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

Faculty of Education of foreign students, residents and postgraduates

Evaluation materials

in the discipline

Pathological physiology

Specialty: General Medicine

2023

1. List of competencies formed by the discipline

general professional (OPK):

Code and name general professional competence	Achievement indicator(s) general professional competence
OPK-5	Able to assess morphofunctional, physiological conditions and pathological processes in the human body to solve professional tasks

2. Kinds estimated materials V compliance Withformed competencies

Name of competency	Types of assessment materials	number of tasks **for 1 competency**
OPK-5	Closed tasks	25 with sample answers
	Open type tasks: Situational tasks Interview Questions	75 with sample answers

OPK-5:
Closed tasks:

1. The most characteristic change for the ischemic zone

1. Decreased cell function, necrosis.
2. Increased permeability of cell membranes.
3. Increased K+ content in cells.
4. Hemorrhage.

*Sample answer:*1.Decreased cell function, necrosis.

2. Metabolism that is disrupted during hypoxia is primarily:

1. Water-electrolyte.
2. Carbohydrate.
3. Energy.
4. Protein.
5. Fatty.

*Sample answer:*3. Energy.

3. Name of pain in missing, amputated limbs:

1. Migraine.
2. Heartache.
3. Phantom pain.
4. The phenomenon of referred pain.

*Sample answer:*3. Phantom pain.

4. The neuroendocrine system, which plays a leading initial role in the development of stress:

1. Sympathoadrenal system.
2. Hypothalamic-pituitary-ovarian.
3. Hypothalamic-neurohypophyseal.

4. Delta cells insular apparatus pancreas glands.

*Sample answer:*1. Sympathoadrenal system

5. Hypoxia plays an initial role in the pathogenesis of metabolic disorders during shock:

1. Respiratory.
2. Bloody.
3. Circulatory.
4. Fabric.

*Sample answer:*3. Circulatory.

6. The type of inflammation that is characterized by the most intense emigration of leukocytes:

1. Proliferative.
2. Serious.
3. Alternative.
4. Purulent.
5. Fibrinous.

*Sample answer:*4.Purulent.

7. Pathological processes in which metabolic acidosis may develop:

1. Hypoxia.
2. Kidney failure.
3. Liver failure.
4. Heart failure.
5. All factors.

*Sample answer:*5.All factors.

8. With a genetic block in the development of stem cells, immunological reactions are suppressed:

1. Humoral.
2. Cellular.
3. Both types.

*Sample answer:*3.Both types.

9. The basic principle of nonspecific hyposensitization:

1. Binding and inactivation of fixed antibodies.
2. The use of drugs-antagonists of allergy mediators.
3. Use of antidepressants.

*Sample answer:*2. The use of drugs-antagonists of allergy mediators.

10. The first phase during a burn disease:

1. Burn toxemia.
2. Burn exhaustion.
3. Burn shock.
4. Loss of skin function.

*Sample answer:*3. Burn shock.

11. Heat transfer in the first stage of fever:

1. Increasing.
2. Decreases.

3. Doesn't change.

*Sample answer:*2.Decreases

12. Thermoregulatory function of the hypothalamus during fever:

1. Violated.
2. Decreases.
3. Rebuilt to a higher level.

*Sample answer:*3. Rebuilt to a higher level.

13. The main significance in the occurrence of traumatic shock belongs to:

1. Excessive afferentation from the site of injury.
2. Circulatory hypoxia.
3. Violation of intercentral relationships.
4. Disorders of energy metabolism in the brain.
5. Strengthening the formation of enkephalins and endorphins.

*Sample answer:*3. Excessive afferentation from the site of injury

14. Pancreas iron helps compensate for shifts in acid-base balance due to secretion:

1. Hydrocarbonate.
2. Phosphate.
3. Ionov Na.
4. Ionov K.

*Sample answer:*1. Hydrocarbonate

15. The most important element of the anticoagulation system:

1. Fibrinogen.
2. Thrombin.
3. Plasmin.
4. Fibrin.

*Sample answer:*1. Fibrinogen.

16. Factor necessary for the implementation of the first stage of the external blood coagulation mechanism:

1. Fibrinogen (I).
2. Prothrombin (II).
3. Proconvertin (VII).
4. Antihemophilic globulin A (VIII).
5. Antihemophilic globulin B (IX).

*Sample answer:*2. Prothrombin (II).

17. With an increase in blood oncotic pressure, glomerular filtration:

1. Increasing.
2. Decrease.
3. Increases slightly.
4. Decreases slightly.

*Sample answer:*2.Decreasing.

18. A process whose development is accompanied by the formation of true leukocytosis:

1. Stress.
2. Sepsis.
3. Exercise stress.

4. Kidney failure.

*Sample answer:*2. Sepsis.

19. A capillary blood pH of 7.25 indicates:

1. Compensated acidosis.
2. Uncompensated acidosis.
3. Compensated alkalosis.
4. Uncompensated alkalosis.

*Sample answer:*2. Uncompensated acidosis

20. What processes are most intensely expressed in chronic inflammation:

1. Alternative.
2. Exudative.
3. Proliferative.
4. Exfoliative.

*Sample answer:*3.Proliferative

21. Pathological erythrocytosis is observed when:

1. Pregnancy.
2. Uncontrollable vomiting.
3. In high mountain conditions.
4. Acute renal failure.

*Sample answer:*2. Uncontrollable vomiting.

22. The consequences of the duration of an attack of paroxysmal tachycardia include:

1. Increased cardiac output.
2. Decrease in stroke volume of the heart.
3. Increased stroke volume of the heart.
4. Increased coronary blood flow.

*Sample answer:*2. Decrease in stroke volume.

23. Organ, dysfunction of which leads to the development of arterial hypertension:

1. Kidneys.
2. Spleen.
3. Stomach.
4. Thymus.

*Sample answer:*1. Kidneys.

24. With hepatic coma, the following may develop:

1. Acidosis.
2. Hyperglycemia.
3. Alkalosis.
4. Hypertension.

*Sample answer:*1. Acidosis.

25. Hormones produced by the adrenal cortex:

1. Liberians.
2. Statins.
3. Corticosteroids.
4. Catecholamines.

*Sample answer:*3. Corticosteroids

Open type tasks:

Situational tasks Task 1.

Patient S., 62 years old. He was admitted with complaints of fever, night sweats, weight loss, and itching. Ill for three years.

*Upon inspection:*enlarged mobile dense elastic lymph nodes not fused to the skin are palpated in the cervical-subclavian region on the right, merging with each other into conglomerates. Lungs and heart without features. Liver at the costal arch. The spleen protrudes 3 cm from under the costal arch.

*Additional research:*blood test: Hb - 100 g/l, leukocytes - 3.2 x 109/l, zosinophils - 11%, PUL - 4%, S/Y - 32%, lymphocytes - 44%, monocytes - 6%,
platelets - 20.0 x 109/l, ESR - 20 mm/hour.

*Preliminary diagnosis:*chronic lymphocytic leukemia.

Exercise:
Explain the pathogenesis of fever in patient S.

Sample answer to task 1.

Fever in leukemia develops due to the formation of leukemia
cells of endogenous pyrogens under the influence of infectious factors, which are sharply activated in leukemia due to the formation of acquired immunodeficiency and the weakening of nonspecific protective factors.

Task 2.

"Child Ch., 8 months. He was born with a weight of 2900 g, the neonatal period proceeded well. There is incompatibility between the blood of mother and child according to the Rh factor. She is on mixed feeding. From 4 months he receives various porridges (usually semolina), sometimes vegetable puree. Suffered an intestinal infection. A clinical examination revealed anemia: Hb - 80 g/l, Er. - 3.2 x 1012/l, reticulocytes - 2.5%.

*Preliminary diagnosis:*Iron-deficiency anemia.

Exercise:
Explain the mechanism of anemia in a child Ch.

Sample answer to task 2.

Iron deficiency in the blood plasma and body cells causes a decrease in its content in the mitochondria of bone marrow erythroblasts. This inhibits the synthesis of heme, its combination with globin and, consequently, the formation of hemoglobin. At the same time, the synthesis of other iron-containing compounds is disrupted both in erythrocytes (catalase, glutathione peroxidase) and in the cells of parenchymal organs (cytochromes, hemoglobin, peroxidases, catalase, etc.). The lack of these enzymes in erythrocytes causes a decrease in resistance to the damaging effects of peroxide compounds, increased hemolysis and a shortening of life expectancy.

Task 3.

A young man, a hairdresser, consulted a doctor with complaints of periodic swelling in the facial area, accompanied by mild itching. The swelling lasts for several hours and disappears completely, sometimes without treatment.

*Upon inspection:*pronounced swelling of the lips, eyelids, and tongue. No focal neurological symptoms were identified.

Exercise:
What is your presumptive diagnosis?

Sample answer to task 3.

The patient probably develops Quincke's edema, which occurs as a result of the ingestion of simple chemicals used in professional activities. It is believed that these substances are able to bind to the receptors of mast cells and basophils in the blood, causing their degranulation and rapid formation of substances such as histamine, platelet-activating factor, thromboxanes, leukotrienes, prostaglandins, etc. There is also evidence that with angioedema, spontaneous activation of complement occurs, starting with C1, due to a decrease in the activity of its inhibitor, esterase. In turn, histamine, leukotrienes B4 and D4, prostaglandins E2, kinins, acetylcholine form local changes, in particular, microcirculation disorders - increased permeability of capillaries and venules, expansion of capillaries, disruption of the rheological properties of blood. Damage to the capillary membrane, even under conditions of normal hydrostatic and oncotic pressures, causes significant diffusion of water, electrolytes and proteins into the tissue, ie forms of swelling.

Task 4.

Patient D., 8 years old. Suffering from diabetes mellitus (severe form, labile course). Takes 26 units of SIL (insulin-long suspension) in the morning. She was taken to the department in an unconscious state. The day before I felt satisfactory. In the evening, the mother, returning from duty, found the girl unconscious at home.

*Objectively:*consciousness is absent. The skin is moist, muscle tone is increased. The tone of the eyeballs is normal. Pulse – 78 beats per minute, rhythmic. Blood pressure - 95/60 mm. rt. Art. Breathing – 28 per minute, rhythmic, even. Meningeal symptoms are negative. Blood glucose - 2.5 mmol/l (normal 3.33 - 5.55 mmol/l), urine glucose (taken by catheter) - 2.8 mmol/l."

Exercise:

Explain Probable reason decompensation sugar diabetes And developmentcomatose state.

Sample answer to task 4.

The probable cause of decompensation of diabetes mellitus may be insufficient intake of carbohydrates when administering the usual dose of insulin, a long break in food intake, heavy muscular work, which leads to a sharp decrease in the content
glucose in the blood (hypoglycemic coma).

Problem 5

Patient S., 20 years old. For three days I have been bothered by a cough, runny nose, and low-grade fever. I took amidopyrine. On the fourth day I noticed subcutaneous hemorrhages on the skin and chest and limbs, and there were repeated nosebleeds.

*Objectively:*widespread petechial and subcutaneous bleeding.
Positive symptoms of pinch and tourniquet. Otherwise no special features.

*Preliminary diagnosis:*hemorrhagic diathesis.

Exercise:

Give a pathogenetic rationale for clinical and laboratory manifestations.

Sample answer to problem 5.

The appearance of hemorrhage may be associated with the use of amidopyrine. Amidopyrine leads to thrombocytopenia, which is associated with increased platelet destruction as a result of an immunological conflict. It is known that one of the side effects

amidopyrine is the development of an allergic reaction of the cytotoxic type. Thus, patient S. apparently developed thrombocytopenic purpura. A decrease in the number of platelets, as well as their damage (Ig M + G + AG + complement) leads to both disruption of the formation of platelet thromboplastin (aggregation and lysis processes are disrupted) and to a decrease in blood clot retraction, which is the final stage of the blood coagulation process (deficiency retractoenzymes in platelets). The consequence of these changes is an increase in bleeding time, which is clinically manifested by spontaneous hemorrhages.

Problem 6

Patient N., 48 years old. He has been working as a radiologist in a clinic for 20 years. During work, I used protective equipment irregularly, and there were episodes of exposure to radiation. Over the past two years, there have been complaints of periodic headaches and dizziness, and memory loss.

*Objectively:*dry skin of the hands, brittle nails, increased hair loss, severe hyperhidrosis. Pulse – 88 beats per minute, rhythmic. Blood pressure – 110/60 mm. rt. Art.

*Additional research:*blood test: Hb – 112 g/l. Er. – 3.2 x 1012/l, leukocytes – 2.1 x 109/l, platelets – 60.0 x 109/l, ESR – 8 mm/hour.

*Preliminary diagnosis:*bone marrow form of radiation sickness.

Exercise:

What is the probable cause of the disease in patient N.?

Sample answer to problem 6.

Based on the medical history, clinical signs and laboratory parameters, patient N. has a bone marrow form of radiation sickness, caused by prolonged external general radiation. One of the most sensitive body systems to the effects of ionizing radiation is the hematopoietic system, because its cells rapidly proliferate. The higher the mitotic activity of cells, the less differentiated they are, the more radiosensitive they are and, therefore, radiodamaged. Therefore, due to bone marrow hypoplasia, patient N. has a decrease in hemoglobin to 112 g/l and erythrocytes to 3.2 x 1012/l, which indicates developing anemia. A significant decrease in the number of leukocytes to 2.1 x 109/l and platelets to 60 x 109 l indicates the presence of leukopenia and thrombocytopenia in the patient N. Thus, patient N., as a result of the action of ionizing radiation, developed pancytopenic syndrome - inhibition of all three hematopoiesis (leukocyte, erythrocyte, platelet).

Problem 7

Patient V., 32 years old. Complaints of weakness, dizziness, bruising for no apparent reason. Ill for 4 months.

*Objectively:*moderate condition. The skin is pale with petechiae and ecchymoses. The tonsils are not enlarged, no pathology of the lungs or heart was detected, the liver and spleen are not palpable.

*Additional research:*blood test: Hb – 80 g/l, Er. 2.4 x 1012/l, leukocytes – 2 x 109/l, platelets – 20.0 x 109/l, ESR 42 mm/hour.

*Preliminary diagnosis:*hemorrhagic diathesis.

Exercise:

Explain the mechanism of hemorrhage and pancytopenia in patient V.

Sample answer to problem 7.

Hemorrhages in patient V. are associated with a decrease in the number of platelets in the peripheral blood, ie thrombocytopenia. The formation of thrombocytopenia is based on three important mechanisms: disruption of the formation of platelets in the bone marrow, increased destruction of platelets as a result of an immunological conflict

cytotoxic type and their increased breakdown in the spleen due to splenomegaly. In patient V., along with thrombocytopenia, there is a decrease in the amount of hemoglobin and red blood cells, which indicates the development of anemia. Moreover, the absence of reticulocytes in a blood test indicates the hyporegenerative nature of anemia. In combination with thrombocytopenia and anemia, a sharp decrease in the number of leukocytes is observed. Such changes in the blood of patient V. indicate pancytopenia, ie decrease in the amount of all blood elements. Therefore, we can make the assumption that the damage occurs at the level of the pluripotent stem cell of the hematopoietic system, as a result of which the observed changes, including hemorrhages, are probably associated with direct damage to the bone marrow.

Task 8.

Patient J., 28 years old. For two years, attacks of paroxysmal tachycardia due to Wolff-Parkinson-White syndrome have been observed. Seizures are stopped by reflex methods. Over the past month, the attacks have become more frequent; patient Zh. associates their occurrence with emotional overload.

*Objectively:*condition is satisfactory. The boundaries of the heart are not expanded, the tones are clear and rhythmic. Pulse – 72 beats per minute, blood pressure – 120/80 mm. rt. Art.

Exercise:

Explain the mechanisms underlying the occurrence of paroxysmal tachycardia in patient Zh.

Sample answer to problem 8.

An attack of paroxysmal tachycardia is probably associated with the development of Wolff-Parkinson-White syndrome, which manifests itself in 80% of cases as tachycardia. The development of the syndrome is based on conduction acceleration, which is associated with the presence of additional pathways for conducting the excitation impulse. In this case, the presence of a special additional conductive bundle in the atria allows the impulse to be transmitted faster directly to the ventricles, bypassing the atrioventricular node, where it is normally delayed. Therefore, excitation of ventricular cardiomyocytes occurs prematurely, sometimes in an unfavorable period (at the end of the formation of the T wave).

Task 9.

Patient U., 32 years old, called an ambulance due to palpitations, dizziness, and weakness. The attack of palpitations occurred for the first time, about 2 hours ago, against the background of emotional stress.

*Objectively:*There are no signs of circulatory failure. Tremor of fingers. The boundaries of the heart are not changed, the tones are loud, the pulse is 200 beats per minute, rhythmic. Blood pressure – 140/90 mm. rt. Art. Urination is frequent and painless.

*Additional research:*on the ECG: the rhythm is correct, the P wave in leads II and III is negative. The ventricular complex is of normal shape.

*Preliminary diagnosis:*attack of paroxysmal tachycardia of atrial origin.

Exercise:

Give pathophysiological justification electrophysiological mechanismsunderlying the occurrence of this arrhythmia.

Sample answer to problem 9.

Paroxysmal tachycardia occurs as a result of the generation of impulses by an ectopic focus with a heart rate of 140–230 beats per minute. The leading electrophysiological mechanism for the formation of an ectopic focus of increased excitability is the RENTRI mechanism (re-entry of the excitation impulse) or circular rhythm. The mechanism of excitation circulation in a closed circle

consists in the re-entry of the excitation impulse into the area of the conduction system of the contractile myocardium.

Problem 10.

Patient E., 62 years old. He was admitted due to increasing shortness of breath, predominantly of the expiratory type. For many years he smokes 1.5-2 packs of cigarettes per day. For several years there has been a cough with difficult to expectorate viscous sputum, the production of which has worsened over the past month. The temperature did not increase. I took alpha-adrenergic agonists and aminophylline. No effect.

*Objectively:*signs of pulmonary emphysema. On auscultation there is breathing with a prolonged exhalation, dry prolonged wheezing on exhalation. Blood pressure – 180/105 mm. rt. Art. Pulse – 90 beats per minute.

*Additional research:*X-ray: increased pulmonary pattern, pulmonary emphysema. Spirography: FVC – 1200 ml, Tiffno test – 55%.

Exercise:

Indicate what mechanism of ventilation disorders occurs in patient E.?

Sample answer to problem 10

With obstructive processes occurring in patient E., the resistance to air flow during exhalation increases. Moreover, as the diameter of the bronchi decreases by half, the resistance to air movement increases to the fourth power. Therefore, with intense exhalation, transpleural pressure increases and even becomes positive due to the inclusion of auxiliary respiratory muscles; the external pressure in the small bronchi exceeds the internal pressure on the walls of the bronchi, and they collapse. This mechanism is called expiratory airway closure (valve mechanism, gas trap). In addition, a decrease in the elasticity of the bronchi and bronchioles is important. The bronchioles collapse, some of the alveoli do not participate in gas exchange due to expiratory closure of the airways; the ventilation/perfusion ratio decreases. Destruction of the interalveolar septa leads to the release of air into the interalveolar space, an increase in the airiness of the lung tissue and a decrease in its elasticity.

Problem 11.

Patient N., 42 years old. For 4 years, she has been periodically bothered by a feeling of heaviness in the epigastrium and nausea, rotten belching, worse after eating mixed food, weight loss, and diarrhea. The skin is pale, skin turgor is reduced. Diffuse pain on deep palpation in the epigastrium, bloating.

Exercise:

What is the possible mechanism of dyspeptic disorders in patient N.?

Sample answer to problem 11.

A feeling of heaviness in the epigastrium, nausea, rotten belching, lack of appetite, diarrhea may be associated with the development of hyposecretory processes in the gastric mucosa. Against the background of achylia, the digestion of protein foods in the stomach is disrupted. With adequate compensatory function of the pancreas and small intestine, achylia is asymptomatic for a long time. This compensation is gradually broken down. Signs of insufficiency of the pancreas and biliary tract function appear. Violations of these systems are decisive in the development of intestinal dyspepsia, increasing the processes of fermentation and putrefaction in the intestines. In the absence of hydrochloric acid in the gastric juice, the colonization of the intestines with microorganisms increases, and dysbacteriosis develops. Progressive atrophy of the fundic glands and increasing secretory insufficiency, up to achlorhydria, may be associated with the appearance of autoantibodies to parietal cells and intrinsic Castle factor. Autoimmune reactions lead to destruction of the gastric mucosa, and subsequently to total atrophy of the body mucosa and

bottom. Atrophy of the gastric fundus mucosa can also lead to hypergastrinemia, because hydrochloric acid is the main inhibitor of gastrin release.

Problem 12

Patient Z., 27 years old. He was admitted with complaints of dull, prolonged pain in the right hypochondrium, and periodically mild jaundice of the sclera. Ill for about 5 years after suffering viral hepatitis. The disease has a wave-like course, exacerbations are associated with overwork and errors in diet.

*Objectively:*the liver protrudes 3 cm from under the edge of the costal arch, dense.

*Additional research:*blood test: bilirubin – 35.4 μmol/l (normal 8.55 – 20.5), aspartate aminotransferase – 0.8 μmol/h/l (normal 0.1-0.5), alanine
aminotransferase – 1.5 μmol/h/l (normal 0.1 – 0.7).

*Preliminary diagnosis:*parenchymal (liver) form of icteric-chotestatic syndrome.

Exercise:

Name a possible reason for the increase in bilirubin and alanine aminotransferase in patient Z.

Sample answer to problem 12.

1. Based on clinical and laboratory data, it can be assumed that patient Z. has a viral infection of the liver parenchyma, which is accompanied by a change in the structure of the cell membranes of hepatocytes and the formation of an inflammatory process. Important signs of hepatocyte damage are an increase in bilirubin in the blood and a high level of the enzyme alanine aminotransferase.

Problem 13.

Patient S., 48 years old. Complains of periodic headache attacks, accompanied by coughing, choking, chest tightness, palpitations, and sudden increases in blood pressure. She has been sick for about a year. Attacks occur during physical exercise (fast walking, heavy lifting), last several minutes and go away on their own. At first they were observed rarely (once every 2–3 months), then they became more frequent and recently occur several times a day. During my illness I lost 6 kg.

*Objectively:*height – 172 cm, body weight – 76 kg. There is no swelling. Pulse – 77 beats per minute, rhythmic. Blood pressure – 160/100 mm. rt. Art. During the examination, deep palpation of the abdominal cavity was carried out, 3 minutes after which the patient suddenly had an attack of severe coughing, accompanied by diffuse cyanosis of the face, swelling of the jugular veins, and a feeling of tightness in the chest . Pulse – 140 beats per minute, blood pressure – 240/130 mm. rt. Art. After 5 minutes, the patient's health began to improve, the cough stopped, and his face returned to its normal color. There was a sharp weakness.

Exercise:

Indicate the probable hormonal disorders in patient S. Which led to the occurrence of these symptoms.

Sample answer to problem 13.

These clinical symptoms in patient C will probably develop due to a sudden and sharp increase in the blood level of adrenaline and norepinephrine, which is a classic manifestation of pheochromocytoma - a hormonally active tumor that occurs when chromaffin tissue of the adrenal medulla, paraganglia or sympathetic nodes is damaged. The occurrence of a catecholamine crisis in the patient during the examination period was probably facilitated by palpation of the tumor.

Problem 14.

Patient Yu., 42 years old. Complaints of significant muscle weakness, dizziness, emaciation, loss of appetite. She has been sick for about 6 months. The disease is not associated with anything. At the age of 24-26 years he suffered from pulmonary tuberculosis and was registered at a dispensary.

*Objectively:*height - 176 cm, body weight 61 kg. Skin of normal color. Pulse – 66 beats per minute, low filling. Blood pressure in the supine position is 95/50 mm. rt. Art., standing – 80/40 mm. rt. Art.

*Additional research:*general blood and urine analysis without deviation from the norm. Blood sodium plasma – 122 mmol/l (normal 130.5 – 156.6), potassium – 6.2 mmol/l (normal 3.5-5.3).

Exercise:

Explain what type of adrenal gland disorder does patient Yu. have? Formulate a possible cause of the disease.

Sample answer to problem 14.

Patient Yu probably has chronic corticosteroid deficiency (Addison's disease). Moreover, its primary form, ie primary damage to the adrenal glands. A possible cause of the disease is tuberculous destruction of the adrenal glands, although a bronze coloration of the skin in patient Yu is not observed, but the presence of hypotension in patient Yu, an increase in potassium and a decrease in sodium in the blood plasma , a decrease in appetite and body weight, and general weakness indicate this.

Problem 15.

Patient S., 28 years old. Two years ago I noticed that I couldn't distinguish between hot and cold with both hands. There were painful burns on my hands. Over the past year, I noticed a loss of weight in the muscles of my hands and awkwardness when performing small, precise movements with my fingers. In the neurological status - Claude-Bernard-Horner syndrome, atrophy of the interosseous muscles of both hands, more on the right, tendon and periosteal reflexes in the hands are not evoked. Knee and Achilles reflexes are high. Abdominal reflexes are reduced. Loss of pain and temperature sensitivity on both hands. Deep sensitivity is preserved. The nail phalanges are thickened, the nails are dull, brittle, and the skin is dry. Traces of burns on crayfish.

Exercise:

Explain the pathogenesis of sensory, motor and trophic disorders.

Sample answer to problem 15.

It is likely that the formation of these symptoms is associated with the development of deafferentation syndrome, which occurs when afferent stimulation is lost from the periphery, ie, the flow of impulses from sensory neurons to the overlying parts of the spinal cord and brain stops. The awkwardness when performing precise movements with the fingers is due to the fact that immediately after damage to the sensory nerve or root, phenomena of transient paralysis occur due to switching off the feedback. Subsequently, movements in the limbs can be restored due to the regulatory influence of the central nervous system on the alpha motor neurons of the spinal cord (since the pyramidal tracts are preserved), but remain sharp with a simultaneous weakening of muscle tone.

Disturbances in nerve trophism may be the result of the fact that the peripheral portion of the sensory nerve is a source of antidromic impulses that disrupt the control of metabolic processes and, therefore, disrupt the structure and function of innervated organs and tissues. The atrophy appears to be related to dysfunction of the motor nerves.

List of interview questions

1. Name the main factors that determine the damaging effects of electric current.

*Answer:*Physical parameters of current, pathways in the body, reactivity of the body.

2. List the basic principles of helping a person struck by an electric current

*Answer:*Stop the influence of electric current on the body, maintaining personal safety. Perform artificial respiration, taking into account that the person affected by the current may be in a state of clinical death for quite a long time. Medication measures aimed at restoring breathing and heart function.

3. List the cells of tissues and organs in descending order of their radiosensitivity, ie from the most radiosensitive to the most resistant.

*Answer:*Cells of lymphoid organs, bone marrow cells, glandular epithelial cells of the gonads, cells of the gastrointestinal mucosa, nerve cells.

4. Which phase of the cell cycle is most radiosensitive? What most often happens to the irradiated cell in this phase?

*Answer:*Mitosis. Cell death.

5. What is the mechanism of development of hemorrhagic syndrome during radiation sickness

*Answer:*Violation of all mechanisms of hemostasis: Platelet (thrombocytopenia and thrombocytopathy); Vascular (damage to the vascular wall, increased permeability); Fibrin (deficiency of coagulation factors, activation of anticoagulation and fibrinolytic systems).

6. List the long-term consequences of the damaging effects of radiation.

*Answer:*Shortening of life; Tendency to various diseases, especially those of a tumor nature; Sexual dysfunction; Hereditary disorders in descendants.

7. Define the term “fever”.

*Answer:*Fever is a typically evolutionarily formed pathological process that occurs in response to chemical high-molecular irritants - pyrogens and is characterized by an increase in body temperature due to the active restructuring of thermoregulation to a higher level.

8. What is the fundamental difference between changes in the mechanisms of thermoregulation during overheating and fever?

*Answer:*During fever, the thermoregulatory apparatus, under the influence of pyrogens, undergoes active restructuring aimed at increasing body temperature. With hyperthermia, the thermoregulatory apparatus counteracts this, and the increase in body temperature is a consequence of the failure of heat transfer mechanisms.

9. Name the stages of fever, including Latin terms

*Answer:*1. Stage of temperature increase - stadium incrementi; 2. Stage - maintaining elevated temperature - stadium fastigii; 3. Temperature reduction stage
— stadium decrementi.

10. Indicate the effects of catecholamines involved in the mechanisms of increase in body temperature during fever.

*Answer: 1.*Constriction of skin blood vessels (↓ heat transfer); 2. Increase in oxidation substrates in the blood (stimulation of glycogenolysis and lipolysis); 3. Stimulation of oxidative processes; 4. Separation of the processes of oxidation and phosphorylation - calorigenic effect. 5. Muscle tremors (contractile thermogenesis).

11. Indicate the effects of thyroid hormones involved in the mechanisms of increase in body temperature during fever.

*Answer:*1. Increasing the content of oxidation substrates in the blood (stimulation of glycogenolysis and lipolysis); 2. Stimulation of oxidative processes

12. What are the negative consequences of fever?

*Answer:*in the direct damaging effect of high temperature at the cellular and organ levels with subsequent changes at the systemic and organismal levels.

13. Name the positive effects of fever.

*Answer:*1. Bacteriostatic effect of high temperature; 2. Stimulation of immunity. 3. Stimulation of nonspecific resistance mechanisms (cellular - phagocytosis and humoral).

14. Give the etiological classification of immunodeficiency states.

*Answer:*1. Primary (hereditary); 2. Secondary (acquired).

15. Specify the three main groups of primary immunodeficiency conditions (IDS)

*Answer:*Combined IDS with damage to the cellular and humoral (T and B) components of immunity; 2. IDS with a predominant defect in cellular (T) immunity; 3. IDS with a defect in the B-system (humoral) immunity.

16. Give specific major reasons causing direct damage to lymphoid tissue.

*Answer:*1. HIV - infection; 2. Ionizing radiation; 3. Bone marrow metaplasia in hemoblastoses, with displacement of lymphoid stem cells; 4. Toxic effects on lymphopoiesis.

17. Give a classification of non-infectious exoallergens, provide specific examples.

*Answer:*1. Plant origin (pollen, fruits, leaves, roots); 2. Animal origin (foreign blood serum, epidermal: hair, wool, dandruff);
3. Household (house dust, synthetic products, detergents and cosmetics);
4. Nutrients of plant and animal origin; 5. Medicines (antibiotics, sulfonamides, barbiturates and much more); 6. Industrial (various chemical compounds, industrial dust).

18. List the stages of allergic reactions in their logical sequence.

*Answer:*1. Stage of immune reactions; 2. Stage of pathochemical disorders; 3. Stage of pathophysiological disorders.

19. Name the two main groups of hyposensitization methods.

*Answer:*1. Specific hyposensitization; 2. Nonspecific hyposensitization.

20. List the main biological features of malignant tumors.

*Answer:*1. Autonomy of growth; 2. Atypicality; 3. Infiltrative growth; 4. Metastasis;5. Tumor progression; 6. Systemic effect on the body.

21. Note the cells that are most likely to undergo malignancy.

*Answer:*Tumors can develop from cells of any tissuehuman body, but more often — from intensively proliferating (epithelium of the skin and mucous membranes, mammary gland, female reproductive organs, connective tissue, bones and blood cells).

22. Name the mechanisms responsible for the autonomy of malignant tumors

*Answer:*1. Violation of the cell genome; 2. Violation of contact inhibition; 3. Changes in the receptor apparatus of the cell membrane.

23. List the main mechanisms of infiltrative growth of malignant tumors.

*Answer:*1. Violations of contact inhibition; 2. Intensive utilization of nutrients by tumor cells and, as a consequence, the death of healthy cells due to nutritional deficiency; 3. Formation by tumor cells of protease enzymes (for example, hyaluronidase), which break down protein and substance collagens of intercellular connections; 4. Low antigenic activity of tumor cells and, as a result, a weak immunological response; 5.Reduction
“killer” effect of lymphocytes, due to the “shielding” effect of antibodies.

24. Name the main routes of metastasis.

*Answer:*1. Lymphogenic; 2. Hematogenous; 3. Mixed.

25. What changes in immunity contribute to the formation of tumors?

*Answer:*Immunodeficiency state.

26. List the main endogenous algogenic factors.

*Answer:*1. Substance P; 2. Histamine; 3. Serotonin; 4.Kinins; 5. Prostaglandins.

27. Name the main mechanisms of the antinociceptive system.

Answer: 1. Opiates; 2. Adrenergic; 3. Serotonergic; 4. Cholinergic; 5. Gamma-ergic.

28. Name the main structures of the spinal cord and brain that perform antinociceptive function.

*Answer:*1. Gelatinous substance of the posterior horns of the spinal cord; 2. Giant cell nucleus 3. Seam cores; 4.CSOV; 5. Hypothalamus; 6. Cerebral cortex.

29. Why is there an increase in systemic blood pressure during acute pain?

*Answer:*The increase in blood pressure is caused by an increase in IOC and OPS due to activation of the sympathoadrenal system.

30. Name the main pathogenetic mechanisms of chronic pain.

*Answer:*1. Excessive chronic pain afferentation; 2. Deficit of afferentation along thick myelin fibers (phantom pain); 3. Suppression of inhibitory humoral mechanisms; 4. Insufficiency of descending analgesic inhibitory effects.

31. List the factors on which the formation of pain depends.

*Answer:*1. Intensity of damage; 2. Localization of damage; 3. Condition body; 4. Weather conditions; 5. Age; 6. Education of a person.

32. Give a clinical classification of the stages of shock.

*Answer:*1. Erectile stage; 2. Torpid stage; 3. Terminal stage.

33. Give a pathogenetic classification of the stages of shock.

Answer:

1. Stage of neuroendocrine disorders; 2. Stage of cardiovascular disorders (hypovolemic); 3. Metabolic stage.

34. Name the types of shock in which the erectile stage is expressed.

*Answer:*Traumatic; 2.Burn; 3. Cardiogenic.

35. Name and characterize the types of corticosteroid deficiency in shock.

*Answer:*1. Relative - when the level of corticosteroids is high, but does not meet metabolic needs; 2. Absolute - as a result of depletion of the adrenal cortex; 3. Extra-adrenal - associated with a disruption of the hormonal effect due to disruption of corticosteroid cell receptors.

36. List the most important phenomena of microcirculation disorders in shock.

*Answer:*1. Changes in the speed of blood flow (acceleration, deceleration, jerky, pendulum-like movement of blood, stasis); 2. Aggregation of formed elements, sludge; 3. Violation of rheological properties; 4. Centralization of blood circulation; 5. Appearance of plasmatic vessels.

37. Give the main pathogenetic mechanisms of shock hypotension.

*Answer:*1. Inhibition of the centers of regulation of systemic blood pressure due to excessive pain and non-pain information; 2. Pathogenic effects of excessive activation of the sympatho-adrenal system; 3. Hypovolemia due to pathological blood deposition and plasma loss as a result of increased vascular permeability; 4. Reduced venous return of blood to the heart and a decrease in its contractility (reduced IOC); 5. Dilation of peripheral arterial vessels under the influence of biologically active substances and acidosis.

38. Name the main etiological factors of insulinpenic type of diabetes.

*Answer:*1. Pancreatitis; 2. Hypoxia; 3. Excessive intake of carbohydrates and fats; 4. Hormonal disorders (acromegaly, Itsenko-Cushing syndrome and disease, stress); 5. Autoimmune process.

39. Name the main pathogenetic link of insulinpletoric type of diabetes.

*Answer:*Decreased sensitivity of insulin receptors.

40. Note the possible clinical and laboratory signs of diabetes mellitus, the development of which is primarily associated with impaired carbohydrate metabolism.

*Answer:*1. Polydipsia; 2. Polyuria; 3. Hyperglycemia; 4. Glucosuria; 5. Acidosis; 6. Angiopathy; 7. Coma.

41. Explain the formation of hyperglycemia in diabetes mellitus.

*Answer:*With insulin deficiency, the effects of contrainsular hormones predominate, the effects of which are aimed at increasing blood glucose levels through inhibition of hexokinase, activation of glucose-6-phosphatase, gluconeogenesis and the permissive effect.

42. Explain the development of angiopathy in diabetes mellitus.

*Answer:*Angiopathy in diabetes mellitus is associated with glycosylation phenomena. The formed complexes, consisting of proteins and carbohydrates, penetrate the wall of microvascular vessels, reducing their diameter and, as a result, reducing blood circulation in the microvasculature.

43. Explain the development of atherosclerosis in diabetes mellitus.

*Answer:*Due to the predominance of the effects of contrainsular hormones, fat is mobilized from fat depots, resulting in an increase in the amount of lipids in the blood, especially cholesterol, the deposition of which in the walls of elastic and muscular-elastic arteries leads to the development of atherosclerosis.

44. Name the main hemostatic mechanisms.

*Answer:*1. Vascular; 2.Platelet; 3. Fibrin (coagulation).

45. Name the three main components of the blood anticoagulation system.

*Answer:*1. Antithromboplastins; 2. Antithrombins; 3. Fibrinolytic system.

46. Give the possible main causes of acquired angiopathy.

*Answer:*1. Diabetes mellitus; 2. Atherosclerosis; 3. Henoch-Schönlein disease; 4. Rheumatism; 5. Infection; 6. Vitamin C deficiency; 7. Leukemia. 17.

47. What phases of blood coagulation are disrupted in hepatocellular failure?

*Answer:*1. Formation of thromboplastin; 2. Thrombin formation; 3. Fibrin formation.

48. Why does thrombohemorrhagic syndrome increase vascular permeability and cause multiple hemorrhages, especially in internal organs?

*Answer:*The increase in vascular permeability is caused by kinins (due to activation of the kinin system) and fibrin and fibrinogen breakdown products (due to activation of the fibrinolytic system).

49. Give a classification of erythrocytosis depending on their mechanism of development.

*Answer:*1. Absolute; 2. Relative.

50. Give the general pathogenesis of relative erythrocytosis.

*Answer:*Dehydration of any origin; decrease in the amount of plasma; relative increase in red blood cells in the blood.

51. Give a definition of the term “erythremia”.

*Answer:*Erythremia is a tumor disease of the hematopoietic system, resulting from the total proliferation of all bone marrow sprouts and manifested by a progressive long course with an increase in total blood volume, systemic blood pressure, the number of red blood cells, leukocytes and platelets.

52. Name the main causes of iron deficiency anemia.

*Answer:*1. Chronic blood loss (gastric, intestinal, hemorrhoidal, uterine); 2. Malabsorption (atrophic gastritis, chronic enteritis, resection of the stomach and intestines); 3. Iron deficiency (fasting); 4. Depletion of iron depot in the liver when it is damaged; 5. Increased iron consumption (during pregnancy, children).

53. Name the etiological factors of vitamin B12-folate deficiency anemia.

*Answer:*1. Insufficient intake of vitamin B12 or folic acid from food (feeding children with powdered or goat milk, vegetarians); 2. Gastromucoprotein deficiency (atrophy, polyposis, stomach cancer, gastrectomy); 3.Violation

absorption of vitamin B12 in the intestine (resection, SPRU, polyposis, tapeworm infestation, familial epitheliopathy).

54. Why should we expect dystrophic changes in the cells of internal organs with anemia?

*Answer:*Due to oxygen deficiency, the formation of ATP decreases and, as a result, all types of metabolism are disrupted.

55. Name the main processes in which the development of pathological leukocytosis should be expected.

*Answer:*1. Inflammation (infectious, non-infectious); 2. Sepsis; 3. Intoxication;
4. Blood loss; 5. Tumors.

56. What does the term pancytopenia mean?

*Answer:*Pancytopenia is a decrease in the number of all cellular elements of the blood (leukocytes, erythrocytes, platelets) due to inhibition of bone marrow function.

57. What does the term “leukemic failure” mean, and in what leukemias is it found?

*Answer:*Leukemic failure is the absence of intermediate forms of leukocytes (myelocytes, young) in the peripheral blood of patients, which is observed in acute myeloid leukemia.

58. What is characteristic of the leukocyte formula in chronic myeloid leukemia?

*Answer:*The presence of all forms of leukocytes - from the most immature (blast) to mature ones inclusive.

59. List the main pathophysiological manifestations of leukemia.

*Answer:*1. Hyperplastic syndrome; 2.Anemia; 3. Fever; 4. Hemorrhagic syndrome; 5. Weight loss up to the development of cachexia.

60. Why can fever develop with leukemia?

*Answer:*Due to weakened immunity and nonspecific protective factors (especially phagocytosis), a tendency to infection appears, as a result of which a large number of exo- and endopyrogens appears, thermoregulation changes and body temperature rises.

CRITERIA for assessing competencies and rating scales

Grade "unsatisfactory"(not accepted) or absence competence development	**Grade "satisfactorily"(passed) or satisfactory (threshold) level of competence development**	**Rating “good” (passed) or sufficient level mastering competence**	**“Excellent” (passed) or high level of mastery competencies**
Inability of the learner to learn independently demonstrateknowledge when solving tasks, lack of independence in using skills. Absence confirmation of the presence of formation competenciesindicates negative development results academic discipline	The student demonstratesindependence in applying knowledge, skills and abilities to solve educational tasks in full accordance with sample given by the teacher for assignments, the solution of which was shown teacher, it should be considered that the competence	The student demonstrates independenceapplication of knowledge, skills and abilities in solving tasks similar to samples, which confirms the presence formedcompetencies at a higher level. Availability such competence	The student demonstratesability to complete independence in choosing a method non-standard solutionsassignments within the discipline using knowledge, skills and abilities, received both during the development of this discipline,

	formed on satisfactory level.	at a sufficient level indicates sustainable fixed practical skill	and related disciplines should be considered competence formed at a high level.

Criteria for assessing test control:

percentage of correct answers	Marks
91-100	Great
81-90	Fine
70-80	satisfactorily
Less than 70	unsatisfactory

When grading tasks with multiple correct answers, one error is allowed.

Interview assessment criteria:

Mark	**Descriptors**		
	strength of knowledge	**the ability to explain (represent) the essence of phenomena, processes, draw conclusions**	**logic and response sequence**
Great	strength of knowledge, knowledge of basic processes subject matter being studied areas, the answer differs in depth and completeness disclosure of the topic; possession terminological apparatus; logic and consistency answer	high skill explain the essence of phenomena, processes, events, draw conclusions and generalizations, give reasonedanswers, give examples	high logic and consistency of the answer
Fine	solid knowledge of the basic processes of the studied subject area, is distinguished by the depth and completeness of the topic; possession terminologicalapparatus; free proficiency in monologue speech, but is allowed one or two inaccuracies in the answer	the ability to explain the essence, phenomena, processes, events, draw conclusions and generalizations, give reasoned answers, give examples; however one or two inaccuracies in the answer are allowed	logic and response sequence
satisfactory	satisfactoryprocess knowledge subject area being studied, the answer differs insufficient depth and completeness of the topic; knowledge of basic	satisfactoryability to give reasonedanswers and give examples; satisfactorily formed	satisfactorylogic and response sequence

	theoretical issues. There may be several errors in the content of the answer	analysis skills phenomena, processes. There may be some errors in the content. answer	
unsatisfactory	poor knowledge of the subject area being studied, shallow disclosure of the topic; poor knowledge basic theoretical issues, poor analysis skills phenomena, processes. There are serious errors in the content answer	disability to give reasoned answers	absencelogic and response sequences

Criteria for assessing situational tasks:

Mark	**Descriptors**			
	understand ing the problem	**analysis of the situation**	**skills solutions to the situation**	**professional thinking**
Great	full understanding Problems. All requirements requirements for the task have been completed	high ability to analyze a situation, draw conclusions	high abilitychoose a solution method problems, sure solution skills situations	high level of professional thinking
Fine	full understanding Problems. All requirements presented for the task, completed	ability to analyze a situation, draw conclusions	abilitychoose a solution method problems sure solution skills situations	sufficient level of professional thinking. One or two inaccuracies in the answer are allowed
satisfactory	partial understanding of the problem. Most of the requirements presented for the task, completed	satisfactorystrong ability to analyze a situation, draw conclusions	satisfactoryskills solutions to the situation,diff iculties with choosing a method for solving a problem	sufficient level of professional thinking. More than two inaccuracies in the answer or an error in the sequence are allowed solutions
unsatisfactory	misunderstandin g of the problem. Many requirements, requirements for the task were not completed. No answer. There was no attempt to solve task	low ability to analyze a situation	insufficientsituati on solving skills	absent