

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

BANK OF ASSESSMENT TOOLS FOR DISCIPLINE
«MICROSCOPIC BASES OF ANALYZERS»

Training program (specialty): **31.05.01 GENERAL MEDICINE**

Department: **HISTOLOGY WITH CYTOLOGY AND EMBRYOLOGY**

Mode of study **FULL-TIME**

Nizhniy Novgorod
202_

1. Bank of assessment tools for the current monitoring of academic performance, mid-term assessment of students in the discipline "Microscopic bases of analyzers"

This Bank of Assessment Tools (BAT) for the discipline "Microscopic bases of analyzers" is an integral appendix to the working program of the discipline "Microscopic bases of analyzers". All the details of the approval submitted in the WPD for this discipline apply to this BAT.

(Banks of assessment tools allow us to evaluate the achievement of the planned results stated in the educational program.

Assessment tools are a bank of control tasks, as well as a description of forms and procedures designed to determine the quality of mastering study material by students.)

2. List of assessment tools

The following assessment tools are used to determine the quality of mastering the academic material by students in the discipline:

No.	Assessment tool	Brief description of the assessment tool	Presentation of the assessment tool in the BAT
1	Test № 1 section "Neurons and neuroglia"	A system of standardized tasks that allows you to automate the procedure of measuring the level of knowledge and skills of a student	Bank of test tasks
	Test № 2 section "Nervous system"		
	Test № 3 section "Sense organs and specific receptors"		
	Test № 4 section "Integumentary system. Skin receptors"		
	Test №5 section "Respiratory system. Olfactory organ"		
2	Individual survey	A control tool that allows you to assess the degree of comprehension of the material	List of questions
3	Diagnostics of histological preparations obtained light microscopy	A tool of verifying the ability to present the study material on a topic, section or sections of a discipline, organized as a practice class in the form of an interview between a teacher and students.	Histological preparations on topics/sections of the discipline
4	Electron (protocols) workbook	A didactic complex designed for independent work of the student and allowing to assess the level of mastering study materials	Workbook sample
5	Diagnosis of electron micrographs of histological structures	A tool of verifying the ability to present the study material on a topic, section or sections of a discipline, organized as a practice class in the form of an interview between a teacher and students.	Electron micrographs of histological structures on topics/sections of the discipline

6	Interview	A tool of control organized as a special conversation between the teacher and the student on topics related to the discipline being studied, and designed to clarify the amount of knowledge of the student on a specific section, topic, problem, etc.	Questions on topics/sections of the discipline
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3. A list of competencies indicating the stages of their formation in the process of mastering the educational program and the types of evaluation tools

Code and formulation of competence*	Stage of competence formation	Controlled sections of the discipline	Assessment tools
UC-1 Able to carry out a critical analysis of problem situations based on a systematic approach, develop an action strategy	Current control	Section (topic) 1 "Neurons and neuroglia"	Computer testing (the variant is formed by the method of random sampling); Individual survey; Diagnostics of histological preparations obtained light microscopy; Diagnosis of electron micrographs of histological structures
		Section (topic) 2 "Nervous system"	Computer testing (the variant is formed by the method of random sampling); Individual survey; Diagnostics of histological preparations obtained light microscopy; Diagnosis of electron micrographs of histological structures
		Section (topic) 3 "Sense organs and specific receptors"	Computer testing (the variant is formed by the method of random sampling); Individual survey; Diagnostics of histological preparations obtained light microscopy; Diagnosis of electron micrographs of histological structures
		Section (topic) 4 "Integumentary system. Skin receptors"	Computer testing (the variant is formed by the method of random sampling); Individual survey; Diagnostics of histological preparations obtained light microscopy; Diagnosis of electron micrographs of histological structures
		Section (topic) 5 "Respiratory system section. Olfactory organ"	Computer testing (the variant is formed by the method of random sampling); Individual survey; Diagnostics of histological preparations obtained light microscopy; Diagnosis of electron micrographs of histological structures
UC-1 Able to carry out a critical analysis of	Mid-term	"Microscopic bases of analyzers"	Computer testing (the variant is formed by the method of random sampling); Diagnostics of histological preparations obtained light microscopy; Diagnosis of electron micrographs of

problem situations based on a systematic approach, develop an action strategy			histological structures; Interview.
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**- not provided for postgraduate programs*

4. The content of the assessment tools of entry, current control

Current control is carried out by the discipline teacher when conducting classes in the form of: assessment tool 1, assessment tool 2, assessment tool 3, assessment tool 4, assessment tool 5.

Assessment tools for current control.

Assessment tool (topic) 1

- 1) Test tasks
- 2) Individual survey
- 3) Histological preparations on topics/sections of the discipline
- 4) Workbook sample
- 5) Electron microphotographs of histological structures by topics/sections of the discipline

Assessment tool (topic) 2

- 1) Test tasks
- 2) Individual survey
- 3) Histological preparations on topics/sections of the discipline
- 4) Workbook sample
- 5) Electron microphotographs of histological structures by topics/sections of the discipline

Assessment tool (topic) 3

- 1) Test tasks
- 2) Individual survey
- 3) Histological preparations on topics/sections of the discipline
- 4) Workbook sample
- 5) Electron microphotographs of histological structures by topics/sections of the discipline

Assessment tool (topic) 4

- 1) Test tasks
- 2) Individual survey
- 3) Histological preparations on topics/sections of the discipline
- 4) Workbook sample
- 5) Electron microphotographs of histological structures by topics/sections of the discipline

Assessment tool (topic) 5

- 1) Test tasks
- 2) Individual survey
- 3) Histological preparations on topics/sections of the discipline
- 4) Workbook sample
- 5) Electron microphotographs of histological structures by topics/sections of the discipline

4.1. Test tasks for the assessment of competence: UC-1

The bank of assessment tools for conducting current control of students is presented on the Educational Portal of the PRIMUM:

Test № 1 <https://sdo.pimunn.net/mod/quiz/view.php?id=156776>

Test № 2 <https://sdo.pimunn.net/mod/quiz/view.php?id=156781>

Test № 3 <https://sdo.pimunn.net/mod/quiz/view.php?id=156786>

Test № 4 <https://sdo.pimunn.net/mod/quiz/view.php?id=156791>

Test № 5 <https://sdo.pimunn.net/mod/quiz/view.php?id=156796>

4.2. Individual survey for the assessment of competence: UC-1

Topic 1 "Neurons and neuroglia"

1. Structural elements of nervous tissue. Classification of neurons. Neuroglia cells, their classification and functions.
2. Features of the structure and function of myelinated and unmyelinated nerve fibers.

Topic 2 "Nervous system"

1. Nerve endings: classification, structural and functional characteristics of different types. Synapses.
2. Nerves: organic composition. The tissue elements of the nerve trunk. Functional types of nerve fibers. Connective tissue stroma of the nerves.
3. Craniospinal ganglia: structural and functional characteristics. The place and role of nerves and craniospinal ganglia in the sensory system composition.
4. The spinal cord. Gray matter: tissue elements, types of neurocytes. Features of the neural organization of parts of the gray matter of the spinal cord. White matter: tissue composition.
5. The cerebellar cortex. Gray and white matter. Cortex: layers, tissue elements. Neural organization of the cerebellar cortex. Efferents and afferents of the cerebellum.
6. Cerebral cortex. Tissue elements. Cortical neurocytes, their varieties. Cytoarchitectonic types of cortex. Cortical fields and modules.

Topic 3 "Sense organs and specific receptors"

1. Sense organs. Classification.
2. Eye. Outer (fibrous) membrane of the eye. Features of the structure and function of the sclera and cornea of the eye. Retina. Neural organization of the retina.
3. Organs of hearing and balance. Organ of Corti. Cytophysiology of sound perception.

Topic 4 "Integumentary system. Skin receptors"

1. Skin. Classification. Structural and functional characteristics of parts and layers; features of their structure and blood supply. The cellular composition of the epidermis.
2. The structure of the hair root. Skin glands. Skin receptors.

Topic 5 "Respiratory system section. Olfactory organ"

1. Respiratory organs. Structural and functional characteristics of the conducting and respiratory portions. Trachea.
2. Features of the structure of various portions of the bronchial tree. Cellular composition of the respiratory epithelium. Alveolar wall: histophysiology of its structural elements.

4.3. Histological preparations by topics/sections of the discipline "Microscopic bases of analyzers": UC-1

Topic 1 "Neurons and neuroglia"

- 1) Preparation 18(dem). Multipolar neuron
- 2) Preparation 74(dem). Pseudounipolar neuron
- 3) Preparation 75. Nissl bodies in the spinal motoneurons
- 4) Preparation 78(dem). Unmyelinated nerve fibers (isolated)
- 5) Preparation 79. Myelinated nerve fibers (isolated)

Topic 2 "Nervous system"

- 1) Preparation 80. Nerve trunk
- 2) Preparation 114. Dorsal root ganglion (or spinal ganglion)
- 3) Preparation 115. Spinal cord
- 4) Preparation 117. Cerebellar cortex
- 5) Preparation 118. Cerebral cortex

Topic 3 "Sense organs and specific receptors"

- 1) Preparation 119. Cornea
- 2) Preparation 121. Posterior wall of the eyeball
- 3) Preparation 123. Organ of Corti

Topic 4 "Integumentary system. Skin receptors"

1) Preparation 124. Thick skin

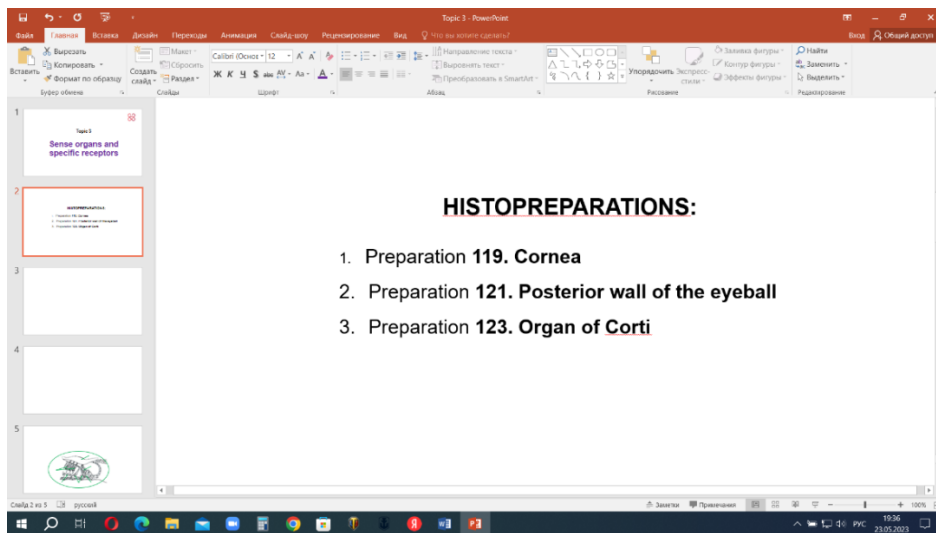
2) Preparation 125. Thin skin

Topic 5 "Respiratory system section. Olfactory organ"

1) Preparation 156. Trachea

2) Preparation 157. Pulmonary tissue

4.4. Workbook sample on topics/sections of the discipline "Microscopic bases of analyzers": UC-1



4.5. Electron microphotographs of histological structures by topics/sections of the discipline "Microscopic bases of analyzers": UC-1

1.	Cilia of epithelial cells A. Longitudinal section of the apical part of a cell (electron micrograph x 36,000) B. Cross sections of cilia (electron micrograph x 88,000)
2.	Electron micrograph of neuron body of the CNS with surrounding neuropil
3.	Unmyelinated nerve fibers
4.	Myelinated nerve fibers
5.	Electron micrograph of neuromuscular junction (or motor end plate)
6.	Interneuronal junctions
7.	Corneal stroma (electron micrograph x 16,700)
8.	Photoreceptor cells of the retina a. Portion of the inner and outer segments of rod-cell of the retina (electron micrograph x 32,000) b. Portion of the inner and outer segments of cone-cell of the retina (electron micrograph x 32,000)
9.	A. Vestibular sensory hair cell (scanning electron micrograph x 47,500) B. Otoliths on a surface of macula (scanning electron micrograph x 5,000)
10.	Hair cells of the organ of Corti A. Stereocilia on the apical surfaces of the cochlear hair cells (scanning electron micrograph x 3,250) B. Outer hair cells (transmission electron micrograph x 6,300)
11.	Thin skin (electron micrograph x 8,000)
12.	Stratum spinosum and stratum granulosum of the thin skin a. Stratum spinosum and stratum granulosum (electron micrograph x 15,000) b. Stratum spinosum (electron micrograph x 58,000)
13.	Olfactory epithelium (electron micrograph x 8,260)
14.	Respiratory epithelium A. Three main cell types of the respiratory epithelium (electron micrograph x 1,800) B. Luminal surface of the trachea (scanning electron micrograph x 1,200)
15.	The wall of a terminal bronchiole (electron micrograph)
16.	Air-blood barrier (electron micrograph x 33,000)
17.	Type II pneumocyte protruding into alveolar lumen (electron micrograph x 30,000)
18.	Alveolar brush cell (electron micrograph)
19.	Taste bud (electron micrograph x 2,353)

5. THE CONTENT OF THE ASSESSMENT TOOLS OF MID-TERM ASSESSMENT

Mid-term assessment is carried out in the **form of a credit**.

The bank of assessment tools for mid-term of students is presented on the Educational Portal of the PRIMUM: <https://sdo.pimunn.net/mod/quiz/view.php?id=156800>

5.1 The list of control tasks and other materials necessary for the assessment of knowledge, skills and work experience

Test tasks

Test tasks	Competence code (according to the WPD)
1. CONNECTIVE TISSUE SHEATHS OF THE NERVE TRUNK 1) endoneurium 2) ectoneurium 3) perineurium 4) epineurium 5) exoneurium	UC-1
2. ENCAPSULATED ACCUMULATION OF NEURON BODIES IN THE PERIPHERAL NERVOUS SYSTEM 1) plexus 2) ganglion 3) population 4) nerve center 5) module	
3. OUTER CONNECTIVE TISSUE SHEATH OF THE NERVE TRUNK 1) endoneurium 2) ectoneurium 3) perineurium 4) epineurium 5) epitendineum	
4. CELL COMPOSITION OF PERINEURIUM 1) gliocytes 2) epithelioid fibroblasts 3) epithelial cells 4) fibroblasts 5) fibrocytes	
5. FINER CONNECTIVE LAYER BETWEEN THE NERVE FIBERS IN THE NERVE TRUNKS COMPOSITION 1) interstitium 2) endoneurium 3) trabeculae 4) neurilemma 5) septum	
6. TYPICAL NEURONS OF SENSORY GANGLIA 1) interneurons 2) pseudounipolar 3) unipolar 4) multipolar 5) bipolar	

<p>7. TYPICAL NEURONS OF CRANIOSPINAL GANGLIA</p> <ol style="list-style-type: none"> 1) unipolar 2) interneurons 3) sensory 4) multipolar 5) bipolar 	
<p>8. PROCESSES OF PSEUDOUNIPOLAR NEURONS IN COMPOSITION OF POSTERIOR ROOTS OF THE SPINAL CORD</p> <ol style="list-style-type: none"> 1) axons 2) dendrites 3) pediculi 4) pseudopodia 5) spines 	
<p>9. PROCESSES OF PSEUDOUNIPOLAR NEURONS IN COMPOSITION OF THE SPINAL MIXED NERVE</p> <ol style="list-style-type: none"> 1) axons 2) dendrites 3) pediculi 4) pseudopodia 5) spines 	
<p>10. GLIOCYTES FORMING SHEATHS OF NERVE FIBERS</p> <ol style="list-style-type: none"> 1) astrocytes 2) ependimocytes 3) plasma cells 4) lemmocytes (Schwann cells) 5) satellite gliocytes 	
<p>11. SUBSTANCE OF CNS CONTAINING NEURON BODIES</p> <ol style="list-style-type: none"> 1) white 2) grey 3) ganglionic 4) neuropil 5) matrix 	
<p>12. SUBSTANCE OF CNS, CONTAINING MOSTLY, NERVE FIBERS</p> <ol style="list-style-type: none"> 1) white 2) grey 3) ganglionic 4) neuropil 5) matrix 	
<p>13. GRAY MATTER OF CNS HAVING STRATIFIED ARRANGEMENT OF NEURON BODIES</p> <ol style="list-style-type: none"> 1) reticular 2) cortex 3) nuclei 4) mosaic 5) neuropil 	
<p>14. GRAY SUBSTANCE OF CNS HAVING COMPACT LOCATION OF NEURON BODIES</p> <ol style="list-style-type: none"> 1) reticular 2) cortex 	

3)	nuclei	
4)	mosaic	
5)	neuropil	
15.	BRAIN AND SPINAL CORD MENINGES	
1)	dura mater	
2)	arachnoid	
3)	pia mater	
4)	reticular	
5)	endostial	
16.	METABOLIC BARRIER BETWEEN THE BLOOD STREAM AND NEURONS OF THE CNS	
1)	air-blood	
2)	blood-brain	
3)	endothelial	
4)	glial	
5)	border	
17.	PROCESSES OF MOTONEURONS IN THE COMPOSITION OF THE ANTERIOR ROOTS OF THE SPINAL CORD	
1)	pseudopodia	
2)	dendrites	
3)	axons	
4)	spines	
5)	pediculi	
18.	PROCESSES OF SPINAL MOTONEURONS IN PERIPHERAL NERVE	
1)	pseudopodia	
2)	dendrites	
3)	axons	
4)	spines	
5)	pediculi	
19.	CELLS OF BLOOD-BRAIN BARRIER	
1)	astrocytes	
2)	microglia	
3)	pericytes	
4)	ependimocytes	
5)	endothelium	
20.	LINING GLIOCYTES OF THE BRAIN VENTRICLES AND CENTRAL CANAL OF THE SPINAL CORD	
1)	astrocytes	
2)	microgliocytes	
3)	oligodendrocytes	
4)	ependimocytes	
5)	endotheliocytes	
21.	PHAGOCYTES OF CNS	
1)	astrocytes	
2)	microgliocytes	
3)	oligodendrocytes	
4)	ependimocytes	
5)	endotheliocytes	
22.	NEURAL LAYERS OF THE MOTOR CORTEX	

<ol style="list-style-type: none"> 1) molecular 2) the outer granular 3) pyramidal 4) ganglionic 5) multiform 	
<p>23. NEURAL LAYERS OF THE CEREBELLAR CORTEX</p> <ol style="list-style-type: none"> 1) molecular 2) ganglionic 3) granular 4) pyramid 5) polymorphic 	
<p>24. LAYERS OF THE CORNEA</p> <ol style="list-style-type: none"> 1) anterior epithelium 2) anterior limiting membrane 3) corneal stroma 4) posterior limiting membrane 5) posterior endothelium 	
<p>25. PART OF THE UVEA, PROVIDING BLOOD SUPPLY OF THE RETINA</p> <ol style="list-style-type: none"> 1) pigment 2) choroid 3) pupilla 4) iris 5) ciliary body 	
<p>26. PRINCIPAL NEUROSENSORY CELLS OF THE RETINA</p> <ol style="list-style-type: none"> 1) interneurones 2) ganglionic 3) rods 4) pigment 5) cones 	
<p>27. VISUAL PIGMENT OF ROD CELLS OF THE RETINA</p> <ol style="list-style-type: none"> 1) melanin 2) lipofuscin 3) carotene 4) iodopsin 5) rhodopsin 	
<p>28. VISUAL PIGMENT OF CONE CELLS OF THE RETINA</p> <ol style="list-style-type: none"> 1) melanin 2) lipofuscin 3) carotene 4) iodopsin 5) rhodopsin 	
<p>29. LAYERS OF THE RETINA THAT CONTAINS THE BODIES OF NEURONS</p> <ol style="list-style-type: none"> 1) outer nuclear 2) outer reticular 3) inner nuclear 4) inner reticular 5) ganglionic 	

<p>30. STRUCTURAL ELEMENTS OF THE RETINA IN THE REGION OF BLIND SPOT</p> <ol style="list-style-type: none"> 1) nerve fibers 2) vessels 3) ganglion cells 4) epithelial cells 5) smooth muscle cells 	
<p>31. WALLS OF MEMBRANOUS CANAL OF THE COCHLEA ORGAN OF HEARING</p> <ol style="list-style-type: none"> 1) spiral ligament 2) helical crest 3) vestibular membrane 4) stria vascularis 5) basilar membrane 	
<p>32. STRUCTURAL FORMATIONS CONNECTING THE EARDRUM TO THE INNER EAR</p> <ol style="list-style-type: none"> 1) eardrum 2) auditory ossicles 3) ear canal 4) endolymph 5) perilymph 	
<p>33. PART OF INNER EAR, HAVING A FUNCTION OF SOUND RECEPTOR</p> <ol style="list-style-type: none"> 1) macula 2) spiral ganglion 3) spiral organ (Corti) 4) spiral crest 5) cristae 	
<p>34. PRINCIPAL CELLS IN THE SPIRAL ORGAN OF HEARING</p> <ol style="list-style-type: none"> 1) photoreceptor 2) sensory (hair) 3) supporting 4) ganglion cells 5) interneurons 	
<p>35. VESTIBULAR RECEPTORS OF THE INNER EAR</p> <ol style="list-style-type: none"> 1) spiral organ (Corti) 2) spiral ganglion 3) ampular cristae 4) maculae in the utricle and saccule 5) spiral crest 	
<p>36. CELL COMPOSITION OF VESTIBULAR RECEPTORS</p> <ol style="list-style-type: none"> 1) photoreceptor cells 2) ganglionic cells 3) switching cells 4) sensory (hair) cells 5) supporting cells 	
<p>37. GENERAL NAME OF THE OLFACTORY EPITHELIUM</p> <ol style="list-style-type: none"> 1) olfactory 2) respiratory 	

3)	pseudostratified columnar	
4)	ectodermal	
5)	ciliated	
38.	SPECIFIC RECEPTORS THAT FORM THE ORGAN OF TASTE	
1)	chemoreceptors	
2)	taste buds	
3)	interceptor	
4)	nociceptors	
5)	proprioceptors	
39.	EMBRYONIC GERMS OF THE SKIN	
1)	ectoderm	
2)	mesenchyme (dermatomes)	
3)	endoderm	
4)	epiblast	
5)	hypoblast	
40.	THE MAIN TYPES OF HUMAN SKIN	
1)	thick skin	
2)	thin skin	
3)	skin with hair	
4)	finger skin	
5)	transitional skin	
41.	THE USUAL SIGNS OF THICK SKIN	
1)	thicker epidermis	
2)	five-layer structure	
3)	hair	
4)	sebaceous glands	
5)	high dermal papillae	
42.	THICK SKIN LAYERS OF THE EPIDERMIS	
1)	stratum basale	
2)	stratum spinosum	
3)	stratum granulosum	
4)	stratum lucidum	
5)	stratum corneum	
43.	LAYERS OF THE EPIDERMIS, DIRECTLY CONTINUING IN THE OUTER ROOT SHEATH	
1)	stratum basale	
2)	stratum spinosum	
3)	stratum granulosum	
4)	stratum lucidum	
5)	stratum corneum	
44.	FUNCTIONS OF RESPIRATORY EPITHELIUM	
1)	barrier	
2)	draining	
3)	secretory	
4)	receptor	
5)	endocrine	
45.	TUNICS OF THE TRACHEA WALL	
1)	mucosa	

2) submucosa 3) fibro-cartilage 4) muscularis 5) adventitia	
46. CELLS OF THE ALVEOLAR WALL, PERFORMING THE FUNCTION OF GAS EXCHANGE 1) alveolocyte type 1 2) alveolocyte type 2 3) brush cells 4) ciliated 5) endocrine	
47. LAYERS OF AIR-BLOOD BARRIER 1) alveolar epithelium 2) basement membrane of the alveolar epithelium 3) basement membrane of endothelium 4) endothelium of capillary 5) cilia	
48. CELLS OF THE ALVEOLAR WALL, PERFORMING SECRETORY FUNCTION 1) alveolocyte type 1 2) alveolocyte type 2 3) brush cells 4) ciliated 5) endocrine	
49. SECRET OF PNEUMOCYTES TYPE 2 1) glycocalyx 2) surfactant 3) mucus 4) serous fluid 5) sebum	
50. CELLS OF THE ALVEOLAR WALL, SERVING AS RECEPTORS THAT MONITOR AIR QUALITY IN THE LUNG 1) alveolocyte type 1 2) alveolocyte type 2 3) brush cells 4) ciliated 5) endocrine	

Test task number	No. of response template	Test task number	No. of response template	Test task number	No. of response template
1	1, 3, 4	18	3	35	3, 4
2	2	19	1, 3, 5	36	4, 5
3	4	20	4	37	3
4	2	21	2	38	2
5	2	22	1, 2, 3, 4, 5	39	1, 2
6	2	23	1, 2, 3	40	1, 2
7	3	24	1, 2, 3, 4, 5	41	1, 2, 5
8	1	25	2	42	1, 2, 3, 4, 5
9	2	26	3, 5	43	1, 2
10	4	27	5	44	1, 2, 3, 4, 5

11	2	28	4	45	1, 2, 3, 5
12	1	29	1, 3, 5	46	1
13	2	30	1, 2	47	1, 2, 3, 4
14	3	31	3, 4, 5	48	2
15	1, 2, 3	32	2	49	2
16	1	33	3	50	3
17	3	34	2, 3		

5.1.1. Questions for the exam in the discipline *(not included in the curriculum)*

5.1.2. Questions for the credit in the discipline "Microscopic bases of analyzers"

Question		Competence code (according to the WPD)
1.	Structural elements of nervous tissue	UC-1
2.	Fundamental features of the structure and function of nerve cells	UC-1
3.	Classification of neurons	UC-1
4.	Neuroglia cells, their classification and functions	UC-1
5.	Features of the structure and function of myelinated and unmyelinated nerve fibers	UC-1
6.	Nerve endings: classification, structural and functional characteristics of different types. Synapses	UC-1
7.	The tissue elements of the peripheral nervous system	UC-1
8.	Nerves: organic composition. The tissue elements of the nerve trunk. Functional types of nerve fibers. Connective tissue stroma of the nerves	UC-1
9.	Craniospinal ganglia: structural and functional characteristics. The place and role of nerves and craniospinal ganglia in the sensory system composition	UC-1
10.	Autonomic ganglia: structural and functional features	UC-1
11.	The spinal cord. Gray matter: tissual elements, types of neurocytes. Features of the neural organization of parts of the gray matter of the spinal cord. White matter: tissue composition, interneuronal connections of the spinal cord with the brain. The meninges. Regeneration	UC-1
12.	The cerebellar cortex. Gray and white matter. Cortex: layers, tissue elements. Neural organization of the cerebellar cortex. Efferents and afferents of the cerebellum. Mediators (inhibitory and excitatory)	UC-1
13.	Cerebral cortex. Tissue elements. Cortical neurocytes, their varieties. Cytoarchitectonic types of cortex. Cortical fields and modules. The blood-brain barrier. The meninges.	UC-1
14.	Sense organs. Classification.	UC-1
15.	Eye. Development. General composition. Histophysiological characteristics of the diopter and accommodation apparatus of the eye. Iris. Age-related changes	UC-1
16.	Outer (fibrous) membrane of the eye. Features of the structure and function of the sclera and cornea of the eye. Venous sinus and its function	UC-1
17.	Choroid of the eye. Features of the structure and function. Retina. Histophysiology of light perception. Visual pigments. Neural organization of the retina. Yellow spot. Blind spot	UC-1
18.	The organ of hearing. Cellular composition and characteristic structures. The walls of the membranous labyrinth, basilar membrane, vascular plate, spiral organ. Histophysiology of sound perception. Innervation	UC-1
19.	Organs of hearing and balance. Sources of development and structure. Organ of Corti. Cytophysiology of sound perception. Age-related changes	UC-1
20.	Skin. Classification. Structural and functional characteristics of parts and layers; features of their structure and blood supply	UC-1

21.	The cellular composition of the epidermis. The structure of the hair root. Skin glands. Skin receptors	UC-1
22.	Respiratory organs. Embryonic sources. Structural and functional characteristics of the conducting and respiratory portions	UC-1
23.	Airways. Nasal mucosa. The olfactory organ: the main and vomeronasal	UC-1
24.	Larynx, trachea. The lung. Features of the structure of various portions of the bronchial tree. Cellular composition of the respiratory epithelium. Characteristics of the structural elements of the alveolar wall	UC-1
25.	Alveolar wall: histophysiology of its structural elements. Blood-air barrier. Surfactant. Features of blood supply. Age-related changes	UC-1

5.1.3. The subject of term papers (not included in the curriculum)

5.1.4. Histological preparations by topics/sections of the discipline "Microscopic bases of analyzers": (UC-1)

- 1) Preparation **80. Nerve trunk**
- 2) Preparation **114. Dorsal root ganglion (or spinal ganglion)**
- 3) Preparation **115. Spinal cord**
- 4) Preparation **117. Cerebellar cortex**
- 5) Preparation **118. Cerebral cortex**
- 6) Preparation **119. Cornea**
- 7) Preparation **121. Posterior wall of the eyeball**
- 8) Preparation **123. Organ of Corti**
- 9) Preparation **124. Thick skin**
- 10) Preparation **125. Thin skin**
- 11) Preparation **156. Trachea**
- 12) Preparation **157. Pulmonary tissue**

5.1.5. Electron microphotographs of histological structures by topics/sections of the discipline "Microscopic bases of analyzers": (UC-1)

1.	Cilia of epithelial cells A. Longitudinal section of the apical part of a cell (electron micrograph x 36,000) B. Cross sections of cilia (electron micrograph x 88,000)
2.	Unmyelinated nerve fibers
3.	Myelinated nerve fibers
4.	Electron micrograph of neuromuscular junction (or motor end plate)
5.	Corneal stroma (electron micrograph x 16,700)
6.	Photoreceptor cells of the retina a. Portion of the inner and outer segments of rod-cell of the retina (electron micrograph x 32,000) b. Portion of the inner and outer segments of cone-cell of the retina (electron micrograph x 32,000)
7.	A. Vestibular sensory hair cell (scanning electron micrograph x 47,500) B. Otoliths on a surface of macula (scanning electron micrograph x 5,000)
8.	Hair cells of the organ of Corti A. Stereocilia on the apical surfaces of the cochlear hair cells (scanning electron micrograph x 3,250) B. Outer hair cells (transmission electron micrograph x 6,300)
9.	Thin skin (electron micrograph x 8,000)
10.	Stratum spinosum and stratum granulosum of the thin skin a. Stratum spinosum and stratum granulosum (electron micrograph x 15,000) b. Stratum spinosum (electron micrograph x 58,000)
11.	Olfactory epithelium (electron micrograph x 8,260)
12.	Respiratory epithelium A. Three main cell types of the respiratory epithelium (electron micrograph x 1,800) B. Luminal surface of the trachea (scanning electron micrograph x 1,200)
13.	The wall of a terminal bronchiole (electron micrograph)

14.	Air-blood barrier (electron micrograph x 33,000)
15.	Type II pneumocyte protruding into alveolar lumen (electron micrograph x 30,000)
16.	Taste bud (electron micrograph x 2,353)

6. CRITERIA FOR EVALUATING LEARNING OUTCOMES

Learning outcomes	Evaluation criteria	
	Not passed	Passed
Completeness of knowledge	The level of knowledge is below the minimum requirements. There were bad mistakes.	The level of knowledge in the volume corresponding to the training program. Minor mistakes may be made
Availability of skills	Basic skills are not demonstrated when solving standard tasks. There were bad mistakes.	Basic skills are demonstrated. Typical tasks have been solved, all tasks have been completed. Minor mistakes may be made.
Availability of skills (possession of experience)	Basic skills are not demonstrated when solving standard tasks. There were bad mistakes.	Basic skills in solving standard tasks are demonstrated. Minor mistakes may be made.
Motivation (personal attitude)	Educational activity and motivation are poorly expressed, there is no willingness to solve the tasks qualitatively	Educational activity and motivation are manifested, readiness to perform assigned tasks is demonstrated.
Characteristics of competence formation*	The competence is not fully formed. The available knowledge and skills are not enough to solve practical (professional) tasks. Repeated training is required	The competence developed meets the requirements. The available knowledge, skills and motivation are generally sufficient to solve practical (professional) tasks.
The level of competence formation*	Low	Medium / High

*- not provided for postgraduate programs

For testing:

Mark "5" (Excellent) - points (100-90%)

Mark "4" (Good) - points (89-80%)

Mark "3" (Satisfactory) - points (79-70%)

Less than 70% – Unsatisfactory - Mark "2"

Developer:

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Date " _____ " _____ 202__