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## ASSESSMENT TOOLS

### Normal Physiology

Curriculum	31.05.01 General Medicine
Qualification	General Medicine
Form of education	Full-time
Department	Morphology and physiology
Graduate Department	Internal diseases

## CONTROL WORK - ABSTRACT

Writing an abstract implies an in-depth study of the identified problem.

An abstract (from Latin refero - report, inform) is a special essay, in which the goals, objectives and conclusions are defined, outlining the main points of the topic or problem.

The topics of abstracts are presented in the Funds of evaluation means and in the educational-methodical aids for independent work of the resident of the corresponding working programme.

Abstracts are reported at the class according to the selected topic and the calendar-thematic plan, handed to the teacher strictly in the specified time.

Summarisation of selected information should be built into the text according to a certain logic. The essay consists of three parts: introduction, main part, conclusion;

a) in the introduction it will be logical to justify the relevance of the topic (why the topic was chosen, how it is related to modernity and science);

purpose (it should correspond to the topic of the abstract);

tasks (ways to achieve the given goal), displayed in the title of paragraphs of the work;

b) the main part characterises and analyses the topic of the abstract as a whole, and further - a concise presentation of the selected information in accordance with the objectives. At the end of the chapter a conclusion (sub-conclusion) should be made, which begins with the following words: "Thus...", "So...", "So...", "In conclusion of the chapter let us note...", "All the above allows us to conclude...", "Summarising...", etc.

c) the conclusion contains conclusions on the chapters (1-1.5 pages). It is appropriate to express your point of view on the problem under consideration.

The abstract can be presented in the form of a presentation, it is obligatory to fulfil the basic requirements to the abstract, including the correctness of the list of references!

Covering the topic of the abstract assumes the presence of several specialised sources (at least 8-10 publications, monographs, reference books, textbooks) as a source of information. Preference is given to publications in specialised journals and monographs of recognised experts in the relevant field of knowledge. The use of foreign literature is mandatory.

### Term 3

#### List:

1. The spinal cord. Its functions. Functions of the posterior and anterior roots. Reflexes for maintaining the length of skeletal muscles. Braking tendon reflexes.
2. The medulla oblongata, its reflex activity and conductive function.
3. Functions of the midbrain. Anterior and posterior tubercles of the quadratochalmia. Tonic reflexes of the brainstem. Significance of the red nuclei and the substantia nigra.
4. Reticular formation of the brainstem.

5. Functions of the cerebellum. Consequences of removal of the cerebellum.
6. Thalamus. Functions of specific and non-specific nuclei.
7. Hypothalamus as the highest centre of regulation of autonomic functions, coordination of autonomic and somatic components of adaptive reactions.
8. The spinal cord in the regulation of movements.
9. The role of stem centres in the regulation of movements.
10. Cerebellum as a structure of motor activity software.
11. Basal ganglia and their participation in the regulation of movements.
12. Motor cortex in the regulation of movements.
13. Central regulation of autonomic functions. The role of different brain structures in providing autonomic response.
14. Limbic system and its role in providing vegetative reactions.

#### **Term 4**

##### **List:**

1. Methods of studying the functions of the cerebral cortex
2. Congenital forms of behavior, unconditioned reflexes, their role for the adaptive activity of the organism
3. Conditioned reflex as a form of adaptation to changing conditions of existence. Rules for the development of conditioned reflexes
4. Classification of conditioned reflexes
5. Physiological mechanisms of reflex communication formation. Development of I.P. Pavlova on the mechanisms of forming a temporary connection.
6. Inhibition of conditioned reflexes. Braking types. Modern ideas about the mechanisms of inhibition of conditioned reflexes.
7. The doctrine of I.P. Pavlova on the types of higher nervous activity, their classification and characteristics.
8. The biological role of emotions. Vegetative and motor components of emotions.
9. Physiological mechanisms of sleep. Sleep phases. Sleep theories.
10. Memory and its importance for the formation of integral adaptive reactions. Concept of the mechanisms of short-term and long-term memory.
11. The law of power relations in higher nervous activity and its changes in various functional states. Experimental neuroses.
12. The architecture of a holistic behavioral act from the point of view of the theory of a functional system P.K. Anokhin
13. The concept of the highest mental functions of a person (attention, perception, memory, emotions, thinking, consciousness, speech)
14. Speech, speech functions. Functional asymmetry of the cerebral cortex associated with the development of speech in humans.
15. Modern ideas about the structural and functional organization of the central nervous system. Physiological features and functions of neurons. Blood-brain barrier.
16. Interneuron interactions. Synaptic organization of the central nervous system. Types of synapses, characterization of mediators, mediator systems of the brain.
17. Polysensory neurons, processes of heterogeneous convergence as the basis of the integrative function of polysensory structures.
18. General concepts about hormones and hormonal regulation.
19. Principles of regulation of hormonal secretion:
20. Methods for studying the functional activity of the endocrine glands and methods for assessing it: clinical and experimental.
21. Hormones of the female reproductive glands. Cyclic activity of the ovaries.
22. The sympathoadrenal system and its role in nonspecific adaptive reactions of the body. The concept of stress (Selye, 1936-1952).

23. Nervous regulation of the secretory function of the adrenal chromaffin tissue.
24. Hormonal regulation of blood calcium levels.

**MIDTERM ASSESSMENT EXAM 4<sup>ND</sup> TERM.**

Midterm assessment is carried out in the form of exam. Tasks for the exam include two theoretical points and one case – study.

<b>Tasks for competence assessment «Knowledge»</b>	<b>Task type</b>
<p><b>List of theoretical points</b></p> <ol style="list-style-type: none"> <li>1. The concept of excitable tissues. Main properties of active tissues. Stimuli. Classification of stimuli.</li> <li>2. Modern ideas of cell membranes structure and function. Membrane potential concept. Resting potential.</li> <li>3. Characteristics of changes in the cell membrane potential in the activation and inhibition process. Action potential, its parameters and value.</li> <li>4. General characteristics of nerve cells: classification, structure, functions.</li> <li>5. Structure and types of nerve fibers and nerves. Main properties of nerve fibers and nerves. Mechanisms of activation propagation along the nerve fibers.</li> <li>6. Concept of the synapse. Structure and types of synapses. Mechanisms of synaptic transmission of activation and inhibition. Mediators. Receptors. Main properties of synapses.</li> <li>7. General patterns of human adaptation. Evolution and forms of adaptation. Adaptogenic factors.</li> <li>8. Concept of reflex and reflex arc. Reflex classification and types of reflex arcs. Features of reflex arcs of somatic and vegetative (sympathetic and parasympathetic) reflexes.</li> <li>9. Concept of the nerve center. The main features of the nerve centers. Compensation of functions and plasticity of nervous processes.</li> <li>10. Basic principles of coordination in the central nervous system activity.</li> <li>11. Functional organization of the spinal cord. The role of spinal centers in the regulation of movements and autonomic functions.</li> <li>12. Characteristics of the functions of the medulla, middle, intermediate brain, cerebellum, their role in the motor and autonomic reactions of the organism.</li> <li>13. The cerebral cortex as the highest part of the central nervous system, its value, organization. Localisation of functions in the cerebral cortex. Dynamic stereotype of nervous activity.</li> <li>14. Functional organisation and functions of the autonomic nervous system (ANS). The concept of the sympathetic and parasympathetic divisions of the ANS. Features, differences, impact on human bodies.</li> <li>15. Pavlov’s doctrine about analyzers. Biological significance and main functions of sensory systems. Classification and activation mechanism of analyzers.</li> <li>16. Characteristics of the visual sensory system.</li> <li>17. Characteristics of the motor sensory system.</li> <li>18. Concept of the auditory, pain, visceral, tactile, gustatory sensory systems.</li> <li>19. Concept of inborn reflexes, their classification according to various indicators. Examples of simple and complex reflexes. Instincts.</li> <li>20. Definition of higher nervous activity. Pavlov’s doctrine about conditioned reflexes, as the basis of higher nervous activity, differences from inborn ones. Characteristics and mechanism of conditioned reflexes background. Signaling systems concept.</li> </ol>	<p><b>-theoretical</b></p>

21. Types and characteristics of inhibition of conditioned reflexes.
22. Basic patterns of motion control. Involvement of various sensory systems in motion control. Motor skill: physiological basis, conditions and phases of its background.
23. Types of higher nervous activity and their characteristics.
24. Striated muscle composition. Types of muscle contraction. Types of muscle fibers.
25. Main features of skeletal muscle. Single cut. Aggregation of contractions and tetanus. Optimum and pessimum concept. Parabiosis and its phases.
26. Physiological basis of muscle strength. Maximum statistical power: conditions necessary for its origin. Maximum conditional force: concept definition, determining factors.
27. Fatigue concept. Physiological phenomenon and stages of fatigue development. Main physiological and biochemical body changes with fatigue. The concept of "active" rest.
28. Comparative characteristics of smooth and skeletal muscles. Mechanism of muscle contraction.
29. Concept of the "blood system". Main functions and the structure of the blood. Physical and mathematical blood features. Blood buffer systems. Blood plasma and its structure. Regulation of blood construction.
30. Erythrocytes: structure, functions, methods of determination. Hemoglobin: structure, functions, methods of determination.
31. Leukocytes: types, structure, functions, methods of determination, counting. Leukocyte formula.
32. The doctrine of blood groups. Blood groups and Rh factor, methods of their determination. Blood transfusion.
33. Blood coagulation: mechanism, process value. Anticoagulant system, fibrinolysis.
34. Heart: structure, phases of the cardiac cycle. Key indicators of the heart activity.
35. Automation of the heart muscle: concept, current understanding of the causes, features. Automation degree of various parts of the heart. Stannius Experiment.
36. Heart muscle excitability: concept mechanisms. Excitability changes in different periods of the cardiac cycle. Extrasystole.
37. Ductance of the heart muscle: concept, mechanism, features.
38. Contractility of the heart muscle: concept mechanism. Hetero - and homeometric mechanisms of contractility regulation.
39. Characteristics of the nervous, reflex and humoral regulation of cardiac activity.
40. Electrical heart activity. Physiological basis of cardiography. Electrocardiogram. Electrocardiogram analysis.
41. Blood vessels types. Mechanisms of blood flow through the veins. Features of blood flow through the veins. Main hemodynamic parameters of blood flow through the vessels.
42. Features of blood circulation in various parts of the vascular channel. Microcirculation. Mechanisms of exchange in the microvasculature.
43. Blood pressure concept. Blood pressure in different parts of the vascular channel. Blood pressure, its determining factors, method of determination.
44. Nervous and humoral regulation of the vascular system. Vasomotor center, its structure. Vascular tone reflex regulation. Vascular reflex zones, their place and value in the regulation of blood circulation.

45. Breathing: importance, basic respiratory organs. Mechanisms of inhalation and exhalation, main respiratory muscles. Structure of inhaled and alveolar air. Concept of "dead space", its physiological meaning.
46. Intrapleural pressure, its value. Lung tissue elasticity. Factors determining lungs elastic traction. Pneumothorax.
47. Lung ventilation. Gas exchange between alveolar air and blood. Main lungs volumes and capacities, their value, methods of determination.
48. Blood oxygen transport. Bohr effect.
49. Carbon dioxide transportation by the blood.
50. Nervous and humoral regulation of respiration. Respiratory center concept. Respiratory center automation. Reflex effects of lungs mechanoreceptors, their meaning.
51. Digestion: concept, physiological basis of hunger and satiety. Food Center. Main theories explaining the state of hunger and saturation.
52. Main stages of digestion in the gastrointestinal tract. Classification of digestion depending on the enzymes and localization process.
53. Characteristics of the digestive process in the stomach. Mechanisms and phases of gastric secretion. Pancreas role in the digestion. Neurohumoral regulation of gastric secretion and pancreatic secretory activity.
54. Main functions of the liver. Digestive function of the liver. Role of bile in the digestion process. Bile structure and biliary excretion.
55. Concept and characteristics of abdominal and parietal digestion. Suction mechanisms.
56. Main functions of the gastrointestinal tract. Basic principles of the digestion regulation. Main effects of nerve and humoral effects on the digestive organs
57. Phases of the adaptation process development. Adaptation mechanisms. Management adaptation.
58. Excretory processes: significance, organs of excretion. Main functions of the kidneys.
59. Features of the renal blood flow. Nephron: structure, functions, characteristics of the processes of urination and excretion. Primary and secondary urine. Urine structure.
60. Nervous and humoral regulation of the kidneys.
61. Concept of homoiothermal and poikilotherm organisms. Meaning and mechanisms of maintaining permanent body temperature. Temperature core concept.
62. Heat production and heat transfer: mechanisms and their determinants. Compensatory changes in heat production and heat transfer. Neurohumoral mechanisms of permanent body temperature regulation.
63. Main stages of metabolism in the body. Metabolism regulation. Liver role in the metabolism of proteins, fats, carbohydrates.
64. Characteristics of carbohydrate metabolism in the body.
65. Characteristics of proteins metabolism in the body.
66. Characteristics of fats metabolism in the body.
67. Energy balance of the body. Methods for determining body energy intake. Caloric oxygen ratio. Concept of the general exchange and its components (basal metabolism, specifically the dynamic effect of food).
68. Characteristics of energy intake in various activities, principles of dieting.
69. Concept of the endocrine glands. Hormones: concept, general properties, classification by chemical structure. Mechanisms of hormones action.
70. Value of the thyroid gland, its hormones. Hyper-and hypofunction.

<p>Parathyroid gland, its role.</p> <p>71. Pituitary function. Hormones of the anterior and posterior lobes of the pituitary gland, its effects.</p> <p>72. Physiology of the adrenal glands. Hormones of the adrenal cortex, their functions. Hormones of the medulla adrenal glands, their role in the body.</p>	
<p><b>Tasks for competence assessment «Abilities»</b></p>	<p><b>Task type</b></p>
<p>Case – studies</p> <ol style="list-style-type: none"> <li>1. The level of angiotensin II in the blood increased. How will this affect urine formation and why?</li> <li>2. Explain why there is a decrease in the formation of urine with blood loss?</li> <li>3. Calculate the minute blood volume if the heart rate is 80 beats / min, the systolic volume is 70 ml. How much oxygen will be associated with a given blood volume, if it is known that in 100 ml. the subject's blood contains 15 grams. hemoglobin?</li> <li>4. When probing the left heart of a healthy person at one of the moments of the cardio cycle, the pressure in the left ventricle is 125 mm Hg. When probing the right ventricle, the pressure in it was equal to 20 mm Hg. What phase does this correspond to?</li> <li>5. When calculating the ECG of the subject, the duration of the PQ interval was 0.24 sec. What does this mean?</li> <li>6. Calculate the respiratory coefficient if it is known that the subject absorbs 0.4 liters of oxygen per minute and releases 0.36 liters. carbon dioxide. What kind of nutrition does this value indicate?</li> <li>7. Are the conditions for the occurrence of "heatstroke" and heat fainting in humans the same?</li> <li>8. Why, when adrenaline is injected into the blood, blood pressure first increases significantly and then decreases?</li> <li>9. When examining a 5-year-old boy, a significant lag in mental development and growth was noted. The child is not very active. General exchange is reduced. Is it possible to think about hypo- or hyperfunction of the thyroid gland?</li> <li>10. A predominance of type II-A fibers, thickening of type I fibers and a decrease in the number of type II-B fibers were found in the patient's 4 thigh muscle. What does this mean? What kind of work will this person be more adapted to?</li> <li>11. In a person after a car accident, examination revealed that the elbow joints and upper abdominal reflexes are normal, while the middle, lower abdominal, knee, Achilles and plantar reflexes are not evoked. What does this indicate?</li> </ol>	<p>-practical</p>