**

2. Receptors specialized for the perception of one type of stimulus are called: A. primary sensory;
B. monomodal;
B. multimodal;
G. sensory.
3. The vital nerve centers of the medulla oblongata include: A. cough and sneeze centers;
B. centers of lacrimation and closure of the eyelids;
B. vasomotor and respiratory centers; D.
center of the gag reflex.
4. The digestive centers of the medulla oblongata include: **A. centers of salivation, sucking, chewing, swallowing;**
B. centers of the gag reflex, salivation, sucking; B.
sucking and chewing centers;
D. swallowing center only.
5. The system of calcium-regulating hormones consists of: A.
adrenaline, norepinephrine and thyroxine;
B. vasopressin, aldosterone and natriuretic peptide; B.
oxytocin, glucagon and insulin;
G. calcitonin, parathyrin and calcitriol
6. In the body of an adult, blood makes up the body weight (%): **A. 6-8;**

B. 20;
V. 16-18;
G. 28.
7. The involuntary act of defecation is carried out with the participation of neurons.
A. medulla oblongata; B.
cerebral cortex;
B. hypothalamus;
G. lumbosacral spinal cord.
8. A person produces saliva volume during 1 day without eating: A.
100 ml;
B. no more than 500
ml; **V. 0.5-2 l;**
G. 4-5 l;
9. The cardiac cycle includes: A.
ventricular systole and diastole;
B. systole and diastole of the atria and ventricles; B. time of complete blood circulation; G.
atrial systole and diastole.
10. Sympathetic nerves have effects on the heart:

A. positive chronotropic and negative inotropic; B. negative chronotropic and inotropic;
B. negative chronotropic and positive inotropic; **G. positive chronotropic and inotropic.** Correct answers to test questions are marked "**bold**" font.

Practical skills

1. Technique for determining a person's blood group according to the ABO system using monoclonal antibodies (coliclones anti-A and anti-B).
2. Spirometry.
3. Auscultation of the heart.
4. Electrocardiography.
5. Measuring blood pressure in humans.

Situational tasks

1. For the purpose of assessing the reflex function of the nervous system in people of different ages The plantar reflex was studied. At the same time, streak irritation of the surface of the foot in newborns was accompanied by dorsiflexion of the foot, extension of the toes and their fan-shaped divergence, and in people of mature age – to plantar flexion of the foot and toes. Do the subjects have any deviation from the norm? What explains this difference in the nature of the plantar reflex?

Answer:There is no deviation from the norm. Differences in response are associated with insufficient development of corticospinal (pyramidal) tracts in a newborn child.

2. A healthy resident of the lowland region came to the highlands. How Will his blood viscosity change in high altitude conditions? What are the standards for this indicator and the factors on which blood viscosity depends. What is the physiological basis for changes in blood viscosity at high altitudes?

Answer:Blood viscosity will increase due to an increase in the number of red blood cells. IN In high altitude conditions, low partial pressure of oxygen in the air leads to the development of hypoxia and/or hypoxemia. This is accompanied by increased production of erythropoietin and, as a result, activation of erythropoiesis.

3. In animals under conditions of a chronic experiment, hypofunction of the adrenal cortex, in particular their zona glomerulosa.

How will this change sodium reabsorption in the nephron tubules? Give a physiological basis for this fact. Indicate the main hormones involved in the regulation of tubular sodium reabsorption.

Answer:Sodium reabsorption in the nephron tubules will decrease due to a decrease in aldosterone concentrations. The main hormones involved in the regulation of tubular sodium reabsorption include aldosterone (increases reabsorption) and natriuretic hormone (decreases reabsorption).

Oral survey, interview, written knowledge test

1. Structure and functions of cell membranes. Structure, properties and functions of ion channels of the cell membrane. Types of active and passive transport of substances across the cell membrane.
2. Peripheral, conductive and cortical sections of the olfactory sensory system. The mechanism of excitation of olfactory receptors.
3. Morphofunctional organization of the spinal cord. Neural organization of spinal segments. Classification and characteristics of spinal reflexes.
4. The role of instincts and conditioned reflexes in human adaptive activity.
5. Concept of the blood system. Functions, volume, composition and properties of blood.
6. Function of external respiration. Biomechanics of respiratory movements. The role of the respiratory muscles in inhalation and exhalation.
7. Physiological properties of the myocardium. Automaticity gradient in the myocardium. Functions of the conduction system of the heart.
8. Secretory function of the stomach. Composition and functions of gastric juice. Regulation of gastric juice secretion.
9. Methods for studying energy metabolism. Direct and indirect calorimetry. Respiratory coefficient and caloric equivalent of oxygen.
10. Structural and functional unit of the kidneys. The structure of nephrons. Blood supply to the kidneys and nephrons

7.1 Interim certification in the form of "pass"

Interim certification of students in the form of a test is carried out on the basis of ongoing monitoring of academic performance and class attendance during the 3rd semester.

7.2 Interim certification in the form of an "exam"

Interim certification of students in the form of an exam takes place at the end of the 4th semester in the form of an interview.

Interim certification forms from the RPD disciplines	Approximate (standard) tasks, quantity
Interview	All control questions on the discipline

List of questions for written knowledge control:

Questions from the autumn semester program

1. Structure, functions of cell membranes and ion channels of the cell membrane. Types of active and passive transport of substances across the cell membrane.
2. Resting potential, its origin and ionic mechanisms. Action potential phases, their origin.
3. Phase changes in cell excitability during the generation of an action potential. Excitability criterion (irritation threshold, chronaxy, lability).
4. Laws of irritation of excitable tissues (strength, duration, rate of increase of irritation). Laws of direct current action on excitable tissues.
5. Classification, physiological properties and functions of neurons. The mechanism of neuron excitation.
6. Conducting excitation in unmyelinated and myelinated nerve fibers. Functional classification of nerve fibers.
7. The law of anatomical and functional integrity of the nerve fiber. Parabiosis according to N.E. Vvedensky, phases of parabiosis. Practical application of parabiosis in medicine.

8. Physiological properties and functions of striated muscle cells. The mechanism of contraction of striated muscle cells.
9. Single contraction of skeletal muscles, its phases. Tetanic contraction of skeletal muscles. Serrated and smooth tetanus muscles.
10. Physiological properties and functions of smooth muscle cells. Types of chemoreceptors in smooth muscle cell membranes.
11. General plan of the structure of synapses. Classification of synapses.
12. The mechanism of excitation in electrical and chemical synapses of the nervous system. Postsynaptic potentials in nerve synapses, their nature.
13. The mechanism of excitation in neuromuscular synapses. Role of Ca^{2+} in the mechanism of the synaptic process.
14. Inhibition in the nervous system. Types of braking. The nature of pre-, postsynaptic, recurrent and pessimal inhibition.
15. Classification of receptors. General mechanisms of receptor excitation, bioelectric phenomena in them (receptor and generator potentials).
16. Signal discrimination. Weber-Fechner law. Adaptation of the sensory system.
17. Peripheral (receptor) section of the olfactory sensory system. The mechanism of excitation of olfactory receptors.
18. Conductive and cortical sections of the olfactory sensory system.
19. Peripheral (receptor) section of the taste sensory system. The mechanism of excitation of taste buds.
20. Conductive and cortical sections of the taste sensory system.
21. Cutaneous mechanoreception (mechanism of excitation of skin mechanoreceptors). Cutaneous thermoreception (mechanism of excitation of skin thermoreceptors).
22. Muscle-tendon and joint proprioception: muscle spindles, their characteristics and mechanism of excitation; Golgi tendon receptors, their characteristics and mechanism of excitation.
23. Conductive and cortical sections of the somatosensory system: lemniscal and spinothalamic pathways, their characteristics. Sensory homunculus.
24. Interoreceptors, their characteristics. Conducting pathways and centers of the visceral sensory system.
25. Physiological role of pain. Theories of the origin of pain.
26. Classification of physiological pain. Reflected and projected pain, mechanisms of their development.
27. Pain suppression system (antinociceptive system). Local and descending pain control.
28. Structure and functions of the vestibular apparatus. Characteristics of the receptors of the vestibular apparatus, the mechanism of vestibuloreception.
29. Conductive and cortical sections of the vestibular sensory system. Vestibular reflexes, their characteristics. Eye nystagmus.
30. Structure and functions of the outer, middle and inner ear. The mechanism of auditory reception.
31. Conductive and cortical sections of the auditory sensory system. Binaural hearing.
32. Methods of hearing research. Bone and air conduction studies (Weber and Rinne tests).
33. Composition and functions of the optical apparatus of the eye. Accommodation of the eye, its mechanisms when viewing near and distant objects.
34. Myopia, farsightedness, astigmatism. Their origin and methods of correction.
35. Pupillary reflex, mechanisms of constriction and dilation of the pupil.
36. Structure and functions of the retina. The pigment layer of the retina and its functions.

37. Photoreceptors, their classification, structure and functions.
38. Visual pigments, their types and functions. Photochemical processes in the receptors of the retina.
39. Morphofunctional characteristics of the conductive and cortical sections of the visual sensory system. Binocular vision, its origin.
40. Color vision. Theories of color perception. Types of color blindness.
41. Visual acuity, field of view. Methods for determining visual acuity and fields.
42. Morphofunctional organization of the spinal cord. Neural organization of spinal cord segments. Functions of the posterior and anterior roots of the spinal cord segments. Bell-Magendie law.
43. Alpha and gamma motor neurons of the spinal cord, their functions. Neurons of the lateral horns of the spinal cord segments, their functions.
44. Ascending and descending pathways of the spinal cord, their functions.
45. Nerve centers and nuclei of the medulla oblongata, their functions. Nerve centers and nuclei of the pons, their functions.
46. Functions of the nuclei of the inferior and superior colliculus. Functions of the red nucleus and substantia nigra of the midbrain.
47. Functions of the reticular formation of the brain stem, their characteristics. Ascending and descending influences of the reticular formation on other structures of the brain and spinal cord.
48. Morphofunctional organization of the thalamus. Classification and functions of thalamic nuclei.
49. Cerebellar control of motor activity. The role of the cerebellum in the regulation of muscle tone.
50. Morphofunctional organization of the striopallidal system of the brain. The caudate nucleus and putamen, their afferent and efferent connections. The globus pallidus, its relationship with the caudate nucleus.
51. Morphofunctional organization of the limbic system of the brain. Limbic circles. Hippocampus, its functions. The amygdala and its functions.
52. Morphofunctional organization of the hypothalamus. Features of neurons and the blood-brain barrier in the hypothalamus. The role of the hypothalamus in the regulation of physiological functions.
53. Sensory, associative and motor areas of the cerebral cortex. Bioelectrical activity of the brain. EEG rhythms.
54. Interhemispheric relationships. Functional interhemispheric asymmetry.
55. Sympathetic and parasympathetic parts of the autonomic nervous system. Autonomic ganglia are like nerve centers located on the periphery.
56. Tone of the sympathetic and parasympathetic parts of the autonomic nervous system, their influence on organ functions. Adaptation-trophic function of the sympathetic nervous system (Orbeli-Ginetzinsky phenomenon).
57. Synaptic process in the sympathetic and parasympathetic ganglia.
58. Synaptic interaction of postganglionic fibers with organ cells in the sympathetic nervous system.
59. Synaptic interaction of postganglionic fibers with organ cells in the parasympathetic nervous system.
60. Centers for regulation of visceral functions. A method for determining the initial tone of the autonomic nervous system in humans using the Kerdo index.
61. Principles of hormonal regulation: direct and feedback regulatory communication.
62. Features of the biosynthesis, secretion and transport of hormones of different chemical natures.
63. Types and routes of action of hormones on target cells.

64. Molecular mechanisms of action of hormones of different chemical nature on target cells.
65. Neurosecretory function of the hypothalamus. Release factors, their characteristics. Hypothalamic-pituitary connections.
66. Hormones of the neurohypophysis, their functions.
67. Hormones of the adenohypophysis, their functions.
68. Endocrine activity of the thyroid gland. The hypothalamic-pituitary system regulates the endocrine activity of the thyroid gland.
69. Iodine-containing thyroid hormones, biosynthesis and physiological action of iodine-containing thyroid hormones.
70. Calcitonin, parathyrin, calcitriol as components of the hormonal regulation system of calcium homeostasis.
71. Hormones of the zona glomerulosa of the adrenal cortex, their physiological effect.
72. Renin-angiotensin-aldosterone system, its physiological functions.
73. Atriopeptide and its role in the system of hormonal regulation of sodium homeostasis.
74. Hormones of the zona fasciculata of the adrenal cortex, their physiological effects.
75. The hypothalamic-pituitary system for regulating the endocrine activity of the zona fasciculata of the adrenal cortex.
76. Hormones of the zona reticularis of the adrenal cortex, their physiological effect.
77. Hormones of the adrenal medulla, their physiological effects. Hypothalamic-sympatho-adrenal system.
78. The mechanism of the hyperglycemic action of glucagon. The mechanism of the hypoglycemic action of insulin.
79. Hypothalamic-pituitary system of regulation of the gonads. Ovarian hormones, their functions. Hormones of the testes, their functions.
80. Endothelium of blood vessels as endocrine tissue. Physiological effects of biologically active substances synthesized by endothelial cells.
81. Instincts, their role in human adaptive activity. Classification of instincts, their characteristics.
82. Conditioned reflexes, their role in human adaptive activity. Classification of conditioned reflexes, their characteristics.
83. Neurophysiological mechanism of formation of a conditioned reflex.
84. Rules of formation, stages of formation and general properties of conditioned reflexes.
85. Inhibition of conditioned reflexes, its role in human adaptive activity. Classification of inhibition of conditioned reflexes.
86. Types of higher nervous activity according to I.P. Pavlov, their relationship with the types of temperament according to Hippocrates.
87. Psychonervous memory, its role in human life. Theories of the mechanism of short-term and long-term memory.
88. Physiological sleep, its role in human life. Theories of sleep. Structure (phases) of physiological sleep. EEG correlates of sleep phases.
89. Motivations, their role in human life. Types of motivations, their characteristics.
90. Emotions, their role in human life. Types of emotions, their characteristics.

Questions from the spring semester program

1. Volume, properties and composition of blood. Hematocrit number. Basic functions of blood.
2. Volume, composition and properties of blood plasma. Blood plasma proteins, their functions.
3. Constancy of blood pH. Blood buffer systems, principles of their functions.
4. Number and functions of red blood cells. The quantity and functions of hemoglobin, its compounds. Color index.

5. Erythrocyte sedimentation rate and factors influencing it. Erythropoiesis, its regulation.
6. Total number of leukocytes. Leukocyte formula. Quantitative changes in the leukocyte formula during postnatal development (lymphocyte-neutrophil crossovers).
7. Characteristics of individual types of leukocytes. Leukopoiesis, its regulation.
8. Number and function of platelets. Thrombocytopoiesis, its regulation.
9. Blood groups according to the ABO system. Blood groups according to the Rh system (Rh-hr). Rules for blood transfusion.
10. Hemostasis system. Stages of hemostasis.
11. Vascular-platelet hemostasis. platelet Characteristic phases vascular hemostasis, their mechanisms.
12. Coagulation hemostasis, its phases. External and internal mechanisms of coagulation hemostasis.
13. Anticoagulant blood system. Natural anticoagulants.
14. Fibrinolysis, its phases and mechanisms. Regulation of blood coagulation and fibrinolysis.
15. Biomechanics of respiratory movements. The role of the respiratory muscles in inhalation and exhalation.
16. The role of changes in alveolar, pleural, transpulmonary pressure in inhalation and exhalation.
17. Elastic properties of the lungs and chest. Compliance of the lungs. Resistance in the respiratory system.
18. Lung volumes and air capacities.
19. Alveolar ventilation. Diffusion of gases.
20. Transport of oxygen and carbon dioxide. Oxyhemoglobin dissociation curve.
21. Respiratory center of the medulla oblongata, its functions. Localization and functional properties of respiratory neurons of the medulla oblongata.
22. Respiratory neurons of the spinal cord and pons, their role in the regulation of pulmonary ventilation.
23. Generation of respiratory rhythm. Classification of inspiratory and expiratory neurons of the respiratory center of the medulla oblongata.
24. Reflexes of breathing regulation from receptors of the nasal mucosa, larynx, trachea, bronchioles and J-receptors.
25. Reflexes of breathing regulation from lung stretch receptors (Hering-Breuer) and proprioceptors of the chest.
26. Humoral regulation of pulmonary ventilation. Impact of changes in pO_2 , pCO_2 , blood pH for ventilation.
27. Arterial (peripheral) and central chemoreceptors, their role in the regulation of pulmonary ventilation.
28. Changes in pulmonary ventilation during physical activity, high-altitude hypoxia and increased atmospheric pressure.
29. Anatomical and histological features of the human heart (heart chambers, heart valves, types of cardiomyocytes, intercellular contacts).
30. Physiological properties of the myocardium (excitability, automaticity, conductivity, contractility).
31. Electrical activity of myocardial cells (action potentials of different parts of the myocardium). Automaticity of myocardial cells.
32. Functions of the conduction system of the heart. Gradient of automaticity in the conduction system of the heart.
33. Dynamics of myocardial excitability. The relationship between mechanocardiogram, ventricular cardiomyocyte action potential and changes in myocardial excitability.

34. Characteristics of standard, enhanced and chest ECG leads. The nature of ECG waves and intervals, their amplitude-time parameters.
35. Pumping function of the heart. Factors in filling the chambers of the heart with blood and expelling blood from the chambers of the heart. The role of the heart valve apparatus.
36. Periods and phases of the cardiac cycle, their duration. Blood pressure in the atria and ventricles in different phases of the cardiac cycle.
37. Mechanical (apex beat) and sound (heart sounds) manifestations of cardiac activity: their origin. The main points for listening to heart sounds during auscultation.
38. Functions of different types of blood vessels. Linear and volumetric blood flow velocities, the relationship between them in different vessels.
39. Blood pressure (BP). Blood pressure waves of the 1st, 2nd and 3rd order, their origin. Hemodynamic factors that determine blood pressure.
40. Arterial pulse. Characteristics of palpation assessment of arterial pulse. Origin of the components of the sphygmogram.
41. Factors of venous return of blood to the heart. Venous pulse (venogram). Origin of venogram waves.
42. Functional features of the coronary circulation.
43. Functional features of cerebral circulation.
44. Functional features of pulmonary circulation.
45. Blood movement in capillaries. Microcirculation. The mechanism of fluid exchange between blood, intercellular space and lymph.
46. Functions of the lymphatic system. Mechanisms of lymph formation and lymph circulation.
47. Heterometric and homeometric regulation of the heart. Regulation of intercellular interactions in the myocardium.
48. Extracardiac regulation of the heart. Characteristics of chronotropic, inotropic, bathmotropic, dromotropic regulatory effects. Scheme of parasympathetic and sympathetic innervation of the heart.
49. The influence of the vagus nerves on the heart. Experience of O. Levi. The mechanism of the negative chronotropic effect of the vagus nerve on the heart.
50. The influence of sympathetic nerves on the heart. "Reinforcing" nerve I.P. Pavlova, the mechanism of its action on the heart.
51. Reflexes of conjugate regulation of the heart (Goltz reflex, Aschner-Danini reflex). Conditioned reflex regulation of the heart.
52. The role of biologically active substances and electrolytes in the regulation of the heart.
53. Basal vascular tone, its nature. Innervation of blood vessels. Vasoconstrictor and vasodilator nerves.
54. Vasomotor center of the medulla oblongata.
55. Baroreceptor reflexes of blood pressure regulation: block diagram of the reflex of blood pressure regulation from the aortic reflexogenic zone (Zion-Ludwig reflex).
56. Baroreceptor reflexes of blood pressure regulation: block diagram of the reflex of blood pressure regulation from the sinocarotid reflexogenic zones (Hering reflex).
57. Humoral influences on blood vessels. Renal endocrine circuit of blood pressure regulation.
58. Long-term pressor mechanisms of blood pressure regulation.
59. Renin-angiotensin-aldosterone system for blood pressure regulation.
60. Long-term depressor mechanisms of blood pressure regulation.
61. Own vascular (endothelial) mechanisms of blood pressure regulation.
62. Regulation of coronary circulation.
63. Regulation of cerebral circulation.
64. Regulation of pulmonary circulation.
65. Digestion in the oral cavity. Chewing, its phases. Regulation of chewing.

66. Salivation. Functions of saliva. Regulation of salivation.
67. Morphofunctional organization of the salivation reflex.
68. Swallowing, its phases of swallowing. Promotion of a bolus of food from the mouth to the stomach.
69. Secretory function of the stomach. Composition and functions of gastric juice. Regulation of gastric juice secretion.
70. Motor activity of the stomach. Types of gastric motility. Regulation of gastric motility.
71. Secretion of the pancreas. Composition and properties of pancreatic juice.
72. Phases of pancreatic secretion. The influence of dietary regimes on pancreatic secretion. Regulation of pancreatic secretion.
73. Bile formation and bile excretion, their regulation. Composition and functions of bile.
74. Digestion in the small intestine. Composition and functions of small intestinal juice. Regulation of intestinal secretion.
75. Cavity and wall hydrolysis of nutrients.
76. Motor activity of the small intestine and its regulation.
77. Absorption of water, electrolytes and hydrolysis products of proteins, fats and carbohydrates in the intestine.
78. Functions of the colon and its role in digestion. Types of motor activity of the colon and its regulation.
79. Involuntary and voluntary regulation of the act of defecation.
80. Liver functions, their characteristics.
81. The concept of gross and basic exchange. Factors that determine the amount of basal metabolism.
82. Specific dynamic action of food. Work increase. The amount of energy consumption depending on the characteristics of the profession.
83. Regulation of energy metabolism. Methods for studying energy exchange: direct and indirect calorimetry.
84. Thermoregulation as a factor of homeostasis. Temperature of the human body and its parts. Daily dynamics of body temperature.
85. Heat generation and heat transfer. Thermoregulation center. Regulation of isothermia.
86. Nutrition. Physiological bases of the formation of feelings of hunger and satiety. Principles of organizing rational nutrition.
87. General characteristics of the organs of the excretory system.
88. Structural and functional unit of the kidneys. The structure of nephrons. Blood supply to the kidneys and nephrons.
89. Glomerular filtration. The mechanism of formation and composition of primary urine. Regulation of glomerular filtration rate.
90. Localization of reabsorption of substances in the renal tubules. Threshold and non-threshold substances. Mechanisms of tubular reabsorption. Regulation of tubular reabsorption.
91. Localization of secretion of substances in the renal tubules. Mechanisms of tubular secretion. Regulation of tubular secretion.
92. Osmotic dilution and concentration of urine. Functioning of a rotary-countercurrent multiplying system.
93. The role of the kidneys in osmoregulation and volume regulation.
94. The role of the kidneys in the regulation of the ionic composition and acid-base state of the blood.
95. Endocrine function of the kidneys. The role of the kidneys in the regulation of erythropoiesis and hemostasis.
96. Involuntary and voluntary regulation of urination.

8. Description of indicators and criteria for assessing competencies at the stages of their formation, description of assessment scales

Criteria	Levels of competency development		
	<i>threshold</i>	<i>sufficient</i>	<i>elevated</i>
	Competence formed. Demonstrated enough level independence sustainable practical skill	Competence formed. Demonstrated enough level independence sustainable practical skill	Competence formed. Demonstrated high level independence high adaptability practical skill

Competency assessment indicators and rating scales

Grade "unsatisfactory" (not accepted) or absence formation competencies	Grade "satisfactorily" (passed) or satisfactory level of development competencies	Rated "good" (passed) or elevated level development competencies	Excellent rating (passed) or high level development competencies
failure to student on one's own demonstrate knowledge when solving assignments, lack independence in application of skills. Absence confirmation availability formation competencies indicates negative development results academic discipline	student demonstrates independence in application of knowledge skills and abilities to solve educational tasks in full According to sample given teacher, by tasks, solution of which there were shown teacher, it should be considered that competence formed on satisfactory level.	student demonstrates independent application knowledge, skills and skills at solving tasks, similar samples that confirms Availability formed competencies for higher level. Availability such competence at an elevated level level indicates sustainable fixed practical skill	Trainable demonstrates ability to full independence in choosing a method solutions non-standard assignments within disciplines with using knowledge, skills and skills, received as in development progress given disciplines and adjacent disciplines should be considered competence formed at a high level.

Criteria for evaluating forms of control: Written control:

Mark	Description
Great	The mark "EXCELLENT" is given to an answer that shows a solid knowledge of the basic processes of the subject area being studied and is distinguished by the depth and completeness of the topic;

	mastery of terminology; the ability to explain the essence of phenomena, processes, events, draw conclusions and generalizations, give reasoned answers, give examples; fluency in monologue speech, logic and consistency of response.
Fine	The mark "GOOD" evaluates an answer that reveals a solid knowledge of the basic processes of the subject area being studied, and is distinguished by the depth and completeness of the topic; mastery of terminology; the ability to explain the essence of phenomena, processes, events, draw conclusions and generalizations, give reasoned answers, give examples; fluency in monologue speech, logic and consistency of response. However, one or two inaccuracies in the answer are allowed.
satisfactorily	The mark "SATISFACTORY" evaluates an answer that mainly indicates knowledge of the processes of the subject area being studied, characterized by insufficient depth and completeness of the topic; knowledge of the basic issues of theory; poorly developed skills in analyzing phenomena and processes, insufficient ability to give reasoned answers and give examples; insufficient fluency in monologue speech, logic and consistency of response. There may be several errors in the content of the answer.
unsatisfactory	The mark "UNSATISFACTORY" evaluates an answer that reveals ignorance of the processes of the subject area being studied, characterized by a shallow disclosure of the topic; ignorance of the basic issues of theory, unformed skills in analyzing phenomena and processes; inability to give reasoned answers, poor command of monologue speech, lack of logic and consistency. Serious errors in the content of the answer are allowed.

Practical skills:

skill credited	independence and correct performance of practical skills
skill not credited	inability to independently perform practical skills

Test control grading scale:

percentage of correct answers	Marks
91-100	Great
81-90	Fine
71-80	satisfactorily
Less than 71	unsatisfactory

Situational tasks:

Mark	Description
Great	Demonstrate a thorough understanding of the problem. Ability to analyze a situation and draw conclusions Demonstration of confident situation-solving skills

	Demonstration of professional thinking
Fine	Demonstrate significant understanding of the problem. Ability to analyze a situation Demonstration of situation-solving skills Demonstration of professional thinking
satisfactorily	Demonstration of partial understanding of the problem. Demonstration of insufficient ability to analyze a situation Demonstrating poor problem solving skills
unsatisfactory	Demonstrating a lack of understanding of the problem. There was no attempt to solve the problem.