Документ подписан простой электронной подписью
Информация о владельце:
ФИО: Стегний Кирилл Владимирович
Должность: И.о. ректора
Дата подписания: 15.04.2026 12:11:24
Уникальный программный ключ:
d59234ba928aea5c04c54eb9013e367220b6b2ae

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.17 Pathophysiology, clinical pathophysiology
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
2	**Interim assessment**	**Interview Questions**
		Mini-Case Studies

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

Tests for continuous 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
I		**ANSWER LEVEL 1 TEST QUESTIONS (ONE CORRECT ANSWER)**
		Pathophysiology of immune reactivity disorders 1. Which of the following is one of the central organs of the immune system? a) Lymph nodes b) Spleen +c) Thymus d) Tonsils 2. What is the main mechanism in the pathogenesis of chronic granulomatous disease?

+a) Defect in the bactericidal function of phagocytes
b) T-lymphocyte deficiency
c) Complement activation
d) Increased antibody production

3. Which is NOT a primary immunodeficiency?
+a) HIV infection
b) DiGeorge syndrome
c) Bruton's agammaglobulinemia
d) Swiss-type agammaglobulinemia

4. Impaired interaction of phagocytes with opsonized microorganisms leads to
+a) immunodeficiency
b) autoimmune reaction
c) type I hypersensitivity
d) type IV hypersensitivity

5. Which of the following is an example of nonspecific pathological reactivity?
+a) Fever
b) Immunodeficiency
c) Allergy
d) Autoimmune disease

6. Which factor does NOT affect body reactivity?
a) Age
b) Sex
+c) Blood group
d) State of the nervous system

Pathophysiology of hypersensitivity reactions
1. Which of the following conditions has immediate-type hypersensitivity as its primary mechanism of pathogenesis?
a) Contact dermatitis
+b) Bronchial asthma
c) Tuberculin reaction
d) Serum sickness

2. Which of the following conditions is caused by a delayed-type hypersensitivity reaction?
a) Urticaria
b) Serum sickness
+c) Contact dermatitis
d) Anaphylactic shock

3. What is the leading mechanism in the pathogenesis of angioedema?
+a) Reaginic type of hypersensitivity
b) Immune complex type
c) Cellular type
d) Cytotoxic type

4. What is the leading mechanism in the pathogenesis of serum disease?
a) Reaginic type
+b) Immune complex type
c) Cellular type
d) Cytotoxic type

5. What is the main mediator of immediate-type allergic reactions?
+a) Histamine
b) Serotonin
c) Prostaglandin
d) Leukotriene

6. What causes haptens to acquire antigenic properties?
a) Acting on immunocompetent cells
+b) Binding to body proteins
c) Binding to bile acids
d) Forming paired compounds with sulfuric acid

7. Which of the following conditions has cell-mediated hypersensitivity as its primary mechanism of pathogenesis?
a) Bronchial asthma
+b) Contact dermatitis
c) Urticaria
d) Anaphylactic shock

8. Which of the following are the main effector cells in Type IV hypersensitivity?
+a) T-lymphocytes
b) B-lymphocytes
c) Eosinophils
d) Basophils

9. What is the main mechanism in the pathogenesis of pseudoallergic reactions?
+a) Direct action of drugs on mast cells
b) Complement activation
c) Formation of immune complexes
d) IgE synthesis

Pathophysiology of water-mineral metabolism
1. Which of the following is a cause of hyperosmolar dehydration?
+a) Drinking seawater with fluid deficit
b) Loss of gastric juice
c) Diarrhea
d) Polyuria in diabetes mellitus

2. What is the cause of membranogenic edema?
+a) Increased vascular wall permeability
b) Impaired lymphatic drainage
c) Increased hydrostatic pressure

d) Hypoproteinemia

3. What is the main mechanism in the pathogenesis of nephrotic edema?
+a) Protein loss
b) Impaired lymphatic drainage
c) Increased vascular wall permeability
d) Activation of the renin-angiotensin-aldosterone system

4. What is the main mechanism of hyponatremia development?
a) Sodium loss with sweat
b) Increased aldosterone secretion
+c) Increased antidiuretic hormone secretion
d) Decreased renin secretion

5. What does dysfunction of the sodium pump lead to?
+a) Transmineralization and cell death
b) Hyperhydration
c) Hypovolemia
d) Hypernatremia

6. What causes hyperosmolar dehydration?
a) Loss of isotonic fluid
b) Loss of hypotonic fluid
c) Loss of hypertonic fluid
+d) Drinking seawater

7. What is the main law of water-electrolyte balance?
+a) The amount of water intake must equal losses
b) The amount of sodium is always higher than potassium
c) The amount of water does not depend on electrolytes
d) Water comes only with food

Pathophysiology of acid-base balance

1. What is the acid-base balance is characterized by?
+a) The equilibrium between acids and bases in the body
b) The balance between proteins and fats
c) The balance between glucose and insulin
d) The balance between calcium and phosphorus

2. What is the main indicator of metabolic acidosis?
+a) Decreased plasma HCO_3^-
b) Increased HCO_3^-
c) Increased pCO_2
d) Decreased pCO_2

3. What causes respiratory acidosis?
+a) Hypoventilation of the lungs
b) Hyperventilation of the lungs
c) Loss of gastric juice
d) Loss of intestinal juice

4. What characterizes compensated metabolic acidosis?

+a) pH 7.35–7.29
b) pH 7.47–7.54
c) pH 7.56–7.70
d) pH 7.19–6.90

5. What is the cause of exogenous alkalosis?
+a) Administration of bicarbonates
b) Loss of gastric juice
c) Prolonged intake of acidic food
d) Hyperventilation

6. What characterizes respiratory alkalosis?
+a) Decreased $PaCO_2$ and standard blood bicarbonate
b) Increased $PaCO_2$ and standard blood bicarbonate
c) Decreased $PaCO_2$ and increased standard blood bicarbonate
d) Increased $PaCO_2$ and decreased standard blood bicarbonate

7. What is the main compensation mechanism for metabolic alkalosis?
+a) Increased renal excretion of HCO_3^-
b) Enhanced ammoniogenesis
c) Increased secretion of NaH_2PO_4
d) Activation of protein buffer

8. What is true for decompensated respiratory acidosis?
+a) Alveolar hypoventilation
b) Hyperventilation
c) Loss of bases
d) Loss of acids

Pathophysiology of tumor growth and disorders of tissue differentiation

1. What is the key sign of tumor cells?
+a) Loss of surface glycoproteins
b) Increased sensitivity to hormones
c) Increased sensitivity to apoptosis
d) Decreased mitotic activity

2. What is the main mechanism of tumor metastasis?
+a) Weakening of intercellular interactions
b) Increased antibody production
c) Decreased vascular permeability
d) Enhanced apoptosis

3. What is NOT a systemic manifestation of tumor growth?
a) Cachexia
b) Immunodeficiency
c) Hyperglycemia
+d) Local edema

4. What is the main gene involved in activation of tumor cell division?
+a) ras
b) p53
c) BRCA1
d) BCL-2

5. What is membrane atypia of tumor cells caused by?
+a) Changes in glycolipids
b) Changes in cytoskeletal proteins
c) Changes in phospholipids
d) Changes in cholesterol

6. Which of the following is a systemic effect of a tumor?
+a) Cachexia
b) Hyperthermia
c) Hypoglycemia
d) Hypertension

Pathophysiology of red blood cell disorders

1. What characterizes anemia?
+a) Decreased hemoglobin concentration
b) Increased number of erythrocytes
c) Increased hematocrit
d) Increased circulating blood volume

2. What characterizes erythrocytosis?
+a) Increased number of erythrocytes above normal
b) Decreased number of erythrocytes
c) Decreased hematocrit
d) Increased ESR

3. What is the main mechanism of pathogenesis of acquired hemolytic anemias?
a) Enzyme deficiency
+b) Immune destruction of erythrocytes
c) Iron deficiency
d) Vitamin B12 deficiency

4. Which of the following is a typical pathological process of the red blood system?
+a) Anemia
b) Leukocytosis
c) Leukopenia
d) Thrombocytosis

5. What is the main mechanism in pathogenesis of posthemorrhagic anemia?
+a) Acute blood loss
b) Chronic inflammation
c) Increased hemolysis
d) Iron deficiency

Pathophysiology of white blood cell disorders

1. What characterizes physiological leukocytosis?
   +a) Short duration
   b) Long duration
   c) Left shift in the leukocyte formula
   d) Right shift

2. Which of the following is a reactive leukocytosis?
   +a) Leukemoid reaction
   b) Leukemia
   c) Leukopenia
   d) Agranulocytosis

3. What is the main mechanism in pathogenesis of leukopenia?
   +a) Suppression of leukopoiesis
   b) Tumor stimulation of leukopoiesis
   c) Redistribution of leukocytes
   d) Hemoconcentration

4. What characterizes agranulocytosis?
   +a) Sharp decrease in the number of granulocytes
   b) Increased number of lymphocytes
   c) Increased number of eosinophils
   d) Increased number of monocytes

5. What is the main mechanism in pathogenesis of leukemia?
   +a) Clonal proliferation of atypical leukocytes
   b) Increased antibody production
   c) Hypersecretion of hormones
   d) Increased erythrocyte production

6. What does left shift in the leukocyte formula indicate?
   +a) Increase in young forms of neutrophils
   b) Increase in mature lymphocytes
   c) Increase in eosinophils
   d) Increase in basophils

7. What is the main biological factor in the pathogenesis of leukocytosis?
   +a) Infection
   b) Hypoxia
   c) Acidosis
   d) Immunodeficiency

8. What characterizes lymphocytosis?
   +a) Increased number of lymphocytes
   b) Decreased number of lymphocytes
   c) Increased number of eosinophils
   d) Decreased number of erythrocytes

9. Which of the following is a pathological process of the white blood system?

		+a) Leukemia b) Thrombocytosis c) Erythrocytosis d) Polycythemia
I		**ANSWER LEVEL 2 TEST QUESTIONS (MULTIPLE CORRECT ANSWERS)**
		Pathophysiology of hemostasis disorders 1. Which of the following are endogenous anticoagulants? +a) Antithrombin III +b) Heparin +c) Protein C d) Thromboxane A2 +e) Plasmin 2. Which of the following conditions are characterized by prolonged bleeding time? +a) Thrombocytopenia +b) Thrombocytopathies +c) Aspirin therapy d) Hyperfibrinogenemia e) Hemophilia 3. What are disorders of secondary (coagulation) hemostasis characteristic of? +a) Liver cirrhosis +b) Hemophilia c) Thrombocytopathies +d) von Willebrand disease +e) Vitamin K deficiency 4. Which of the following are pathogenetic factors of thrombosis? +a) Endothelial injury +b) Hypercoagulation +c) Blood stasis d) Hypoproteinemia +e) Thrombocytosis **Pathophysiology of cardiovascular diseases. General aspects** 1. What are forms of circulatory insufficiency? +a) Cardiac +b) Vascular +c) Peripheral d) Respiratory e) Renal 2. Which of the following are symptoms of heart failure? +a) Dyspnea +b) Tachycardia +c) Edema d) Hyperglycemia +e) Cyanosis

3. Which of the following are pathogenetic factors of arterial hypertension?
+a) Hereditary
+b) Renal
+c) Metabolic
+d) Hormonal
e) Infectious

4. Which renal factors are involved in blood pressure regulation?
+a) Kinins
+b) Renin
+c) Angiotensin
d) Catecholamines
+e) Aldosterone

5. What are the main manifestations of venous hyperemia?
+a) Tissue cyanosis
+b) Edema
c) Increased temperature
+d) Decreased organ function
e) Redness

Pathophysiology of cardiovascular diseases. Specific aspects

1. What are the mechanisms of cardiomyocyte damage in myocardial infarction?
+a) Release of lysosomal enzymes
+b) Autoimmune mechanisms
+c) Activation of free radical oxidation
d) Inhibition of lysosomal enzymes
e) Suppression of free radical oxidation

2. Which changes in blood biochemical markers are characteristic of acute myocardial infarction?
+a) Increased LDH
+b) Increased creatine phosphokinase
+c) Increased aspartate aminotransferase
d) Decreased lactic acid
+e) Increased prothrombin

3. Which of the following are pathogenetic factors in the development of cardiac arrhythmias?
+a) ATP deficiency
+b) Hypokalemia
+c) Hyperkalemia
+d) Hypoxia
+e) Excess calcium

Pathophysiology of respiratory system disorders

1. Which of the following are causes of obstructive respiratory failure?
+a) Bronchiolar collapse
+b) Bronchospasm
c) Pneumonia
+d) Loss of lung elasticity
+e) Bronchial mucosal edema

2. What characterizes respiratory failure?
+a) Hypoxemia
+b) Hypercapnia
+c) Acidosis
d) Hypokalemia
+e) Tachypnea

3. Which of the following are causes of impaired lung diffusion function?
+a) Thickening of the alveolar-capillary membrane
+b) Pulmonary edema
c) Bronchial obstruction
+d) Decreased perfusion
+e) Pulmonary artery thrombosis

4. Which of the following are extrapulmonary causes of respiratory failure?
+a) Stroke
+b) Brain tumors
+c) Chest trauma
d) Pulmonary edema
e) Pneumonia

Pathophysiology of digestive system disorders

1. Which of the following are causes of gastric and duodenal ulcer disease?
+a) Helicobacter pylori infection
+b) Hypersecretion of hydrochloric acid
+c) Stress
+d) NSAID use
+e) Autoimmune processes

2. Which of the following are manifestations of malabsorption syndrome?
+a) Diarrhea
+b) Steatorrhea
+c) Hypoproteinemia
+d) Anemia
+e) Flatulence

3. Which of the following are manifestations of chronic intestinal autointoxication?
+a) Anemia

		+b) Weakening of cardiac contractions +c) Decreased blood pressure +d) Decreased pain sensitivity e) Leukocytosis 4. Which of the following are manifestations of disorders of the motor function of intestines? +a) Diarrhea +b) Constipation +c) Abdominal distension +d) Pain syndrome +e) Vomiting
I		**ANSWER LEVEL 3 TEST QUESTIONS (MATCHING QUESTIONS)**
		Pathophysiology of endocrine diseases. Specific aspects 1. Match the disease with its pathogenesis A) Acromegaly B) Cushing's disease C) Autoimmune thyroiditis D) Diabetes insipidus 1. Deficiency of antidiuretic hormone (vasopressin) 2. Hyperproduction of ACTH and cortisol 3. Excess of growth hormone (GH) 4. Antibodies to thyroid peroxidase **Answer:** A-3, B-2, C-4, D-1 2. Match the hormonal imbalance with its manifestation A) Hyperprolactinemia B) Hypothyroidism C) Hyperparathyroidism D) Hypoglycemia 1. Myxedema 2. Galactorrhea 3. Osteoporosis 4. Seizures, loss of consciousness **Answer:** A-2, B-1, C-3, D-4 **Pathophysiology of nervous system disorders and higher nervous function** 1. Match the disease with its pathogenesis A) Alzheimer's disease B) Parkinsonism C) Epilepsy D) Ischemic stroke 1. Degeneration of dopaminergic neurons 2. Accumulation of beta-amyloid plaques 3. Pathological synchronization of neurons 4. Occlusion of a cerebral artery **Answer:** A-2, B-1, C-3, D-4 4. Match the syndrome with its characteristic

		A) Dementia B) Ataxia C) Hyperkinesis D) Aphasia 1. Impaired coordination of movements 2. Loss of ability to speak 3. Cognitive decline 4. Involuntary movements **Answer:** A-3, B-1, C-4, D-2 **Pathophysiology of immune diseases** 1. Match the disease with its type of immunopathology A) DiGeorge syndrome B) Rheumatoid arthritis C) HIV infection D) Urticaria 1. Primary immunodeficiency 2. Autoimmune disease 3. Secondary immunodeficiency 4. Type I hypersensitivity **Answer:** A-1, B-2, C-3, D-4

Assessment criteria

"Very good" - more than 80% correct answers of questions of every level
"Good" - 70-80% correct answers of questions of every level
"Satisfactory" - 60-70% 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
I		**ANSWER THE QUESTIONS** 1. The concept of oxygen deprivation. Petrov's classification of oxygen deprivation. Metabolic and functional disorders associated with hypoxia. 2. Pathology of exogenous oxygen deprivation. Etiology, pathogenesis of mountain and altitude sickness. 3. Characteristics of endogenous types of hypoxia. Etiology and pathogenesis. Features of blood gas composition in various types of hypoxia. 4. Mechanism of urgent and long-term adaptation to hypoxia. Focus on their fundamental differences. Aspects of hypoxia development in children. 5. Main types of microcirculation disorders. Examination

		methods in clinic practice and in experiments. Features of microcirculation disorders in children. 6. Causes, pathogenesis of vascular permeability disorders (types, forms). 7. Sludge phenomenon, definition. Causes, mechanism of development, clinical manifestation. 8. Capillary-trophic insufficiency. Definition, causes, mechanism of development, consequences. 9. Arterial hyperemia: types, causes, mechanisms of development, external signs and their pathogenesis. Outcomes (physiological and pathological significance). 10. Etiology and pathogenesis of diffuse glomerulonephritis: the role of autoimmune mechanisms. Main manifestations, pathological changes in urine, mechanism of development. 11. Nephrotic syndrome: causes, mechanism of development, main manifestations. 12. Renal insufficiency: forms (acute, chronic), mechanism of development, main manifestations. Features of development in children. 13. Laboratory indicators and clinical manifestations of renal dysfunction. 14. General etiology and pathogenesis of endocrine diseases (affected levels of the system): main types of endocrinopathies and compensatory mechanisms. 15. Etiology and pathogenesis of hypothalamopathies (food homeostasis disorder syndrome, sleep-wake cycle disturbances, autonomic disorders, etc.). 16. The role of disorders of central regulatory mechanisms, hypothalamic-pituitary system function in the development of endocrinopathy. 17. Primary neuroendocrine hypothalamic disorders (hypothalamic dysgonadism, hypothalamic myxedema, diabetes insipidus). 18. Etiology and pathogenesis of disorders caused by adenohypophyseal hypofunction (pituitary dwarfism, Simmonds' disease, pituitary myxedema, Sheehan's syndrome). 19. Etiology and pathogenesis of disorders caused by adenohypophyseal hyperfunction (gigantism, acromegaly).

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.

Standardized case studies and checklists for **Б1.О.17 Pathophysiology, clinical pathophysiology** 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
I		**READ THE PROVIDED CASE DESCRIPTION AND GIVE DETAILED ANSWERS TO THE QUESTIONS** A 58-year-old patient, who had been smoking 30 years, was presents with progressive dyspnea, productive cough (with sputum), and cyanosis of the lips and nail beds. His medical history includes COPD. On examination: SaO_2 — 82%, pO_2 — 52 mmHg, Hb — 180 g/L, hematocrit — 55%. Chest X-ray shows emphysematous changes in the lungs.
Q	1	Question: What type of hypoxia has developed in this case? Justify your answer.
Q	2	Question: What compensatory mechanisms have developed in this case?
Q	3	Question: Why has the patient developed cyanosis?
Q	4	Question: Which therapeutic principles must be followed in treatment of this patient? Justify your answer.

Case Study No.1 Checklist

	Code	**Competence description / name of labor function / name of work activity / text**
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Q	1	Question:

		What type of hypoxia has developed in this case? Justify your answer.
A		Correct answer: The patient has respiratory hypoxia. Signs: Decreased pO_2 (52 mmHg, normal range 80–100 mmHg) and SaO_2 (82%) — evidence of hypoxemia. The cause is chronic airway obstruction (COPD), confirmed by X-ray. Hypercapnia (increased pCO_2) is also typical for respiratory hypoxia, but no data on pCO_2 is present case.
Q	2	Question: What compensatory mechanisms have developed in this case?
A		Correct answer: Polycythemia (Hb — 180 g/L, hematocrit — 55%) — compensatory increase in red blood cells to improve the oxygen-carrying capacity of the blood. Tachypnea — increased respiratory rate to enhance alveolar ventilation. Stimulation of erythropoiesis — activation of renal erythropoietin in response to hypoxia.
Q	3	Question: Why has the patient developed cyanosis?
A		Correct answer: Cyanosis is caused by the accumulation of deoxygenated hemoglobin in the capillaries (more than 50 g/L). In hypoxemia (pO_2 < 60 mmHg), hemoglobin oxygen saturation decreases, which is visually manifested as bluish discoloration of the mucous membranes and nail beds
Q	4	Question: Which therapeutic principles must be followed in treatment of this patient? Justify your answer.
A		Correct answer: Oxygen therapy (controlled) — to correct hypoxemia. Bronchodilators — to reduce airway obstruction. Antibiotics (in case of infection) — to prevent complications
R2	Very good	given to a student who gives a full correct answer, demonstrates deep, systemic knowledge of the subject, shows mastery of skills necessary to achieve objectives during professional activity, and knows and uses professional terminology correctly
R1	Good	given to a student who gives a full correct answer, demonstrates deep, systemic knowledge of the subject, shows mastery of skills necessary to achieve objectives during professional activity, and knows and uses professional terminology correctly
	Satisfactory	given to a student who gives a full correct answer, demonstrates sufficient knowledge of the subject, shows mastery of skills necessary to achieve objectives during professional activity, knows and uses professional terminology, but whose answer was slightly inaccurate without being incorrect
R0	Fail	given to a student who provides no answer or only fragments of an answer, demonstrates the lack of knowledge, and cannot provide an answer even with external help

Topics of discussion:

1. The role of free-radical reactions and oxidative stress in the pathogenesis of human diseases.
2. Modern theory of mechanisms behind chronic inflammation and its consequences for the body.
3. Pathophysiology of hypoxia: universal and specific mechanisms of adaptation and damage.
4. Mechanisms and significance of apoptosis and necrosis in the development of pathology.
5. Immunopathology: autoimmune and allergic reactions and their role in disease development.
6. Disorders of the hemostatic system: thrombosis, coagulopathies, and their pathogenesis.
7. Pathogenesis of heart failure: current perspectives on compensation and decompensation mechanisms.
8. Stress as a cause of pathology: the role of neuroendocrine regulation and adaptation mechanisms.
9. Tumor growth: molecular mechanisms, systemic manifestations, and challenges of treatment.
10. Biological rhythms and pathology: the impact of circadian rhythm disorders on disease development.

4. Assessment criteria for learning outcomes

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