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Federal State Budget Educational Institution
of Higher Education
Pacific State Medical University
of the Ministry of Health of the Russian Federation

APPROVED BY
Head of the Department of Human
Physiology and Pathophysiology
_____ / Markelova E.V /
"14th" of April 2025

COLLECTION OF ASSESSMENT TOOLS
Б1.О.10 Human physiology
of the basic educational program
of Higher Education

Specialty	**31.05.01 General Medicine for international students (in English)** (code, name)
Degree	Specialist's degree
Profile	02 "Healthcare" (in the field of providing primary health care to the population in medical organizations: polyclinics, outpatient clinics, inpatient/outpatient facilities of the municipal health care system)
Mode of study	**Full-time**
Period of mastering the BEP	**6 years** (nominal length of study)
Department	of Human Physiology and Pathophysiology

Vladivostok, 2025

1. INTRODUCTION

1.1. Collection of Assessment Tools is a document that regulates the format, content, and types of assessment tools for continuous assessment, interim examination and final (state final) examination, and graded criteria for each type of assessment tools.

1.2. Assessment tools allows to evaluate the development of universal, general professional, and professional competencies (UCs, GPCs and PCs respectively) outlined in Federal State Educational Standard of Higher Education and defined in the basic educational program of higher education for the specialty 31.05.01 General Medicine for international students (in English), profile 02 "Healthcare" (in the field of providing primary health care to the population in medical organizations: polyclinics, outpatient clinics, inpatient/outpatient facilities of the municipal health care system).

(BEP HE for the 31.05.01 General Medicine for international students (in English) specialty, section 3 Learning Outcomes Requirements of the Basic Educational Program of Higher Education)

2. DOCUMENT BODY

2.1. Types of Assessment, Formats of Assessment Tools

No.	Types of assessment	Assessment Tools Format
1	**Continuous assessment**	**Tests**
		Interview Questions
		Mini-Case Studies
		Checklists
2	**Interim assessment**	**Tests**
		Interview Questions
		Mini-Case Studies
		Checklists

3. The contents of assessment tools for continuous and interim examination are prepared by the teacher of the course

Tests for continuous and interim assessment

	Code	Competence description / name of labor function / name of work activity / text
S	31.05.01	General Medicine for international students (in English)
C	UC-1	Is able to analyze of problems critically using system approach and devise a plan of action
C	GPC-5	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity
F	A/01.7	Providing emergency and urgent medical care to the population
	A/02.7	Examination of the patient in order to make a diagnosis
I		**ANSWER LEVEL 1 TEST QUESTIONS (ONE CORRECT ANSWER)**
		Module 1. General physiology of excitable tissues and control systems of the body

01 Electrical charge of the inner surface of the cell membrane of an excitable cell, compared to its outer surface, in a physiological resting state is
1) positive
2) the same
3) no charge
+4) negative

02 In the phase of rapid depolarization of the action potential, membrane permeability increases for ions of
1) potassium
+2) sodium
3) chlorine
4) calcium

03 Muscle contraction is triggered by ions of
1) potassium
2) sodium
3) chlorine
+4) calcium

04 The excitatory postsynaptic potential develops as a result of movement into the cell of the ions of
+1) sodium
2) potassium
3) chlorine
4) magnesium

05 A motor neuron and the muscle fibers innervated by that neuron are called
+1) motor unit
2) sarcomere
3) myofibrils
4) actin and myosin

06 An additional irritation during the latent period of contraction leads to
1) a single contraction
2) tetanic contraction
3) summation of contraction
+4) nothing

07 The pessimum of stimulation frequency is
1) a frequency that is below optimum
+2) a frequency that is above optimum
3) the lowest frequency
4) the highest frequency

08 The motor center that increases the tone of the extensor muscles is:
1) nucleus ruber
2) substantia nigra
+3) Deiters' vestibular nucleus
4) spinal cord

09 Cerebellum _____ on the motor centers of the brain stem
1) has no effect
2) has excitatory effect
3) has inhibitory effect
+4) has corrective effect

10 The neurotransmitter of the preganglionic neuron in the sympathetic part of the autonomic nervous system is
1) dopamine
2) noradrenaline
+3) acetylcholine
4) glutamate

11 The anterior pituitary produces
1) thyroid-stimulating hormone (TSH), insulin, glucagon, melanocyte-stimulating hormone, and aldosterone
2) thyroid-stimulating hormone (TSH), aldosterone, cortisol, and testosterone
+3) thyroid-stimulating hormone (TSH), follicle-stimulating hormone (FSH), and adrenocorticotropic hormone (ACTH)
4) thyroid-stimulating hormone (TSH), adrenocorticotropic hormone (ACTH) parathyroid hormone, and calcitonin

Module II. Physiology of the blood system and blood circulation

12 Ratio of erythrocytes to plasma (in percent) is called
1) anemia
2) color index
3) hemoglobin
4) hemolysis
+5) hematocrit
6) thrombocrit

13 An increase in total amount of leukocytes in blood is called
1) thrombocytopenia
+2) leukocytosis
3) erythropenia
4) erythrocytosis
5) anemia
6) leucopenia

14 For adults, the normal lymphocytes percentage is
+1) 19-38%
2) 1-5%
3) 60-70%
4) 14-18%
5) 3-8%
6) 0-1%

15 Ventricular repolarization appears on the ECG as
+1) T wave
2) QRS complex
3) P wave
4) R wave

5) U wave

16 For adults, the normal resting systolic blood pressure is approximately
+1) 110 – 120 mm Hg
2) 70 – 80 mm Hg
3) 40 mm Hg
4) 100 mm Hg
5) 20 mm Hg

Module III. Physiology of respiration, digestion, metabolism, and excretion

17 Volume of air moved into or out of the lungs in 1 minute is called
1) tidal volume
+2) minute ventilation (respiratory minute volume)
3) inspiratory reserve volume
4) expiratory reserve volume
5) residual volume

18 Pepsin of gastric juice hydrolyzes
1) fats
2) carbohydrates
3) nucleic acids
4) mucopolysaccharides
+5) proteins

19 A digestive enzyme that hydrolyzed carbohydrates is called
1) pepsin
2) trypsin
3) lipase
+4) amylase
5) enterokinase

21 Staying in the cold is often leads to an increase in urine excretion due to
1) an increased secretion of antidiuretic hormone (ADH)
2) an inhibition of the secretion of antidiuretic hormone (ADH)
+3) an increase in the glomerular filtration rate
4) an increased secretion of aldosterone
5) a release of renin into the blood

22 Glycosuria in patients with normal blood glucose levels is possible due to the damage to
1) glomeruli
+2) proximal tubules
3) loops of Henle
4) distal tubules
5) collecting ducts

23 In a healthy adult, the main cause of exogenous hyperthermia is
1) low ambient temperature

		2) high ambient temperature +3) heat emission is difficult or impossible 4) heat loss is increased 5) high ambient humidity **Module IV. Physiology of adaptation, sensory systems, and higher nervous function** **24 Impaired conversation hearing is associated with the damage primarily to** +1) the left temporal cortex 2) the right temporal cortex 3) the frontal cortex 4) occipital cortex **25 Choose the types of sensations that are perceived only by taste buds** 1) sour, bitter, sweet, salty 2) sour, bitter, sweet, salty, “umami” (glutamate, protein) 3) sour, bitter, sweet, salty, “umami”, fatty +4) sour, bitter, sweet, salty, “umami”, fatty, minty, spicy
		ANSWER LEVEL 2 TEST QUESTIONS (MULTIPLE CORRECT ANSWERS)
		Module 1. General physiology of excitable tissues and control systems of the body **01. The main criteria for assessing excitability are** +1) threshold stimulus intensity 2) subthreshold stimulus intensity +3) suprathreshold stimulus intensity 4) chronaxie 5) rheobase **02 The main aspects of a smooth muscle contraction include** 1) rapid reaction to stimuli +2) slow reaction to stimuli +3) automatism 4) full dependence on nerve affects +5) low energy consumption and fatigue **03 The properties of nerve centers depend on** +1) properties of nerve cells 2) properties of nerve fibers 3) properties of glia cells +4) properties of chemical synapses +5) neural network structure **04 The development of the program of a movement involves** 1) spinal cord 2) medulla oblongata, pons +3) cerebellum 4) midbrain 5) hypothalamus 6) thalamus +7) striatopallidal system +8) cerebral cortex

05 Effects of sympathetic stimulation include
+1) decreased intestinal motor activity
2) increased intestinal motor activity
+3) dilated pupils
4) constricted pupils
+5) stimulated heart activity
6) inhibited heart activity
+7) dilated bronchi
8) constricted bronchi

06 Biological effects of the parathyroid hormone include
+1) increased calcium levels in the blood
2) increased phosphate levels in the blood
3) increases blood glucose levels
4) lowered calcium levels in the blood
+5) lowered phosphate levels in the blood
6) lowered blood glucose levels

07 Biological effects of vasopressin include
+1) promotes the water absorption in the distal nephron segment
2) promotes sodium excretion
+3) increases blood pressure in high concentration
4) reduces water absorption
5) reduces sodium excretion

08 Negative feedback
+1) returns the system to its original state, stabilizes it
2) increases changes in the system, transfers it to a new state
+3) increases influence of the control component
4) directed from the control nerve centers to the controlled organs

Module II. Physiology of the blood system and blood circulation

09 Basal vascular tone is caused by
1) parasympathetic stimulation
2) sympathetic stimulation
+3) automaticity of smooth muscle of the vascular wall
4) metasympathetic stimulation
+5) properties of the vascular wall
6) humoral regulation

10 Out of the following, vasodilators are
+1) bradykinin
+2) histamine
3) angiotensin II
+4) adenosine
+5) acetylcholine

11 Effects of sympathetic innervation on the heart include
+1) increased heart rate
2) decreased heart rate
+3) increased force of contractions
4) decreased force of contractions

+5) increased excitability
6) decreased excitability
+7) increased conductivity
8) decreased conductivity

12 Stimulation of the aortic arch baroreceptors leads to
1) decreased vagal tone
+2) increased vagal tone
+3) inhibition of heart activity
4) stimulation of heart activity
5) increased blood pressure
+6) decreased blood pressure

13 During the period of blood ejection the following is true
+1) semilunar valves are open
2) semilunar valves are closed
3) atrioventricular valves are open
+4) atrioventricular valves are closed

14 B blood group contains
1) agglutinogen A
+2) agglutinogen B
+3) agglutinin α
4) agglutinin β

15 System that controls aggregate state of blood includes
1) Rhesus (Rh) factor
2) blood buffer systems
+3) fibrinolysis system
+4) coagulation system
+5) anticoagulation system

Module III. Physiology of respiration, digestion, metabolism, and excretion

16 Methods used to determine vital capacity of the lungs include
+1) spirograpy
+2) body plethysmography
+3) spirometry
4) pneumotachometry
5) peak flow measurement
6) pulse oximetry

17 Saliva contains the following digestive enzymes
1) muramidase
2) protease
+3) alpha-amylase
+4) alpha-glucosidase
5) lipase

18 The phases of gastric secretion by I.P. Pavlov are
+1) reflex (cephalic) phase
+2) gastric phase
+3) intestinal phase

4) anabolic phase
5) catabolic phase

19 Biological effects of aldosterone in kidneys include
+1) increased excretion of potassium
2) increased excretion of sodium
3) increased excretion of chloride
4) reduced excretion of potassium
+5) reduced excretion of sodium
+6) reduced excretion of chloride

20 Which methods of heat emission are ineffective in a high-temperature environment
+1) heat conduction/transfer
+2) heat radiation
+3) convection
4) evaporation

Module IV. Physiology of adaptation, sensory systems, and higher nervous function

24 A sensory system includes the following components
+1) peripheral
+2) conductive
3) efferent
+4) central
5) afferent
6) additional

25 Types of internal inhibition in higher nervous function include
1) unconditioned
2) protective
+3) conditioned inhibition
+4) delayed inhibition
+5) differentiating (discriminative)
+6) extinction

26 Types of attention include
+1) involuntary (passive)
+2) voluntary
+3) post-voluntary
4) innate
5) acquired

ANSWER LEVEL 3 TEST QUESTIONS (MATCHING QUESTIONS)

Module 1. General physiology of excitable tissues and control systems of the body

01

Action potential phase	**Excitability phase**
1. Rest	A) excitability above normal
2. Latent period	B) normal excitability
3. Peak phase	C) relative refractory phase

4. Afterpotential hyperpolarization	D) absolute refractory phase

Correct answers: 1 – B; 2 – A; 3 – D; 4 – C

02

Period of Vvedensky parabiosis (reduction of normal excitation by the application of repeated stimuli)	**Description**
1. Rest	A) The cell reproduces its maximum stimulation frequency without changes
2. Transformational (equalizing) phase	B) The cell does not respond to stimuli of any strength
3. Paradoxical phase	C) The cell responds equally to strong and weak stimuli, and its maximum response frequency is lower than normal
4. Inhibitory phase	D) The reaction is stronger to weak and rare stimuli than to strong and frequent ones

Correct answers: 1 – A; 2 – C; 3 – D; 4 – B

03

Adrenoreceptors	**Typical localization**
1. α1	A) heart
2. α2	B) blood vessels
3. β1	C) bronchi
4. β2	D) presynaptic membrane of neurons

Correct answers: 1 – B; 2 – D; 3 – A; 4 – C

04

Endocrine gland	**Hormone**
1. thyroid gland	A) parathyroid hormone
2. parathyroid gland	B) insulin, glucagon
3. adrenal medulla	C) triiodothyronine, calcitonin
4. pancreas	D) adrenaline

Correct answers: 1 – C; 2 – A; 3 – D; 4 – B

05

Hormone	**Main function**
1. insulin, glucagon	A) regulation of water reabsorption in the kidneys
2. triiodothyronine	B) regulation of phosphorus-calcium metabolism
3. calcitonin, parathyroid	C) regulation of metabolism and

hormone	its speed, thermoregulation
4. vasopressin	D) regulation of glucose metabolism and its blood levels

Correct answers: 1 – D; 2 –C; 3 – B; 4 – A

Module II. Physiology of the blood system and blood circulation

06

Type of leukocyte	**Main function**
1. neutrophils	A) defense against parasites
2. eosinophils	B) defense against bacteria
3. basophils	C) adaptive immunity, defense against viruses
4. monocytes	D) blood vessel metabolism, restructuring of the vascular bed
5. lymphocytes	E) transform into macrophages, tissue remodeling and protection

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

07

Term	**Definition**
1. acidosis	A) a solution whose osmotic pressure is the same as that of blood plasma
2. alkalosis	B) shift in blood plasma pH towards acidic
3. physiological solution	C) shift in blood plasma pH towards alkaline
4. hematocrit	D) plasma to red blood cell ratio

Correct answers: 1 – B: 2 – C; 3 – A; 4 – D

08

Period of cardiomyocyte action potential	**Main ions**
1. depolarization	A) Ca^{2+}
2. initial repolarization	B) Na^{+}
3. plateau	C) Cl^{-}
4. rapid repolarization	D) K^{+}

Correct answers: 1 – B; 2 – C; 3 – A; 4 – D

09

Term	**Definition**
1. bathmotropy	A) change in the force of heart contractions
2. dromothropy	B) change in heart rate

3. inothropy	C) change in excitability
4. chronotropy	D) change in conductivity

Correct answers: 1 – C; 2 – D; 3 – A; 4 – B

10

Speed and duration of action of regulatory mechanisms	**Mechanisms of blood pressure regulation**
1. rapid	A) humoral regulation, change in myogenic vascular tone, redistribution of fluid in the body
2. medium-term	B) reflex mechanisms
3. slow, long-term	C) change in the volume of circulating blood due to excretory organs activity

Correct answers: 1 – B; 2 – A; 3 – C

11

Blood pressure parameter	**Value**
1. systolic pressure	A) 40 mm Hg
2. diastolic pressure	B) 70 – 80 mm Hg
3. pulse pressure	C) 110 – 130 mm Hg
4. average dynamic pressure	D) 100 mm Hg

Correct answers: 1 – C; 2 – B; 3 – A; 4 – D

Module III. Physiology of respiration, digestion, metabolism, and excretion

12

The level of the nuclei of the respiratory center in the central nervous system	**Function**
1. Spinal cord	A) Automaticity of breathing
2. Medulla oblongata	B) Voluntary control of rate and depth of breathing
3. Pons	C) Adaptation of respiration to changes in environmental temperature
4. Hypothalamus	D) Innervation of the respiratory muscles
5. Cerebral cortex	E) Regulation of the duration of inhalation and exhalation

Correct answers: 1-D; 2-A; 3-E; 4-C; 5-B;

13

The part of gastrointestinal tract	**Corresponding process of digestion**

1) oral cavity	A) beginning of protein hydrolysis
2) stomach	B) hydrolysis of fats
3) duodenum	C) beginning of carbohydrate hydrolysis
4) small intestine	D) formation of feces
5) large intestine	E) monomer absorption

Correct answers: 1-C; 2-A; 3-B; 4-D; 5-E

14

Nephron segment	**Urine formation processes**
1) renal corpuscle (Shumlyansky capsule)	A) optional/facultative tubular reabsorption
2) proximal tubule	B) dilution and concentration
3) loop of Henle	C) renal filtration
4) distal tubule	D) obligatory tubular reabsorption

Correct answers: 1-C; 2-D; 3-B; 4-A;

Module IV. Physiology of adaptation, sensory systems, and higher nervous function

15

Type of central nervous system	**Type of temperament**
1. Strong, unbalanced	A) phlegmatic
2. Strong, balanced, mobile	B) sanguine
3. Strong balanced inert	C) choleric
4. Weak	D) melancholic

Correct answers: 1 – C; 2 – B; 3 – A; 4 – D

16

Photoreceptors	**Functions**
1. rods	A) most sensitive to light
2. cones	B) are responsible for visual acuity
	C) are responsible for peripheral vision
	D) are responsible for color perception
	E) are responsible for black and white vision

Correct answers: 1 – A, B, D; 2 – C, E

17

Types of sensitivity	**Location in the cerebral cortex**
1. tactile	A) occipital region of the cerebral cortex
2. thermal	B) superior temporal gyrus of the cerebral cortex, area 41 (Heschle's area)
3. gustatory (taste)	C) superior temporal gyrus of the

			left hemisphere of the cerebral cortex, area 42 (Wernicke's area)
		4. auditory (speech perception)	D) posterior central gyrus of the parietal region of the cerebral cortex
		5. auditory (general perception of sounds)	E) hippocampus
		6. visual	
		7. olfactory	
		Correct answers: 1 – D; 2 – D; 3 – D; 4 – C; 5 – B; 6 – A; 7 – E	
		18	
		Type of attention	**Description**
		1. involuntary	A) requires effort
		2. voluntary	B) supported by interest
		3. post-voluntary	C) supported by the novelty of the stimulus, information
		Correct answers: 1	
		19	
		Emotions	**Description**
		1. affect	A) weak, long-lasting
		2. passion	B) strong, relatively short-term
		3. mood	C) extremely strong, short-lived emotion
		Correct answers: 1 – C; 2 – B; 3 – A	

Assessment criteria

"Very good" - more than 90% correct answers of questions of every level
"Good" - 77-89% correct answers of questions of every level
"Satisfactory" - 60-76% correct answers of questions of every level
"Unsatisfactory" - less than 60% correct answers of questions of every level

Interview questions

	Code	**Competence description / name of labor function / name of work activity / text**
S	31.05.01	General Medicine for international students (in English)
C	UC-1	Is able to analyze of problems critically using system approach and devise a plan of action
C	GPC-5	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity
F	A/01.7	Providing emergency and urgent medical care to the population
	A/02.7	Examination of the patient in order to make a diagnosis
I		**ANSWER THE QUESTIONS** **Module 1. General physiology of excitable tissues and control systems of the body** 1. Structure and functions of the cell membrane. Membrane potentials.

		2. Action potential, its phases and mechanisms. 3. Excitability, methods of assessment. Correlation between excitability phases and action potential phases. 4. Rules of excitable tissues reactions. Relationship between force and time. 5. Parabiosis (by N. Vvedensky). **Module II. Physiology of the blood system and blood circulation** 6. Internal environment of an organism. The blood system, its properties and functions. Basic constants of blood, pathways of regulation of the constants. 7. Protective function of the blood. Immunity. 8. Leukocytes, their types, ratio and their functions. 9. Regulation of cardiac activity, its levels, mechanisms, and effects. 10. Arterial pulse, its properties. Impedance reography. 11. Mechanisms (short-term, medium-term and long-term) regulating general and visceral blood circulation 12. Functional system maintaining stability of blood pressure, its central and peripheral components. **Module III. Physiology of respiration, digestion, metabolism, and excretion** 13. Breathing and its stages. Biomechanics of inhalation and exhalation. 14. Regulation of respiration by reflexes. Change of respiratory phases. 15. Humoral regulation of respiration (role of concentration of carbon dioxide and blood pH). 16. Digestion in oral cavity. Composition and physiological properties of saliva. Salivation, its regulation. 17. Metabolism. Assimilation and dissimilation. Nutrients and their role in metabolism and synthesis. 18. Neural and humoral thermoregulation. Thermoregulation during physical work and external temperature fluctuations. Physiological basis of cold exposure training. 19. Excretory system and its role in maintaining homeostasis. Kidney functions. Nephron. **Module IV. Physiology of adaptation, sensory systems, and higher nervous function** 20. Pain, its biological significance. Nociceptors and pathway of pain. Antinociceptive system. 21. Motivation. Classification and mechanisms of development. 22. Emotions, their biological significance. Somatic and autonomic components of emotions. 23. Memory, its purpose and adaptive properties. Types of memory and mechanisms of development.

Assessment criteria

“Very good” - more than 85% correct answers

“Good” - 72-84% correct answers

“Satisfactory” - 56-70% correct answers

“Unsatisfactory” - less than 55% correct answers

Standardized case studies and checklists for the **Б1.О.10 Human physiology** course

Case Study No. 1

	Code	Competence description / name of labor function / name of work activity / text
S	31.05.01	General Medicine for international students (in English)
C	UC-1	Is able to analyze of problems critically using system approach and devise a plan of action
C	GPC-5	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity
F	A/01.7	Providing emergency and urgent medical care to the population
	A/02.7	Examination of the patient in order to make a diagnosis
I		**READ THE PROVIDED CASE DESCRIPTION AND GIVE DETAILED ANSWERS TO THE QUESTIONS** Some types of toxins (Amanita phalloides – death-cap mushroom - poison) significantly reduce the absolute refractory period in the heart. Can ingestion of such poisons be fatal? Describe the mechanism.
Q	1	Question: What is the absolute refractory period of an excitable cell?
Q	2	Question: What is the duration of absolute refractory period of the ventricular myocardium?
Q	3	Question: What main modes of functioning in muscle tissue do you know?
Q	4	Question: How the function of the heart changes due to prolonged absolute refractory period?
Q	5	Question: How the function of the heart changes if the phase of absolute refractory period is shortened significantly?
Q	6	Question: What are changes in hemodynamics in this situation?

Case Study No.1 Checklist

	Code	Competence description / name of labor function / name of work activity / text
S	31.05.01	General Medicine for international students (in English)
C	UC-1	Is able to analyze of problems critically using system approach and devise a plan of action
C	GPC-5	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity
F	A/01.7	Providing emergency and urgent medical care to the population
	A/02.7	Examination of the patient in order to make a diagnosis
I		**READ THE PROVIDED CASE DESCRIPTION AND GIVE DETAILED ANSWERS TO THE QUESTIONS** Some types of toxins (Amanita phalloides poison) significantly reduce the absolute refractory period in the heart. Can ingestion of such poisons be fatal? Describe the mechanism.
R2	Very good	Correct answers to all questions are provided
R1	Good	Correct and complete answers are provided to the questions 1, 2, 3, and

		4
	Satisfactory	Correct and complete answers are provided to the questions 1, 2, and 3
R0	Fail	No correct answers given
Q	1	Question: What is the absolute refractory period of an excitable cell?
A		Correct answer: The absolute refractory period is the time when a cell cannot respond to a repeated stimulus of any strength, even a very strong one since all potential-gated sodium channels after the action potential are not available for re-exposure for some time.
R2	Very good	Correct answer is given
R0	Fail	No answer, incorrect or irrelevant answer is given
Q	2	Question: What is the duration of absolute refractory period of the ventricular myocardium?
A		Correct answer: Normally, the absolute refractory period of the ventricular myocardium lasts 0.25 - 0.3 seconds and almost coincides with the duration of the plateau phase of the action potential.
R2	Very good	Correct answer is given
R0	Fail	No answer, incorrect or irrelevant answer is given
Q	3	Question: What main modes of functioning in muscle tissue do you know?
A		Correct answer: The main modes of functioning in muscle tissue are single contraction and contraction summation (single contraction, contraction summation, tetanus contraction).
R2	Very good	Correct answer is given
R0	Fail	No answer, incorrect or irrelevant answer is given
Q	4	Question: How the function of the heart changes due to prolonged absolute refractory period?
A		Correct answer: Due to prolonged absolute refractory period, the heart can only produce single contractions, the myocardium contracts synchronously, as a whole. As a result, the contraction and relaxation of the heart follow one after the other
R2	Very good	Correct answer is given
R0	Fail	No answer, incorrect or irrelevant answer is given
Q	5	Question: How the function of the heart changes if the phase of absolute refractory period is shortened significantly?
A		Correct answer: If the absolute refractory period is shortened significantly, the heart may enter a state of tetanus contraction, which will lead to cardiac arrest in the systole phase. In addition, the likelihood of asynchronous myocardial work increases.
R2	Very good	Correct answer is given
R0	Fail	No answer, incorrect or irrelevant answer is given
Q	6	Question: What are changes in hemodynamics in this situation?

A		Correct answer: These disorders of the heart function will lead to disrupted hemodynamics. This condition is life-threatening and requires emergency medical intervention. Impaired blood supply, in particular of the brain, manifests primarily as loss of consciousness
R2	Very good	Correct answer is given
R0	Fail	No answer, incorrect or irrelevant answer is given

Case Study No. 2

	Code	**Competence description / name of labor function / name of work activity / text**
S	31.05.01	General Medicine for international students (in English)
C	UC-1	Is able to analyze of problems critically using system approach and devise a plan of action
C	GPC-5	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity
F	A/01.7	Providing emergency and urgent medical care to the population
	A/02.7	Examination of the patient in order to make a diagnosis
I		**READ THE PROVIDED CASE DESCRIPTION AND GIVE DETAILED ANSWERS TO THE QUESTIONS** Stroke volume is 75 mL; heart rate is about 65 beats per minute. Calculate the cardiac output. Assess the result.
Q	1	Question: What is stroke volume?
Q	2	Question: What is cardiac output?
Q	3	Question: What is the normal resting cardiac output in a healthy adult?
Q	4	Question: How to calculate cardiac output using the available data?
Q	5	Question: What is cardiac output in this case?
Q	6	Question: Assess the calculated cardiac output.

Case Study No.2 Checklist

	Code	**Competence description / name of labor function / name of work activity / text**
S	31.05.01	General Medicine for international students (in English)
C	UC-1	Is able to analyze of problems critically using system approach and devise a plan of action
C	GPC-5	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity
F	A/01.7	Providing emergency and urgent medical care to the population
	A/02.7	Examination of the patient in order to make a diagnosis
I		**READ THE PROVIDED CASE DESCRIPTION AND GIVE DETAILED ANSWERS TO THE QUESTIONS** Stroke volume is 75 mL; heart rate is about 65 beats per minute. Calculate the cardiac output. Assess the result.

R2	Very good	Correct answers to all questions are provided
R1	Good	Correct and complete answers are provided to the questions 1, 2, 3, and 4; no answer or incorrect answers are given for question 5 and/or 6
	Satisfactory	Correct and complete answers are provided to the questions 1, 2, 3, and 4; no answer or incorrect answers are given for question 5 and/or 6, or there is an error in calculations for question 5
R0	Fail	No correct answers given or answers are only given for questions 1 and 2
Q	1	Question: What is stroke volume?
A		Correct answer: Stroke volume is volume of blood ejected with each heartbeat.
R2	Very good	Correct answer is given
R0	Fail	No answer, incorrect or irrelevant answer is given
Q	2	Question: What is cardiac output?
A		Correct answer: Cardiac output is the quantity of blood pumped by the heart into the aorta each minute.
R2	Very good	Correct answer is given
R0	Fail	No answer, incorrect or irrelevant answer is given
Q	3	Question: What is the normal resting cardiac output in a healthy adult?
A		Correct answer: The normal resting cardiac output of a healthy adult is 4–6 liters and depends on body weight.
R2	Very good	Correct answer is given
R1	Good/Satisfactory	Answer “5 – 5.5 L” is given
R0	Fail	No answer, incorrect or irrelevant answer is given
Q	4	Question: How to calculate cardiac output using the available data?
A		Correct answer: To calculate cardiac output, one needs to multiply stroke volume by heart rate.
R2	Very good	Correct answer is given
R0	Fail	No answer, incorrect or irrelevant answer is given
Q	5	Question: What is cardiac output in this case?
A		Correct answer: Cardiac output x heart rate=75x65=4875 mL
R2	Very good	Correct answer is given
R1	Good/Satisfactory	Correct formula is used, but there is an error in calculations
R0	Fail	No answer, incorrect or irrelevant answer is given
Q	6	Question: Assess the calculated cardiac output.
A		Correct answer: Normal cardiac output.
R2	Very good	Correct answer is given
R0	Fail	No answer, incorrect or irrelevant answer is given

Examples of topics for discussions, library-research papers:

1. Physiology of stress and adaptation
2. Physiology of rational nutrition
3. Physiology of pain and anesthesia
4. Physiology of motivation and emotions

4. Assessment criteria for learning outcomes

"Very good" grade is given to a student who possesses knowledge of the subject in full scope outlined in the curriculum, has a sufficiently deep insight into the subject; is able to answer all questions clearly, exhaustively, and with no outside help; structures their answers logically, with emphasis on the most important information; is able to analyze, compare, classify, summarize, refine, and structure the course content, giving particular attention to cause-and-effect relationships.

"Good" is given to a student whose knowledge of the subject is almost in full scope outlined in the curriculum (gaps are only present in the knowledge of some especially complex aspects); is able to answer questions exhaustively with little to no outside help; does not always put emphasis on the most important information, but does not make significant mistakes.

"Satisfactory" is given to a student who possesses the bulk of knowledge on the subject; has difficulties answering questions with no outside help, uses imprecise wording; makes mistakes in substantial number of their answers.

"Unsatisfactory" is given to a student who does not have the mandatory minimum of knowledge on the subject, is not able to give an answer even with additional guiding questions.

Appendix 1

Practical Skills Assessment Checklist

Practical Skill Name: Radial pulse assessment

C	GPC-5	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity		
F	A/01.7	Providing emergency and urgent medical care to the population		
	A/02.7	Examination of the patient in order to make a diagnosis		
WA	Assessment of the patient's condition requiring emergency or urgent medical aid. Conducting a full physical examination of the patient (visual examination, palpation, percussion, auscultation)			
	Action		Performed	Not Performed
1.	The patient is seated facing the one conducting the examination		1 point	-1 point
2.	One's fingers are placed above the patient's wrist joint so that the 2nd and 3rd fingers are above the radial arteries; the pulse is assessed by changing the pressure applied by the fingers		1 point	-1 point
3.	Heart rate is evaluated: the number of beats per minute is counted; the results are evaluated (normocardia, bradycardia, tachycardia)		1 point	-1 point
4.	The rhythm (the duration of time intervals between beats) is assessed as either rhythmic or arrhythmic		1 point	-1 point
5.	The pulse strength (the force that must be applied to compress the artery until the pulse completely disappears) is assessed		1 point	-1 point
6.	The pulse volume (the change in the volume of the arteries, determined by the strength of the pulse beat) is assessed		1 point	-1 point
7.	An overall assessment of the pulse is made		1 point	-1 point
	Total		7 poins	

Final grade:

"Pass" - at least 75% of required actions performed

"Fail" - 74% of required actions or less performed