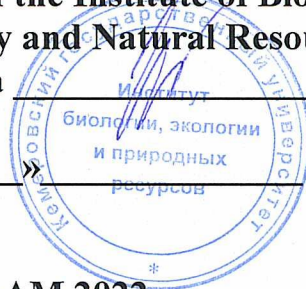


**MINISTRY OF EDUCATION AND SCIENCE
OF THE RUSSIAN FEDERATION
Federal State Budgetary Educational Institution of Higher Education
Kemerovo State University**

**Approved by
Director of the Institute of Biology,
Ecology and Natural Resources
O. A. Neverova**

« _____ » 2021



**ENTRANCE EXAMINATION PROGRAM 2022
for applicants of ANATOMY AND PHYSIOLOGY
(Specialist / Bachelor's Degree)**

Kemerovo 2021

The entrance examination tests your knowledge in various areas of Anatomy and Physiology. If you get a sufficient score, you are enrolled.

The maximal score is 100 points.

Each individual version of the test has 47 tasks in the main areas of Anatomy and Physiology.

Test structure and assessment scale

№	Type of test	Number	Max.score	Total score
1	Choose one correct answer out of four	15	2	30
2	Choose three correct answers out of six given	5	4	20
3	Match the items	5	4	20
4	Generalization and exposure to new areas	2	5	10
5	Practical cases	2	5	10
6	Fill in the captions for the picture	1	10	10
	Total			100

This Program features:

- examination test samples;
- topics;
- references.

Should you find your score disputable, you are free to file an appeal on the next day after your test results have been published on our website.

1. Examination test samples

Choose one correct answer

1. Bones are maximally mobile if they are connected by :

- 1) a joint
- 2) osseous fusion
- 3) a bone suture
- 4) cartilage discs

2. Semilunar valves are located in :

- 1) the arteries of the upper extremities
- 2) the capillaries of the brain
- 3) the veins of the lower extremities
- 4) in all blood vessels

3. The ducts of the liver and pancreas open into :

- 1) stomach
- 2) gallbladder
- 3) large intestine
- 4) duodenum

4. Oxyhemoglobin breaks into hemoglobin and oxygen in :

- 1) the pulmonary capillaries
- 2) the capillaries of the systemic circulation
- 3) the lungs
- 4) the respiratory tract

5. Secondary urine goes through the discharging tubules and enters :

- 1) the cortex of the kidneys
- 2) the medulla of the kidneys
- 3) renal pelvis
- 4) urinary bladder

Choose three correct answers

1. The refractive structures of the eye include :

- 1) cornea
- 2) pupil
- 3) lens
- 4) vitreous body (corpus vitreum)
- 5) retina
- 6) yellow spot (macula)

2. Epithelial tissues :

- 1) are not capable of regeneration;
- 2) have no blood vessels;

- 3) perform the functions of secretion and absorption;
- 4) can be keratinized and non-keratinized;
- 5) contain a lot of intercellular substances;
- 6) contain epithelia, all of which developed from the ectoderm

3. Blood corpuscles include :

- 1) erythrocytes
- 2) proteins
- 3) leukocytes
- 4) platelets
- 5) antibodies
- 6) antigens

Match the items

1. Establish the glands and their features:

Feature	Gland
A. releases its secret into the duct; B. participates in digestion; B. regulates metabolism; G. is an endocrine gland; D. releases its secret into the blood; E. is an external secretion gland	1. Liver; 2. Thyroid gland

2. Match the tissues and their features:

Feature	Tissue
A. Its cells have no striations; B. Its cells contract following the impulses from the autonomic nervous system; B. Its fibers contract following the impulses from the somatic nervous system; D. The cell contains one nucleus; D. It forms skeletal muscles; E. It forms the muscular layer of blood vessels	1. smooth-muscle tissue; 2. striped muscle

3. Match the part of the nervous system and its effect on human organs:

Feature	Part of the nervous system
A. lowers heart beat rate; B. increases blood pressure; B. reduces the frequency of respiratory movements; D. dilates pupils; D. increases muscle tone; E. intensifies the secretion of digestive juices	1. Sympathetic nervous system; 2. Parasympathetic nervous system

4. Match the visual receptors and their features:

Feature	Visual receptors
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<p>A. are activated by a weak response; B. provide color vision; B. are focused mainly in the center of the retina; D. are more abundant than the other visual receptors; D. provide a black and white image; E. are sensitive to low light</p>	<p>1. rods; 2. cones</p>
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Generalization and exposure to new areas

1. Name at least three causes of anemia in humans.
2. How does upright walking affect the human skeleton? Name at least three features.

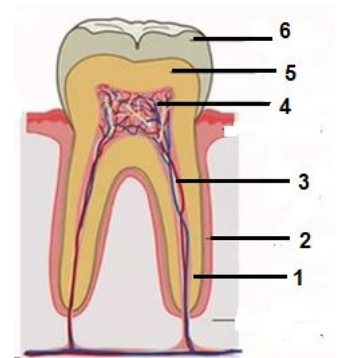
Practical cases

1. The bullet pierced the chest; the lungs were not affected, but the wounded still died from suffocation. Why?
2. To be applied intravenously, medical preparations have to be diluted with saline. Why?

Fill in the captions for the picture:

1. Match the tooth parts (a-f) and captions 1-6:

- a) dental enamel
- b) root
- c) dentine
- d) periodont (dental ligament)
- e) tooth pulp
- f) root canal



Captions	1	2	3	4	5	6
Tooth parts						

2. Topics

Human body as a living biological system

Development of biology, physiology, and medicine. The concept of the average and the norm in anatomy. Anatomy methods. Taxonomy.

Types of tissue. Epithelial, connective, muscle, and nervous tissue.

Organs: definition, types, body cavities, organ systems and their mutual integration.

The human body as a living biological system. Age periodization and changes. Aging and regeneration.

Muscles and skeleton

The musculoskeletal system. Osteology. Human skeleton: functions. Bones: number, location. Bones: properties, types, and structure. Interconnection with other organ systems.

Skull. Bones, brain and face. Evolution of human skull. Teeth: structure and classification.

Body skeleton. Spine: curvature and vertebrae. Motion. Mass center. Variability of the number of bones. Movement limiters. Evolutionary features.

Skeleton of the upper extremities. Similarities and differences with primates. Evolutionary features.

Skeleton of the lower extremities. Similarities and differences with primates. Evolutionary features. The structure of the foot, upright posture. Flat footedness.

Bone connections. Connection types. Movable and fixed connections. Joints: structure, types. Movement restriction.

Skeleton of newborns. Gender difference in skeleton structure.

Muscles: types, topology, classification. Voluntary and involuntary muscles. Muscle contractions. Innervation.

Heart muscle. Autonomy of the heart muscle.

Muscle strength and work. Levers of the body: muscles and bones.

Integumentary system

Skin: structure and functions.

Hair, nails; sebaceous, sweat and mammary glands.

Digestive system

Direction. Oral cavity. Salivary glands. Teeth. Esophagus. Stomach. Intestines. Liver. Pancreas. Gallbladder.

Intestinal absorption. Stomach and intestinal diseases. Gastritis and peptic ulcer.

Excretory system

Excretory organs: skin, lungs, glands, and kidneys.

Urinary and reproductive systems.

Kidneys: structure and functions. Filtration.

Respiratory system

Nasopharynx. Trachea. Bronchi. Lungs.

Lung: volume, capacity, structure.

The mechanics of breathing. Oxygenation.

Diseases of the respiratory system. Effect of external factors on the respiratory system.

Blood

Blood: functions and composition. Blood vessels. The volume of blood in the body.

Blood as connective tissue. Fractions. Plasma. Elements.

Functions of the blood particles.

Complete clinical blood count.

Blood groups. Transfusion. Compatibility. Rh-factor. Homeostasis and hemostasis.

Blood clotting. Clotting factors.

Cardiovascular system

Vessels and nerves. Classification of vessels. Veins and arteries. Gate system. Priority of provision of organs with blood. Blood circulation. Blood vessels. Diseases of the blood and cardiovascular system.

Heart. Location. Automatism of the heart muscle. Contractions (systole and diastole). Cardiac conduction and factors that affect it. Pulse. Blood pressure.

Cardiogram and its interpretation. Cardiac deflections.

Analyzers

Visual analyzer. Eye structure. Image perception and signal processing. Visual defects and their correction.

Auditory analyzer. Hearing. Frequency range. Threshold value.

Equilibrium. Vestibular apparatus.

Taste analyzer. Odor analyzer. Taste and smell. Pheromones.

Touch. Touch and skin: structure and functions.

Nervous system

Structure, evolution, criteria and parameters. Parts: brain and spinal cord. Memory. Reception, processing and transmission of information. Control over the body as a whole. Diseases of the nervous system. Physical processes of electric impulse transmission. Cranial nerves. Coordination of the work of organs and body systems.

Endocrine system

Chemical signal. Glands. Hormones. Their effect on the body.

Immune system

Immunity. Effect on with other body systems. Blood, lymph. Immunity-related diseases.

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