

Ministry of Education and Science of Ukraine  
Sumy State University

**TEST PROBLEMS IN PHYSIOLOGY  
STATE LICENSING EXAMINATION  
KROK – 1**

**2<sup>nd</sup> edition**



Sumy  
Sumy State University  
2015

Test problems in physiology (State licensing examination KROK – 1) for the second-year students in speciality 7.110101 “Medicine” / compilers: O.A. Obukhova, V.Yu. Harbuzova. – Sumy: Sumy State University, 2015. – 78 p.

Department of physiology and pathophysiology with a course of medical biology

<b>CONTENTS</b>	<b>P.</b>
INTRODUCTION.....	4
1. EXCITABLE STRUCTURE.....	5
2. NERVOUS REGULATION OF ORGANISM FUNCTIONS.....	9
3. HUMORAL REGULATION OF ORGANISM FUNCTIONS.....	19
4. ANALYZERS.....	25
5. BEHAVIOR.....	29
6. BLOOD SYSTEM.....	30
7. CIRCULATORY SYSTEM.....	39
8. RESPIRATORY SYSTEM.....	52
9. ENERGY METABOLISM AND THERMOREGULATION.....	59
10. DIGESTIVE SYSTEM.....	62
11. EXCRETORY SYSTEM.....	68
KEYS OF RIGHT ANSWERS.....	76

## INTRODUCTION

The collection that we offer has been worked out for the students mastering base physiology, training for the test examination “Krok – 1. General medical training”, and studying at higher medical educational establishments of III – IV levels of accreditation, subordinate of Ministry of public health of Ukraine, and at the medical faculties of the universities of the system of Ministry of education and science, youth and sports of Ukraine.

Each test has only one right or the best answer, which must be chosen from the list of suggested variants. In the end of the book there are keys of right answers to the test tasks. The control over the correctness of answers to the test tasks is a very important element of education, because it increases the motivation of students for study, makes it possible to understand what need additional attention, helps to find weak points in training.

Individual work with the tests will help students to prepare for the licensed integrated examination “Krok – 1. Medicine”. It must be borne in mind that the examination consists of 200 test questions.

## 1. EXCITABLE STRUCTURE

1. A hypertensive glucose solution was introduced to a patient. It will intensify water movement:

- A. From the cell to the intercellular liquid
- B. From the intercellular liquid to the cell
- C. From the intercellular liquid to the capillaries
- D. There will no changes of water movement
- E. From the capillaries to the intercellular liquid

2. An isolated muscle of a frog is rhythmically irritated with electric impulses. Every next impulse is in period of relaxation from the previous contraction. What contraction of the muscle occurs?

- A. Tonic
- B. Asynchronous
- C. Single
- D. Waved tetanus
- E. Continuous (smooth) tetanus

3. In course of an experiment a skeletal muscle is being stimulated by a series of electric impulses. What type of muscle contraction will arise, if every subsequent impulse comes in the period of relaxation of single muscle contraction?

- A. Partial tetanus
- B. Asynchronous tetanus
- C. Muscle contracture
- D. Holotetanus
- E. A series of single contractions

4. Ions cells have been blocked in the excitative cell. It doesn't change significantly the quiet potential, but the cell has lost its capacity to the generation of AP (action potential). What canals have been blocked?

- A. Chlorine
- B. Sodium
- C. Sodium and potassium
- D. Calcium
- E. Potassium

5. The action of electric current on the excitable cell caused depolarization of its membrane. Movement of what ions through the membrane caused depolarization?

- A.  $\text{Cl}^-$

- B.  $\text{Ca}^{2+}$
- C.  $\text{Na}^+$
- D.  $\text{HCO}_3^-$
- E.  $\text{K}^+$

6. The penetration of the irritable cell membrane for potassium ions has been increased experimentally. What changes of membrane electric status can occur?

- A. Local response
- B. No change
- C. Depolarization
- D. Hyperpolarization
- E. Action potential

7. The permeability of the irritable cell membrane has been increased for potassium ions during an experiment. What changes of membrane electric status can occur?

- A. Hyperpolarization
- B. Depolarization
- C. No changes
- D. Local response
- E. Action potential

8. What will the reduction of the muscles of the upper extremity be at an attempt to lift a load beyond one's strength?

- A. Isometric
- B. Isotonic
- C. Auxotonic
- D. Phase
- E. Single

9. The irritation of what force is it necessary to inflict on a nervous fibre to entail excitation in the phase of relative refractivity?

- A. Under-threshold
- B. Above-threshold
- C. Threshold
- D. Under-threshold prolonged
- E. Threshold prolonged

10. During the examination of a sportsman after an intensive physical activity the incoordination of movement was detected. At the same time the force of muscle contraction was the same. The reason for it can be the diminution of conduction of excitement speed. What structures does it take place in first of all?

- A. Conduction tracts
- B. Nervous-muscular synapses
- C. Efferent nerves
- D. Afferent nerves
- E. Central synapses

11. Skeletal muscles are irritated with a series of electro pulses in an experiment. Every next impulse is in the period of the shortening of a single muscular contraction. What type of muscular contraction will arise?

- A. Smooth tetanus
- B. Toothed tetanus
- C. Asynchronous tetanus
- D. A series of single contractions
- E. Muscle contracture

12. Complete demyelination of fibers of conductive ascending tracks of a patient is revealed. Formation of what sensation will worsen the least?

- A. Acoustic
- B. Proprioceptive
- C. Aftervision
- D. Tactile
- E. Temperature

13. As a result of blockage of the ionic channels of the cell membrane its membrane resting potential diminished from -90 to -70 mV. What channels were blocked?

- A. Sodium
- B. Potassium
- C. Calcium
- D. Magnesium
- E. Chloric

14. During the research of an isolated excitable cell it was stated that the threshold of the stimulation force of the cell diminished substantially. What was the reason for it?

- A. Blockage of energy production in the cell
- B. Inactivation of membrane sodium channels
- C. Inactivation of membrane calcium channels
- D. Activation of membrane potassium channels
- E. Activation of membrane sodium channels

15. As a result of the action of electric current on an excitable cell there was the depolarization of its membrane. The movement of what ions through the cell membrane plays a basic part in the development of depolarization?

- A.  $K^+$
- B.  $HCO_3^-$
- C.  $Ca^{2+}$
- D.  $Cl^-$
- E.  $Na^+$

16. It is necessary to estimate the level of the excitability of tissue in an experiment. What parameter is it necessary to define for this purpose?

- A. Threshold of depolarization
- B. Resting potential
- C. Duration of action potential
- D. Amplitude of action potential
- E. Critical level of depolarization

17. It is necessary to estimate the level of the nerve excitability of a patient. What parameter is it necessary to define for this purpose?

- A. Resting potential
- B. Threshold force of the irritant
- C. Critical level of depolarization
- D. Amplitude of action potential
- E. Duration of action potential

18. As a result of activation the ionic channels of external membrane of an excitable cell its resting potential was considerably increased. What channels were activated?

- A. Fast calcium
- B. Sodium
- C. Potassium
- D. Slow calcium
- E. Sodium and calcium

19. The processes of energy production were completely blocked in an excitable cell. How will the membranous resting potential change as a result of it?

- A. Will increase insignificantly
- B. Will diminish insignificantly
- C. Will diminish substantially
- D. Will disappear

E. Will increase substantially

20. A neuromuscular preparation of a frog was processed with poison. After that the capacity of the muscle for contraction in reply to direct stimulation was preserved, but the one in reply to nerve stimulation was lost. What does the poison block?

- A. Processes of energy production
- B. Coupling of excitation and contraction in the muscle
- C. Sodium channels
- D. Potassium channels
- E. Nervous-muscle synapse

21. An isolated muscle of a frog is rhythmically irritated by electric impulses in an experiment. Every next impulse is in the period of relaxation of the previous contraction. What contraction will arise?

- A. Asynchronous
- B. Single
- C. Toothed tetanus
- D. Smooth tetanus
- E. Tonic

22. A tissue is acted on by an electric impulse of cathode direction with the amplitude of 70% threshold. What will the changes of membrane potential be as a result of it?

- A. Partial depolarization
- B. Hyperpolarization
- C. Action potential
- D. There will be no changes
- E. Inhibitor postsynaptic potential

23. The ionic channels of an excitable cell were blocked, as a result of which its resting potential disappeared completely soon after. What channels were blocked?

- A. Potassium and sodium
- B. Sodium
- C. Potassium
- D. Chloric
- E. Calcium

24. The ionic channels of an excitable cell were blocked. It did not change the level of the resting potential substantially, but the cell lost

the capacity to the generation of action potential. What channels were blocked?

- A. Sodium
- B. Potassium
- C. Sodium and potassium
- D. Chloric
- E. Calcium

25. It is necessary to get the increase of the membranous resting potential (hyperpolarization) in an experiment on an isolated excitable cell. What ionic channels will be activated for this purpose?

- A. Potassium and sodium
- B. Sodium
- C. Potassium
- D. Calcium
- E. Sodium and calcium

26. In the experiment under the influence of chemical substances in the muscles the reaction of Ca<sup>2+</sup>-pump is weakened. Which phenomena will be observed?

- A. Prolonged relaxation
- B. Prolonged duration of the AP
- C. Decreased AP
- D. Activation of the sodium-potassium pump
- E. Decreased speed of the AP distribution

27. During the heart transplantation the viability of myocardial cells is determined. The determination of which parameter of the myocardium is the most important?

- A. Heart temperature
- B. Concentration of the oxygen in the heart vessels
- C. Concentration of calcium-ions in myofibrils
- D. Rest potential of cardiomyocytes
- E. Concentration of Ca-ions in heart vessels

28. During the registration of the action potential of cardiomyocytes, the duration of the plateau phase is prolonged. It is provided by:

- A. Activation of the fast calcium canals
- B. Activation of the sodium canals
- C. Activation of the slow calcium canals
- D. Inactivation of the potassium canals
- E. Inactivation of the slow calcium canals

29. Water follows the osmotic gradient to the area where is more:

- A. Aminoacids and proteins
- B. Natrium, potassium, hydrogen, glucose
- C. Active ions of hydrogen
- D. Bilirubin
- E. Urea

30. During an experiment the myotatic reflex has been studied in frog. After extension in a skeletal muscle its reflectory contraction was absent. The reason for it might be a dysfunction on the following receptors:

- A. Articular
- B. Muscle spindles
- C. Golgi tendon organs
- D. Tactile
- E. Nociceptors

31. A 35-year-old man came to a dentist with complaints of reducing dental tissue density, heightened fragility of teeth at ingesting hard food. The lack of what mineral element most probably takes place in this case?

- A. Calcium.
- B. Potassium.
- C. Sodium.
- D. Magnesium.
- E. Iron.

32. During the experiment on the influence of chemical substances in the muscles the reaction of  $Ca^{2+}$ -pump is weakened. Which phenomenon will be observed?

- A. Prolonged duration of the AP
- B. Decreased AP
- C. Prolonged relaxation
- D. Activation of the sodium-potassium pump
- E. Decreased velocity of the AP distribution

33. In course of an experiment a skeletal muscle is being stimulated by a series of electric impulses. What type of muscle contraction will arise, if every subsequent impulse comes in the period of shortening of the previous single muscle contraction?

- A. Partial tetanus

- B. Holotetanus
- C. Asynchronous tetanus
- D. A series of single contractions
- E. Muscle contracture

34. A hypertensive glucose solution was introduced to a patient. It will intensify water movement:

- A. From the intercellular liquid to the cells
- B. From the intercellular liquid to the capillaries
- C. From the cells to the intercellular liquid
- D. From the capillaries to the intercellular liquid
- E. There will be no changes of water movement

35. Rest potential of a cell equals  $-80\text{ mV}$ . At what stage of action potential did the membrane potential equal  $+30\text{ mV}$ ?

- A. Reverse polarization
- B. After hyperpolarization
- C. After depolarization
- D. Depolarization
- E. –

36. In course of an experiment there has been an increase in the nerve conduction velocity. This may be caused by an increase in the concentration of the following ions that are present in the solution around the cell:

- A.  $Ca^{2+}$
- B.  $K^{+}$  and  $Cl^{-}$
- C.  $K^{+}$  and  $Na^{+}$
- D.  $Ca^{2+}$  and  $Cl^{-}$
- E.  $+Na^{+}$

37. When measuring total muscle action potential it was revealed that it was subject to the power-law relationship. The reason for this is that individual muscle fibers differ in:

- A. Depolarization threshold
- B. Diameter
- C. Conduction velocity
- D. Resting potential
- E. Critical level of depolarization

38. Curariform substances introduced into a human body cause the relaxation of all skeletal muscles. What changes in the neuromuscular synapse cause this phenomenon?



- A. Impaired acetylcholine release
- B. Blockade of N-cholinergic receptors of the synaptic membrane
- C. Blockade of  $Ca^{2+}$  channels of the presynaptic membrane
- D. Impaired cholinesterase synthesis
- E. Depolarization of the postsynaptic membrane

39. It is required to evaluate the level of tissue excitability. For this purpose one should determine:

- A. Action potential amplitude
- B. Resting potential
- C. Critical level of depolarization
- D. Depolarization threshold
- E. Action potential duration

40. Microelectrode technique allowed registering a potential following "All-or-None" law and being able of undecremental spreading. Specify this potential:

- A. Action potential
- B. Excitatory postsynaptic potential
- C. Rest potential
- D. Inhibitory postsynaptic potential
- E. Receptor potential

41. As a result of activation of the ion channels of the external membrane the rest potential of an excitable cell has greatly increased. What channels were activated?

- A. Sodium channels
- B. Potassium channels
- C. Fast calcium channels
- D. Slow calcium channels
- E. Sodium and calcium channels

42. An isolated muscle fiber is under examination. It was established that the threshold of stimulation force became significantly lower. What is the cause of this phenomenon?

- A. Activation of sodium channels of membrane
- B. Activation of potassium channels of membrane
- C. Inactivation of sodium channels of membrane
- D. Inactivation of potassium channels of membrane

E. Block of energy production in the cell

43. Which muscle contraction will be observed in the upper extremity during holding (not moving) a load in a certain position?

- A. Isometric
- B. Isotonic
- C. Auxotonic
- D. Concentric
- E. Excentric

## 2. NERVOUS REGULATION OF ORGANISM FUNCTIONS

44. A patient after hypertension stroke has no voluntary movements in his right arm and leg, muscle tone in these extremities is increased. What type of dysfunction of nervous system is it?

- A. Peripheral paralysis
- B. Reflex paresis
- C. Central paralysis
- D. Central paresis
- E. Peripheral paresis

45. During an experiment the dorsal roots of the spinal cord of an animal have been cut. What changes will be observed in the innervations zone?

- A. Loss motor functions
- B. Increase in muscle tone
- C. Sensitivity loss and loss of motor functions
- D. Sensitivity loss
- E. Decrease in muscle tone

46. A patient after trauma has developed paralysis, algesthia impairment on the right; there are no paralyses on the left but temperature and pain sensivity are also impaired. What is the cause of this?

- A. Brainstem injury
- B. Midbrain injury
- C. Cerebellum injury
- D. Motor zone brain cortex injury
- E. Unilateral right-side spinal cord injury

47. When a patient with traumatic impairment of the brain was examined, it was discovered,

that he had stopped to distinguish displacement of an object on a skin. What part of the brain was damaged?

- A. Posterior central gurus
- B. Occipital zone of the cortex
- C. Parietal zone of the cortex
- D. Frontal central gurus
- E. Frontal zone

48. A patient becomes quickly tired during his work. In vertical position with closed eyes he is dizzying and loosing equilibrium. Skeletal muscle tone is reduced. Which of the below mentioned brain structures is damaged?

- A. Hypothalamus
- B. Precentral gyrus of cerebral hemispheres cortex
- C. Thalamus
- D. Cerebellum
- E. Basal ganglia

49. A 50-year-old patient was injured on the occipital region of the head. The closed skull's trauma was diagnosed. She was taken to the hospital. The medical examination deregulation of walking and balance, trembling of arms. What part of brain was injured?

- A. The inter-brain
- B. The spinal cord
- C. The medulla oblongata
- D. The mind-brain
- E. The cerebellum

50. In the experiment the part of animal's brain was destroyed. After this the animal rejected food and died after some time from exhaustion. Which part of brain was destroyed?

- A. Lateral hypothalamus
- B. Ventromedial hypothalamus
- C. Specific nucleus of hypothalamus
- D. Reticular formation of the brain
- E. Non-specific nucleus of hypothalamus

51. Central receptors for glucose localize in

- A. Posterior hypothalamus
- B. Pons
- C. Cerebellum
- D. Cerebral hemispheres

E. Anterior hypothalamus

52. As a result of damage to certain structures of brainstem an animal lost orientation reflexes. What structures were damaged?

- A. Quadritubercular bodies
- B. Red nuclei
- C. Medial nuclei of reticular formation
- D. Vestibular nuclei
- E. Black substance

53. As a result of spinal-cord trauma a 33-year-old man has a disturbed pain and temperature sensitivity that is caused by damage of the following tract:

- A. Lateral spinocortical
- B. Anterior spinocerebellar
- C. Posterior spinocerebellar
- D. Medial spinocortical
- E. Spinothalamic

54. When a patient with traumatic impairment of the brain was examined, it was discovered that he had stopped to distinguish displacement of an object on the skin. What part of the brain was damaged?

- A. Parietal zone of the cortex
- B. Posterior central gurus
- C. Occipital zone of the cortex
- D. Frontal central gurus
- E. Frontal zone

55. A hemorrhage into the brainstem of a patient of 70 is diagnosed. The examination found out the increased of the tone of flexor muscles and the decline of the tone of extensor muscles. The irritations of what structures of brain can explain the changes in the tone of muscles?

- A. Substantia nigra.
- B. Vestibular nuclei.
- C. Quadrigeminal plate.
- D. Red nuclei.
- E. Reticular formation.

56. A woman of 25 felt nausea, vomiting, and the increase of sweat secretion while being on a merry-go-round. The activation of what receptors stimulated reflex development of these symptoms?

- A. Corti's organs.
- B. Proprioceptors of skeletal muscles.
- C. Vestibular receptors of semicircular ducts.
- D. Visual.
- E. Otoconia vestibular.

57. It is ascertained in an experiment during excitation of the motoneurons of flexor muscles the motoneurons of extensor muscles are inhibited. What kind of inhibition underlies this phenomenon?

- A. Reciprocal
- B. Inhibition after excitation
- C. Pessimal
- D. Feedback (Ranshow)
- E. Lateral

58. For better examination of the fundus of eye a doctor began to drip the solution of atropine on the conjunctiva of the patient's eye. It resulted in pupil expansion. The blockade of what membranous cytoceptors stipulated such effect?

- A. H<sub>2</sub>-receptors
- B. N-holinoreceptors
- C. α-adrenoreceptors
- D. β-adrenoreceptors
- E. M-holinoreceptors

59. During the pathoanatomic research of the spinal cord of a 70-year-old man the destruction and diminishing of the quantity of anterior horns nuclei cells in cervical and thoracic spines were found. What functions were damaged during the man's life?

- A. Moving functions of the lower extremities.
- B. Moving functions of the upper extremities.
- C. Sensitiveness and moving functions of the upper extremities.
- D. Sensitiveness of the lower extremities.
- E. Sensitiveness of the upper extremities.

60. As a result of a trauma a man's otolithic apparatus of the internal ear is damaged. To what irritants will not the patient be able to react?

- A. Sound stimuli.
- B. Motion with angular acceleration.
- C. Skin irritants.

- D. Photic stimuli.
- E. Motion with linear acceleration.

61. The working capacity of a man reduced as a result of physical activity. The changes in what structures are the reason for the fatigue first of all?

- A. Muscles.
- B. Nerve centers.
- C. Afferent nerves.
- D. Efferent nerves.
- E. Nervous-muscle synapses.

62. The consequence of what process is the persistent dilation of pupil under the conditions of intense illumination?

- A. Paralysis of ciliary muscle.
- B. Normal state of regulatory mechanism.
- C. Over activity of the parasympathetic part of the nervous system.
- D. Paralysis of the muscle that expands the pupil.
- E. Over activity of the sympathetic part of the nervous system.

63. After a cranial trauma a patient's respiration became infrequent and deep. What structure of cerebrum is damaged?

- A. Medulla oblongata.
- B. Hypothalamus.
- C. Metencephalon.
- D. Cortex of large hemisphere.
- E. Cerebellum.

64. After the introduction of micrielectrodes into the structures of diencephalon the animal's eyesight failed completely. What subcortex structure was possibly damaged?

- A. Suprachiasmatic nucleus of hypothalamus
- B. Medial geniculate body
- C. Associative nuclei of thalamus
- D. Supraoptical nuclei of hypothalamus
- E. Lateral geniculate body

65. During an operation on cerebrum it was noted that the irritation of a certain area of the cortex of cerebrum caused tactile and temperature sensation of a patient. Which area of cerebral cortex was irritated?

- A. Cingulate gyrus
  - B. Precentral gyrus
  - C. Upper lateral gyrus
  - D. Postcentral gyrus
  - E. Parahippocampal gyrus
- 66.** A frog reacts by generalized convulsions to the least irritation after the introduction of strychnine. The blockage of what structure of the CNS is the reason for such reaction?
- A. Inhibitory synapses.
  - B. Excitatory synapses.
  - C. Renshaw cells.
  - D. Adrenoreceptors.
  - E. Cholinergic receptors.
- 67.** A woman of 64 has disorders of fine movements of fingers, evident muscular rigidity, and tremor. A neurologist diagnosed Parkinson's disease. The defect of what structure of cerebrum resulted in this disease?
- A. Reticular formation.
  - B. Thalamus.
  - C. Red nuclei.
  - D. Cerebellum.
  - E. Substantia nigra.
- 68.** Red nuclei of a mesencephalic animal were destroyed in an experiment. Which reflexes disappear in this condition?
- A. Static postural vestibular.
  - B. Static postural neck.
  - C. Straightening and statokinetic.
  - D. Myotatic tonic.
  - E. Myotatic phasic.
- 69.** After a domestic trauma a patient of 18-year-old began to complain of permanent giddiness, nystagmus of eyes, scanning speech, uncertain gait. Dysfunction of what structures of cerebrum does it testify to?
- A. Vestibular nuclei.
  - B. Motor cortex.
  - C. Basal nuclei.
  - D. Substantia nigra.
  - E. Cerebellum
- 70.** After a traffic accident a patient of 36 got paralysis of muscles of extremities on the right, the loss of pain and temperature sensitivity on the left, partial reduction of tactile sensation on both sides. These changes are most characteristic of the defect of some part of brain. What part is it?
- A. Motor cortex on the left.
  - B. Right half of spinal cord.
  - C. Left half of spinal cord.
  - D. Anterior division of the anterolateral pathway of spinal cord.
  - E. Dorsal columns of spinal cord.
- 71.** Pushing a barbell a sportsman pulls the head back of the maximal increase of the tone of the upper extremities extensor muscles. Where are the local centers of the reflexes arising here situated?
- A. In the spinal cord.
  - B. In the motor cortex.
  - C. In basal nuclei.
  - D. In red nuclei.
  - E. In Deiters' nuclei.
- 72.** An experiment is conducted on a spinal frog. The time of defense flexor reflex decreased from 10 sec. to 6 sec. after increasing the area of the skin surface, which is acted on with acid solution. What mechanism underlies the diminishing of the time of defense flexor reflex?
- A. Irradiation of excitation on divergent nervous chains.
  - B. Spatial summation of excitation.
  - C. Temporal summation of excitation.
  - D. Principle of dominant.
  - E. Recirculation of excitation.
- 73.** In an experiment on a cat one irritates a cerebrum motor structure; as a result there is an increase of the tone of extensor muscles on the side of stimulation. What structures of cerebrum are irritated?
- A. Nucleus reticularis medialis.
  - B. Nucleus caudatus.
  - C. Nucleus ruber.
  - D. Nucleus vestibularis lateralis.
  - E. Nucleus intermedius lateralis.

**74.** A man with one CNS part affected has asthenia, muscular dystonia, imbalance. What CNS part is affected?

- A. Red nuclei.
- B. Substantia nigra.
- C. Reticular formation.
- D. Cerebellum.
- E. Vestibular nuclei.

**75.** A supertension of extensor muscles of extremities and back (decerebrate rigidity) is observed in an experiment on a cat. What level is the section done at?

- A. Spinal cord.
- B. Between spinal cord and medulla oblongata.
- C. Below vestibular nuclei.
- D. Above red nuclei.
- E. Below red nuclei.

**76.** The section of a cat's brain leads to the decerebrate rigidity – the jump of tone of extensor muscles. What level of brain was the section made at?

- A. Between medulla oblongata and spinal cord.
- B. Between diencephalon and mesencephalon.
- C. Between mesencephalon and metencephalon.
- D. Between diencephalon and telencephalon.
- E. Between medulla oblongata and pons.

**77.** After a long training a sportsman got tired, working capacity decreased. In what link of the reflex arch did fatigue occur first of all?

- A. In an efferent.
- B. In an afferent.
- C. In receptors.
- D. In nerve centers.
- E. In muscles.

**78.** An experimental animal has lost orientative reflexes as a result of destruction of certain brainstem structures. What structures had been destroyed?

- A. Medial nuclei of the reticular formation
- B. Vestibular nuclei

- C. Red nuclei
- D. Black substance
- E. Quadrigeminal plate

**79.** In vertical position a patient loses balance when closing eyes. What structures of brain are probably damaged?

- A. Basal ganglia.
- B. Cerebellum.
- C. Limbic system.
- D. Thalamus.
- E. Precentral gyrus of the cortex of cerebral hemisphere.

**80.** A patient was diagnosed with Parkinson's syndrome. It is connected with the disorder of some transmitter systems of cerebrum. What transmitter system are there?

- A. Histaminergic.
- B. Dopaminergic.
- C. Serotonergic.
- D. Cholinergic.
- E. Opioid.

**81.** A person who was rolling on a merry-go-round got an increase of heart beats, perspiration, and nausea. What the irritation of what receptors is it connected first of all?

- A. Visual.
- B. Proprioceptors.
- C. Tactile.
- D. Auditory.
- E. Vestibular.

**82.** A patient has got an incoordination of movements, disorder of their amplitude and orientation; movements are sweeping, disproportional; the gait of cock, tottering. What part of brain is damaged?

- A. Spinal cord.
- B. Medulla oblongata.
- C. Cerebellum.
- D. Hypothalamus.
- E. Thalamus.

**83.** In response to a muscle strain its reflex contraction is observed. From the irritation of what receptors does this reflex reaction begin?

- A. Muscular spindles.
  - B. Tendon Golgi's receptors.
  - C. Articular.
  - D. Tactile.
  - E. Nociceptor.
- 84.** In response to a strong rapid reduction of a muscle its reflex weakening is observed. With the irritation of what receptors does this reflex reaction begin?
- A. Muscular spindles.
  - B. Tendon Golgi's receptors.
  - C. Articular.
  - D. Tactile.
  - E. Nociceptor.
- 85.** The vestibular apparatus of a frog was ruined on the right side. What changes of muscle tone will it cause?
- A. Decreasing the tone of extensor on the right.
  - B. Increasing the tone of extensors on the right.
  - C. Decreasing the tone of flexors on the left.
  - D. Decreasing the tone of flexors on the left.
  - E. Decreasing the tone of extensors on the left
- 86.** Red nuclei of an animal were ruined. Which of the following reflexes will it lose as a result of this?
- A. Myotatic
  - B. Vestibular static
  - C. Tonic cervical
  - D. Statokinetic
  - E. Tendon
- 87.** A research was carried out on a decerebrated animal. What structures of the animal should be ruined for rigidity to disappear?
- A. Substantia nigra
  - B. Red nuclei
  - C. Vestibular lateral nuclei
  - D. Medial reticular nuclei
  - E. Lateral reticular nuclei
- 88.** As a result of the destruction of certain brainstem structures an animal lost orientative reflex in response to strong phoric stimuli. What structures were ruined?
- A. Substantia nigra.
  - B. Posterior tubercles of quadrigeminal plate.
  - C. Red nuclei.
  - D. Vestibular nuclei.
  - E. Anterior tubercles of quadrigeminal plate.
- 89.** As a result of the destruction of certain brainstem structures an animal lost orientative reflex in response to strong sound stimuli. What structures were ruined?
- A. Red nuclei.
  - B. Anterior tubercles of quadrigeminal plate.
  - C. Posterior tubercles of quadrigeminal plate.
  - D. Vestibular nuclei.
  - E. Substantia nigra.
- 90.** As a result of the destruction of certain brainstem structures an animal lost orientative reflex. What structures were ruined?
- A. Medial nuclei of reticular formation.
  - B. Quadrigeminal plate.
  - C. Red nuclei.
  - D. Vestibular nuclei.
  - E. Substantia nigra.
- 91.** A patient gets tired quickly. While standing with closed eyes he is reeling, losing balance. Skeletal muscle tone is reduced. Which of the following structures of the person's brain is probably affected?
- A. Hypothalamus.
  - B. Thalamus.
  - C. Cerebellum.
  - D. Precentral gyrus of cerebral hemisphere cortex.
  - E. Basal ganglia.
- 92.** An animal has an increased tonus of extensor muscles. This the result of intensified information transmission to the motoneurons of the spinal cord through the following descending pathways:
- A. Lateral corticospinal
  - B. Rubrospinal
  - C. Medial corticospinal
  - D. Vestibulospinal
  - E. Reticulospinal

- 93.** During the examination of the mouth cavity of a 59-year-old patient it was necessary to examine the movements of the lower jaw. What method is used in this case?
- Myography.
  - Electromyography.
  - Masticaciography.
  - Electroodontodiagnostics.
  - Gnathodynamometry.
- 94.** A patient has defects in the act of chewing as a result of the affection by a pathological process in the structures that form the afferent guide of the arch of the proper reflex. What nerve is affected?
- N. hypoglossum.
  - N. vagus.
  - N. glossopharyngeus.
  - N. trigeminus.
  - N. glossopharyngeus and n. vagus.
- 95.** A patient has defects in the act of swallowing as a result of the affection by a pathological process in the structures that form the afferent guide of the arch of the proper reflex. What nerve is affected?
- N. trigeminus and n. vagus.
  - N. vagus.
  - N. hypoglossum.
  - N. glossopharyngeus.
  - N. trigeminus.
- 96.** After the destruction of CNS structures an animal lost orientative reflex. What structures were destroyed?
- Quadrigenal plate.
  - Red niclei.
  - Lateral vestibular nuclei.
  - Substantia nigra.
  - Medial reticular nuclei.
- 97.** As a result of a trauma a patient has got defective swallowing. The affection of what of the following CNS structures is the most probable reason for this disorder?
- Hypothalamus.
  - Spinal cord at the level Th<sub>II-IV</sub>.
  - Spinal cord at the level C<sub>V-VI</sub>.
  - Mesencephalon.
  - Medulla oblongata.
- 98.** The CNS stimulation produced by methylxanthines, such as caffeine, is most likely due to the antagonism of one of the following receptors:
- Glycine receptors
  - Adenosine receptors
  - Glutamate receptors
  - GABA receptors
  - Cholinergic muscarinic receptors
- 99.** A student is thoroughly summarizing a lecture. When his groupmates begin talking the quality of the summarizing worsens greatly. What type of inhibition in the cerebral cortex is the cause of it?
- External
  - Protective
  - Dying
  - Differential
  - Delayed
- 100.** Inhibition of alpha-motoneuron of the extensor muscles was noticed after stimulation of  $\alpha$ -motoneuron of the flexor muscles during the experiment on the spinal column. What type of inhibition can be caused by this process?
- Lateral
  - Presynaptic
  - Depolarizational
  - Recurrent
  - Reciprocal
- 101.** A person felt thirsty after staying under the conditions of hot weather for a long time. Signals of what receptors caused it first of all?
- Osmoreceptors of hypothalamus
  - Sodium receptors of hypothalamus
  - Osmoreceptors of liver
  - Glucoreceptors of hypothalamus
  - Baroreceptors of aortic arch
- 102.** Inhibition of  $\alpha$ -motoneuron of the extensor muscles was noticed after stimulation of  $\alpha$ -motoneuron of the flexor muscles during the experiment on the spinal cord. What type of inhibition is this process based upon?

- A. Depolarizational
- B. Presynaptic
- C. Reciprocal
- D. Recurrent
- E. Lateral

**103.** As a result of craniocerebral trauma a patient reveals the following symptoms: intention tremor, dysmetria, adiadochokinesis, dysarthria. What structure of the brain is injured?

- A. Pale sphere
- B. Striatum
- C. Motor cortex
- D. Cerebellum
- E. Black substance

**104.** A patient's knee joint doesn't extend, there is no knee-jerk reflex, and skin sensitivity of the anterior femoral surface is disturbed. What nerve structures are damaged?

- A. Big fibular nerve
- B. Superior gluteal nerve
- C. Femoral nerve
- D. Obturator nerve
- E. Inferior gluteal nerve

**105.** A sensitive neural ganglion consists of roundish neurocytes with one extension that divides into axon and dendrite at some distance from the perikaryon. What are these cells called?

- A. Unipolar
- B. Pseudounipolar
- C. Bipolar
- D. Multipolar
- E. Apolar

**106.** In course of an experiment a peripheral section of vagus of an experimental animal is being stimulated. What changes will be observed?

- A. Heart rate fall
- B. Heart hurry
- C. Pupil dilation
- D. Increase of respiration rate
- E. Bronchi dilation

**107.** In an experiment a dog had been conditioned to salivate at the sight of food and a flash of light. After conditioning the reflex, the light was then paired with the bell. The dog didn't start to salivate. What type of inhibition was observed?

- A. Extinctive
- B. Differential
- C. External
- D. Persistent
- E. Protective

**108.** As a result of a road accident a 37-year-old female victim developed urinary incontinence. What segments of the spinal cord had been damaged?

- A. *Th1 – L1*
- B. *Th1 – Th5*
- C. *L1 – L2*
- D. *Th2 – Th5*
- E. *S2 – S4*

**109.** As a result of an injury, the integrity of the anterior spinal cord root was broken. Specify the neurons and their processes that had been damaged:

- A. Motor neuron dendrites
- B. Axons of motor neurons
- C. Axons of sensory neurons
- D. Dendrites of sensory neurons
- E. Dendrites of association neurons

**110.** The receptors under study provide transfer of information to the cortex without thalamic involvement. Specify these receptors:

- A. Visual
- B. Tactile
- C. Gustatory
- D. Olfactory
- E. Auditory

**111.** During an animal experiment, surgical damage of certain brain structures has caused deep prolonged sleep. What structure is most likely to cause such condition, if damaged?

- A. Reticular formation
- B. Basal ganglion
- C. Red nuclei



- D. Hippocampus
- E. Cerebral cortex

**112.** A patient complains that at the bare mention of the tragic events that once occurred in his life he experiences tachycardia, dyspnea and an abrupt rise in blood pressure. What structures of the CNS are responsible for these cardiorespiratory reactions in this patient?

- A. Cerebellum
- B. Cerebral cortex
- C. Lateral hypothalamic nuclei
- D. Specific thalamic nuclei
- E. Quadrigemina of mesencephalon

**113.** An animal has an increased tonus of extensor muscles. This is the result of enhanced information transmission to the motoneurons of the spinal cord through the following descending pathways:

- A. Lateral corticospinal
- B. Medial corticospinal
- C. Reticulospinal
- D. Rubrospinal
- E. Vestibulospinal

**114.** As a result of a craniocerebral injury a patient has decreased skin sensitivity. What area of the cerebral cortex may be damaged?

- A. Posterior central gyrus
- B. Occipital region
- C. Cingulate gyrus
- D. Frontal cortex
- E. Anterior central gyrus

**115.** A man sitting with his eyes closed, undergoes electroencephalography. What rhythm will be recorded on the EEG if there is an audible signal?

- A. Alpha rhythm
- B. Beta rhythm
- C. Delta rhythm
- D. Theta rhythm
- E. Gamma rhythm

**116.** A patient presented to a hospital with complaints about quick fatigability and significant muscle weakness. Examination revealed an autoimmune disease that causes

functional disorder of receptors in the neuromuscular synapses. This will result in the disturbed activity of the following mediator:

- A. Acetylcholine
- B. Noradrenaline
- C. Dopamine
- D. Serotonin
- E. Glycine

**117.** As a result of a trauma a patient has damaged anterior roots of spinal cord. What structures have been affected?

- A. Peripheral processes of sensitive spinal ganglions
- B. Central processes of sensitive neurons of spinal ganglions
- C. Axons of motoneurons and axons of neurons of lateral horns
- D. Axons of neurons of lateral horns
- E. Dendrites of neurons of spinal ganglions

**118.** Vegetative abnormalities in the sleep, heat regulation, all kinds of metabolism, diabetes insipidus are developing in the patient due to growth of the tumour in the III ventricle of brain. Irritation of the nucleus of what part of the brain can cause these symptoms?

- A. Pons cerebelli
- B. Cerebral peduncles (cruces cerebri)
- C. Mesencephalic tegmentum
- D. Hypothalamus
- E. Medulla

**119.** After a long training session a sportsman has developed fatigue accompanied by abrupt performance decrement. What link of the reflex arch was the fatigue initiated in?

- A. Nerve centres
- B. Afferent conductor
- C. Receptors
- D. Efferent conductor
- E. Muscles

**120.** A sportsman was examined after an intensive physical activity. The examination revealed disorder of movement coordination but the force of muscle contractions remained the same. It can be explained by retarded speed of excitement conduction through:

- A. Afferent nerves
- B. Neuromuscular synapses
- C. Efferent nerves
- D. Central synapses
- E. Conduction tracts

**121.** Students who are taking examinations often have dry mouth. The mechanism that causes this state is the realization of the following reflexes:

- A. Conditioned sympathetic
- B. Unconditioned parasympathetic
- C. Conditioned parasympathetic
- D. Unconditioned sympathetic
- E. Unconditioned peripheral

**122.** A patient consulted a doctor about loss of taste sensitivity on the tongue root. The doctor revealed that it is caused by nerve affection. Which nerve is it?

- A. Glossopharyngeal
- B. Vagus nerve
- C. Facial nerve
- D. Superlaryngeal nerve
- E. Trigeminal nerve

**123.** A man having a hearing loss after a head trauma was delivered to the neurosurgery department. The cause of the hearing loss might be the damage of the following lobe of cerebral cortex:

- A. Parietal
- B. Postcentral gyrus
- C. Temporal
- D. Occipital
- E. Frontal

**124.** In course of an experiment thalamocortical tracts of an animal were cut. What type of sensory perception remained intact?

- A. Olfactory
- B. Auditory
- C. Exteroreceptive
- D. Visual
- E. Nociceptive

**125.** Brain tomography revealed a tumour in the region of red nucleus. What part of brain is damaged?

- A. Medulla oblongata
- B. Midbrain
- C. Cerebellum
- D. Interbrain
- E. Pons cerebelli

**126.** One of sections of central nervous system has layerwise arrangement of neurocytes. Among them there are cells of the following forms: stellate, fusiform, horizontal, pyramidal. What section of central nervous system is this structure typical for?

- A. Cortex of cerebrum
- B. Spinal cord
- C. Cerebellum
- D. Medulla oblongata
- E. Hypothalamus

**127.** A patient with hip fracture was prescribed a narcotic analgetic. Its anesthetic action is determined by interaction with the following receptors:

- A. GABA-ergic receptors
- B. Adrenoreceptors
- C. Cholinoreceptors
- D. Benzodiazepine receptors
- E. Opiate receptors

**128.** A patient staggers and walks astraddle. He has hypomyotonia of arm and leg muscles, staccato speech. In what brain section is this affection localized?

- A. Putamen
- B. Cerebellum
- C. Caudate nucleus
- D. Motor cortex
- E. Red nucleus

**129.** A patient caught a cold after which there appeared facial expression disorder. He cannot close his eyes, raise his eyebrows, bare his teeth. What nerve is damaged?

- A. Facial
- B. Vagus
- C. Trigeminal
- D. Glossopharyngeal
- E. Infraorbital

**130.** A man has normal sensitivity of his finger skin; however he doesn't sense his wedding ring around the finger. What process induced by wearing of the ring has caused this phenomenon?

- A. Abnormality of the receptor structure
- B. Development of the fibrous tissue
- C. Abnormality of the epidermis structure
- D. Impaired circulation
- E. Receptor adaptation

**131.** A patient came to the hospital complaining about quick fatigability and apparent muscle weakness. Examination revealed an autoimmune disease that causes disorder of functional receptor condition in neuromuscular synapses. What transmitter will be blocked?

- A. Dopamine
- B. Noradrenalin
- C. Acetylcholine
- D. Serotonin
- E. Glycine

### 3. HUMORAL REGULATION OF ORGANISM FUNCTIONS

**132.** A 32-year-old patient consulted a doctor about the absence of lactation after parturition. Such disorder might be explained by the deficit of the following hormone:

- A. Vasopressin
- B. Thyrocalcitonin
- C. Gucagon
- D. Somatotropin
- E. Plolactin

**133.** A patient complaining of weight loss (10 kg during 2 months), palpitation and exophthalmoses came to the endocrinologist. For the hyper function of what endocrine gland (glands) are there complaints the most typical?

- A. Ovaria
- B. Parathyroid glands
- C. Adrenal glands
- D. Thyroid
- E. Pancreas

**134.** Careless student occasionally met his dean. The concentration of what hormone will most likely increase in the blood of the student?

- A. Somatotropin
- B. Thyrotropin-releasing hormone
- C. Cortisol
- D. Corticotropin
- E. Adrenalin

**135.** Decreased concentration of the glucose leads to the increased secretion of:

- A. Adrenalin
- B. Acetylcholine
- C. Histamine
- D. Serotonin
- E. Dopamine

**136.** Examination of a patient revealed hyperkalemia and hyponatremia. Low secretion of which hormone may cause such change?

- A. Vasopressin
- B. Aldosteron
- C. Parathormone
- D. Cortisol
- E. Natriuretic

**137.** Parents of a 10-year-old boy consulted a doctor about extension of hair-covering, growth of beard and moustache, low voice. Intensified secretion of which hormone must be assumed?

- A. Of somatotropin
- B. Of testosterone
- C. Of oestrogen
- D. Of cortisol
- E. Of progesterone

**138.** There is only one hormone among the neurohormones which refers to the derivatives of amino acids according to classification. Point it out:

- A. Melatonin
- B. Vasopressin
- C. Oxytocin
- D. Thyroliberin
- E. Somatotropin

**139.** A frog reacts by generalized convulsions in reply to all irritations after the introduction of the solution of a chemical agent. What agent was introduced?

- A. Strychnin.
- B. Adrenaline.
- C. Acetylcholine.
- D. Serotonine
- E. Dopamine

**140.** A boy of 12 is 180 cm tall. The reason for it is the disorder of hormone secretion. What kind of hormone is it?

- A. Somatotropin
- B. Thyroxin
- C. Thyreotropin
- D. Gonadotropin
- E. Insulin

**141.** The height of a grown-up person is 120 cm. Proportions of the body-build and mental capacity are normal. There characteristics are result of a lack of some hormone secretion in childhood. What kind of hormone is it?

- A. Thyroxin.
- B. Gonadotropin.
- C. Corticotropin.
- D. Thyreotropin.
- E. Somatotrot pin.

**142.** A careless student met the dean by change. The concentration of what hormone will increase in the student's blood first of all?

- A. Cortisol.
- B. Thyreoliberin.
- C. Corticotropin.
- D. Adrenaline.
- E. Somatotropin.

**143.** The function of the thyroid gland of a child has been reduced since birth. What is the main consequence of this state?

- A. Giantism.
- B. Nanism.
- C. Cretinism.
- D. Hypopituitarism.
- E. Hyperpigmentation of skin.

**144.** Height of a grown-up person is 100 cm. Proportions of the body-build characteristics are the result of a lack of some hormone secretion in childhood. What kind of hormone is it?

- A. Thyreotropine.
- B. Gonadotropin.
- C. Corticotropine.
- D. Somatotropin.
- E. Prolactin.

**145.** Tachycardia, increase of basal metabolism and body temperature, weight loss, increase of excitability of a patient are diagnosed. The reason for it is the increase of the hormone secretion of some gland. What gland is it?

- A. Neurohypophysis.
- B. Adrenal glands.
- C. Parathyroid glands
- D. Gonads
- E. Thyroid gland

**146.** Demineralization of bones (decreasing of calcium ions content) is often a problem of elderly people. The reason for this is the decreasing of some hormone. What hormone is it?

- A. Thyrocalcitonin.
- B. Thyroxin.
- C. Insulin.
- D. Aldosteron.
- E. Parathormone.

**147.** A woman of 25-year-old came to a doctor a month after childbirth with complaint about the decrease of galactopoiesis. What hormone deficit resulted in such state?

- A. Prolactin.
- B. Somatostatin.
- C. Corticotropin.
- D. Insulin.
- E. Glucagon.

**148.** The height of a 10-year-old child is 178 cm, the weight is 64 kg. it is connected with function disorders of some gland. What gland is it?

- A. Gonads.
- B. Thyroid gland.

- C. Pituitary gland.
- D. Adrenal glands.
- E. Parathyroid glands.

**149.** A 2-year-old child had cramps as a result of the decline of the concentration of calcium ions in blood plasma. It was caused by the decline of the function of some organ of internal secretion. What organ is it?

- A. Thymus.
- B. Hypophysis.
- C. Adrenal cortex.
- D. Pineal body.
- E. Parathyroid glands.

**150.** The secretion of some hormone of hypophysis is inhibited after taking oral contraceptives containing sex hormones. What hormone secretion is inhibited?

- A. Somatotropin.
- B. Vasopressin.
- C. Thyrotropin.
- D. Gonadotropin.
- E. Oxytocin.

**151.** A patient has an increased basal metabolism, high body temperature, tachycardia in the state of rest. What gland's hyperfunctioning can be the reason for this state?

- A. Pancreas.
- B. Thyroid.
- C. Neurohypophysis.
- D. Adrenal cortex.
- E. Gonads.

**152.** A woman has a limited blood flow in kidneys, high arteriotony. What hormone's hypersecretion was the reason for high arteriotony?

- A. Vasopressin.
- B. Adrenaline.
- C. Noradrenaline.
- D. Erythropoietin.
- E. Rennin.

**153.** A child has signs of physical development delay and mental retardation (cretinism). With the deficit of what hormone is it connected?

- A. Thyroxin.
- B. Somatotropin.
- C. Calcitonin.
- D. Insulin.
- E. Testosterone.

**154.** While examining a patient, attention was paid to cervical intumescences, exophthalmus, high body temperature, pulse 110 per minute. The content of what hormone in blood is it necessary to examine?

- A. Insulin.
- B. Sex hormone.
- C. Catecholamines.
- D. Thyroxin.
- E. Cortisol.

**155.** During the last 6 month a woman has signs of masculinization: increased hair growth on the face, while line of stomach, legs. She complains of irregular menstrual cycle. The reason of such state can be the increased secretion of some hormone. What hormone is it?

- A. Mineralocorticoids.
- B. Estrogens.
- C. Somatotropin.
- D. Thyroxin.
- E. Androgens.

**156.** An infant has got a laryngospasm. In anamnesis there is a susceptibility to cramps development. One must think about the dysfunction of some endocrine glands. What are there?

- A. Parathyroid glands.
- B. Pancreas.
- C. Thymus.
- D. Thyroid gland.
- E. Adrenal glands.

**157.** A patient has got a sharp lowering of calcium level in blood. It will cause the increasing secretion of some hormone. What hormone is this?

- A. Parathormone.
- B. Thyrocalcitonin.
- C. Aldosterone.
- D. Vasopressin.

E. Somatotropin.

**158.** A patient has hypercalcemia. What hormone deficit can be the reason for it?

- A. Parathormone.
- B. Thyrocalcitonin.
- C. Aldosterone.
- D. Corticotropin.
- E. Corticoliberin.

**159.** The height of a 10-year-old child is 80 cm, he has right proportions of body, normal mental development. What hormone deficit in the organism can cause such changes?

- A. Thyroxin.
- B. Somatostatin.
- C. Somatotropin.
- D. Triiodothyronine.
- E. Cortisol.

**160.** A patient has got the enlargement of separate parts of body (lower jaw, nose, ears, tongue, feet, and hands), body proportions preserved. It can be connected with the increase of the secretion of a certain hormone. What hormone is it?

- A. Cortisol.
- B. Somatostatin.
- C. Tetraiodothyronine.
- D. Triiodothyronine.
- E. Somatotropin.

**161.** Some diseases reveal symptoms of aldosteronism with hypertension and edema due to sodium retention in the organism. What organ of the internal secretion is affected on aldosteronism?

- A. Ovaries
- B. Testicle
- C. Adrenal glands
- D. Pancreas
- E. Hypophysis

**162.** A 19-year-old female suffers from tachycardia in rest condition, weight loss, excessive sweating, exophthalmos and irritability. What hormone would you expect to find elevated in her serum?

- A. Thyroxine
- B. Cortisol
- C. Mineralocorticoids
- D. ACTH
- E. Insulin

**163.** Intake of oral contraceptives containing sex hormones inhibits secretion of the hypophysiae hormones. Secretion of which of the indicated hormones is inhibited while taking oral contraceptives with sex hormones?

- A. Somatotropic
- B. Vasopressin
- C. Thyrotropic
- D. Follicle-stimulating
- E. Oxytocin

**164.** Under some diseases it is observed aldosteronism accompanied by hypertension and edema due to sodium retention in the organism. What organ of the internal secretion is affected under aldosteronism?

- A. Hypophysis
- B. Testicle
- C. Ovaries
- D. Pancreas
- E. Adrenal glands

**165.** Testosterone and its analogs increase the mass of skeletal muscles that allows using them for treatment of dystrophy. Due to interaction of the hormone with what cell substrate is this action caused?

- A. Membrane receptors
- B. Nuclear receptors
- C. Ribosomes
- D. Chromatin
- E. Proteins-activators of transcription

**166.** A 44-year-old woman complains of common weakness, heart pain, considerable increase of body weight. Objectively: moon-like face, hirsutism, AP- 165/100 mm Hg, height - 164 cm, weight - 103 kg; fat is mostly accumulated in the region of neck, upper shoulder girdle, stomach. What is the main pathogenetic mechanism of obesity?

- A. Increased production of mineralocorticoids
- B. Decreased production of thyroidal hormones

- C. Increased production of insulin
- D. Decreased production of glucagon
- E. Increased production of glucocorticoids

**167.** A 40-year-old patient complains of intensive heartbeats, sweating, nausea, visual impairment, arm tremor, hypertension. From his anamnesis: 2 years ago he was diagnosed with pheochromocytoma. Hyperproduction of what hormones causes the given pathology?

- A. Catecholamines
- B. Aldosterone
- C. Glucocorticoids
- D. ACTH
- E. Thyroidal hormones

**168.** A girl is diagnosed with adrenogenital syndrome (pseudohermaphroditism). This pathology was caused by hypersecretion of the following adrenal hormone:

- A. Aldosterone
- B. Estrogen
- C. Androgen
- D. Cortisol
- E. Adrenalin

**169.** A 46-year-old patient suffering from the diffuse toxic goiter underwent resection of the thyroid gland. After the surgery the patient presents with appetite loss, dyspepsia, increased neuromuscular excitement. The body weight remained unchanged. Body temperature is normal. Which of the following has caused such a condition in this patient?

- A. Reduced production of parathormone
- B. Increased production of thyroxin
- C. Increased production of calcitonin
- D. Increased production of thyroliberin
- E. Reduced production of thyroxin

**170.** To prevent the transplant rejection after organ transplantation it is required to administer immunosuppression for the purpose of immunosuppression. What hormones are used for this purpose?

- A. Glucocorticoids
- B. Mineralocorticoids
- C. Sexual hormones
- D. Catecholamines

E. Thyroid

**171.** A middle-aged man went to a foreign country because he had been offered a job there. However he had been unemployed for quite a long time. What endocrine glands were exhausted most of all in this man?

- A. Substernal gland
- B. Parathyroid glands
- C. Seminal glands
- D. Adrenal glands
- E. Thyroid gland

**172.** Atria of an experimental animal were superdistended by blood that resulted in decreased reabsorption of  $Na^+$  and water in renal tubules. This can be explained by the influence of the following factor upon kidneys:

- A. Natriuretic hormone
- B. Aldosterone
- C. Renin
- D. Angiotensin
- E. Vasopressin

**173.** A concentrated solution of sodium chloride was intravenously injected to an animal. This caused decreased reabsorption of sodium ions in the renal tubules. It is the result of the following changes of hormonal secretion:

- A. Aldosterone reduction
- B. Aldosterone increase
- C. Vasopressin reduction
- D. Vasopressin increase
- E. Reduction of atrial natriuretic factor

**174.** People adapted to high external temperatures have such peculiarity: profuse sweating isn't accompanied by loss of large volumes of sodium chloride. This is caused by the effect of the following hormone upon the perspiratory glands:

- A. Thyroxin
- B. Vasopressin
- C. Cortisol
- D. Aldosterone
- E. Natriuretic

**175.** Emotional stress causes activation of hormone-sensitive triglyceride lipase in the

adipocytes. What secondary mediator takes part in this process?

- A. Ions of  $\text{Ca}^{2+}$
- B. Cyclic guanosine monophosphate
- C. Cyclic adenosine monophosphate
- D. Adenosine monophosphate
- E. Diacylglycerol

**176.** The secretion of which hypophysial hormones will be inhibited after taking the oral contraceptives containing sex hormones?

- A. Thyrotrophic hormone
- B. Vasopressin
- C. Gonadotropic hormone
- D. Somatotrophic hormone
- E. Oxytocine

**177.** A female patient presents with endocrine dysfunction of follicular cells of the ovarian follicles resulting from an inflammation. The synthesis of the following hormone will be inhibited:

- A. Follistatine
- B. Progesterone
- C. Lutropin
- D. Follicle stimulating hormone
- E. Estrogen

**178.** A child has abnormal formation of tooth enamel and dentin as a result of low concentration of calcium ions in blood. Such abnormalities might be caused by deficiency of the following hormone:

- A. Parathormone
- B. Thyrocalcitonin
- C. Thyroxin
- D. Somatotrophic hormone
- E. Triiodothyronine

**179.** Before the cells can utilize the glucose, it is first transported from the extracellular space through the plasmatic membrane inside them. This process is stimulated by the following hormone:

- A. Thyroxin
- B. Glucagon
- C. Insulin
- D. Aldosterone

E. Adrenalin

**180.** Parodontitis is treated with calcium preparations and a hormone that stimulates tooth mineralization and inhibits tissue resorption. What hormone is it?

- A. Calcitonin
- B. Parathormone
- C. Adrenalin
- D. Aldosterone
- E. Thyroxine

**181.** A 20 year old patient complains of morbid thirst and huperdiuresis (up to 10 l daily). Glucose concentration in blood is normal but it is absent in urine. The patient has been diagnosed with diabetes insipidus. What hormonal drug is the most appropriate for management of this disorder?

- A. Insulin
- B. Cortisol
- C. Thyroxin
- D. Oxytocin
- E. Vasopressin

**182.** A 19-year-old male was found to have an elevated level of potassium in the secondary urine. These changes might have been caused by the increase in the following hormone level:

- A. Aldosterone
- B. Oxytocin
- C. Adrenaline
- D. Glucagon
- E. Testosterone

**183.** A 26-year-old woman at 40 weeks pregnant has been delivered to the maternity ward. Objectively: the uterine cervix is opened, but the contractions are absent. The doctor has administered her a hormonal drug to stimulate the labor. Name this drug:

- A. Testosterone
- B. Hydrocortisone
- C. Estrone
- D. Oxytocin
- E. ACTH

**184.** A patient with signs of osteoporosis and urolithiasis has been admitted to the



endocrinology department. Blood test revealed hypercalcemia and hypophosphatemia. These changes are associated with abnormal synthesis of the following hormone:

- A. Calcitonin
- B. Parathyroid hormone
- C. Cortisol
- D. Aldosterone
- E. Calcitriol

**185.** A 30-year-old female exhibits signs of virilism (growth of body hair, balding temples, menstrual disorders). This condition can be caused by the overproduction of the following hormone:

- A. Testosterone
- B. Oestriol
- C. Relaxin
- D. Oxytocin
- E. Prolactin

**186.** In the course of an experiment adenohipophysis of an animal has been removed. The resulting atrophy of thyroid gland and adrenal cortex has been caused by deficiency of the following hormone:

- A. Somatotropin
- B. Thyroid hormones
- C. Tropic hormones
- D. Cortisol
- E. Thyroxin

**187.** A patient with signs of osteoporosis and urolithiasis has been admitted to the endocrinology department. Blood test has revealed hypercalcemia and hypophosphatemia. These changes are associated with abnormal synthesis of the following hormone:

- A. Parathyroid hormone
- B. Calcitonin
- C. Cortisol
- D. Aldosterone
- E. Calcitriol

#### 4. ANALYZERS

**188.** A 25-year-old patient complained of vision reduction. Accommodation disorder, dilated

pupil, not reacting on the light was revealed on examination. Function of what muscles is disturbed?

- A. Pupil narrowing muscle, ciliary
- B. Pupil narrowing and dilating muscle
- C. Inferior oblique muscle, ciliary
- D. Pupil dilating muscle, ciliary
- E. Lateral rectus muscle, pupil narrowing

**189.** A patient has a hemorrhage into the posterior central gyrus. What type of sensitivity on the opposite side will be disturbed?

- A. Skin and proprioceptive
- B. Auditory
- C. Visual
- D. Olfactory
- E. Auditory and visual

**190.** A man who went for a ride on a roundabout had amplification of heart rate, sweating and nausea. What receptors stimulation is it primarily connected with?

- A. Vestibular
- B. Visual
- C. Tactile
- D. Proprioceptors
- E. Auditory

**191.** After brain injury a patient has lost his vision. What zone of the brain cortex is damaged in this case?

- A. Temporal and parietal
- B. Occipital
- C. Parietal
- D. Frontal
- E. Temporal

**192.** According to audiometry data a patient has a disturbed perception of medium-frequency sounds. It might have been caused by a damage of:

- A. Quadritubercular structure
- B. Spinal ganglion
- C. Cochlear nuclei
- D. Lateral geniculate bodies
- E. Middle part of helix

**193.** A 60-year-old patient has a reduced perception of high-frequency sounds. What structures' disorder of auditory analyzer caused these changes?

- A. Muscles of middle ear
- B. Eustachian tube
- C. Main membrane of cochlea near the oval window
- D. Main membrane of cochlea near helicotrema
- E. Tympanic membrane

**194.** After looking thorough the window for a while, a person began to read a book. Due the change of the state of a certain eye structure the refractive power of optical mediums increases. What eye structure is it?

- A. Lens.
- B. Cornea.
- C. Vitreous body.
- D. Pupil.
- E. Liquid of chamber of the eye.

**195.** What process takes place during shifting one's look from near to remote things?

- A. Contraction of the ciliary muscle.
- B. Relaxation of the ciliary muscles.
- C. Relaxation of suspensory ligaments.
- D. Increase of lens curvature.
- E. Increase of refractive power of the eye.

**196.** During physical activity the person is less sensitive to pain. Activation of what index is the reason for this phenomenon?

- A. Sympathoadrenal system.
- B. Nociceptive system.
- C. Function of the thyroid gland.
- D. Antinociceptive system.
- E. Function of adrenal glands.

**197.** Which of the visual functions is violated most of all when rods are damaged?

- A. Light adaptation.
- B. Color vision.
- C. Binocular vision.
- D. Central vision.
- E. Peripheral vision.

**198.** In an experiment on an animal electric activity of spinal ganglion neuron is registered. In allows analyzing afferent impulsation from certain receptors. What receptors are there?

- A. Maculae.
- B. Corti's organ.
- C. Cemicircular canals.
- D. Vestibular.
- E. Vestibular and Corti's organ.

**199.** In an experiment on an animal the middle part of the internal ear helix on the right is ruined. The violation of perception of what sounds will it result in?

- A. High-frequency.
- B. Low-frequency.
- C. Medium-frequency.
- D. High- and low-frequency.
- E. Violations will not be present.

**200.** With the help of a tuning fork the perception of sounds of a patient was examined. When the tuning fork was placed near the external ear the patient didn't hear sounds of the tuning folk by his right ear. When the legs of the turning folk were placed on a mastoid bone the patient heard a sound. With the affection of what part of the auditory sensory system is it connected?

- A. Cochlear nerve.
- B. Inferior colliculus testi.
- C. Internal ear.
- D. Middle ear.
- E. Medial geniculate body.

**201.** As a result of a spinal trauma a man of 33 got violation of pain and temperature sensitivity. Damage of what pathway does it cause?

- A. Spinothalamic.
- B. Medial spinocortical.
- C. Posterior spinocerebella.
- D. Lateral spinocortical.
- E. Anterior spinocerebellar.

**202.** After a craniocerebral trauma a patient does not recognize objects at touching them. What department of cerebrum has been damaged?

- A. Cerebellum.
- B. Occipital lobulus.
- C. Temporal particle.
- D. Precentral gyrus.
- E. Postcentral gyrus.

**203.** Under the action of an irritant an animal's neurons activity of the spiral ganglion increased. What irritant was it?

- A. Light.
- B. Sound.
- C. Rotation.
- D. Touch to the skin.
- E. Muscle strain.

**204.** During an examination a student's absolute threshold of pain sensitivity is bigger than in the state of calm. Activating of what system of organism is the reason for this state?

- A. Antinociceptive.
- B. Sympathoadrenal.
- C. Sympathetic part of the nervous system.
- D. Parasympathetic part of the nervous system.
- E. Hypophysial-adrenal.

**205.** In an experiment on an animal the middle part of internal ear helix was damaged. Violation of the perception of what sounds will it result it?

- A. High- and medium-frequency.
- B. Medium- and low-frequency.
- C. Low-frequency.
- D. Medium-frequency.
- E. High- and low-frequency.

**206.** According to the data of audiometry a patient has got the imperceptions of the sounds of medium frequency. The damage of what organ can be the reason for it?

- A. Cochlear nuclei.
- B. Middle part of helix.
- C. Spiral ganglion.
- D. Quadrigeminal plate.
- E. Lateral geniculate bodies.

**207.** To get the imprints of dentitions for the following prosthetics the solution of gypsum was brought into the mouth cavity of a woman

of 65. What receptors of the mucous tunic of the mouth cavity become excited first of all?

- A. Chemoreceptors.
- B. Thermal cold.
- C. Thermal hermal.
- D. Tactile.
- E. Taste.

**208.** Examination of an 18-year-old patient showed that he didn't feel the temperature irritations in the central part of the back surface of the tongue. What is the reason for this state?

- A. Edema of the mucous tunic of the tongue.
- B. Affection of the glossopharyngeal nerve.
- C. Affection of the tongue nerve.
- D. Absence of cold and thermal receptors in this area.
- E. Affection of somatosensory cortex.

**209.** Gustatory sensibility of a person is preserved, but general sensitiveness of the mouth cavity structures is lost. The damage of what organ does it testify about?

- A. N. vagus.
- B. N. trigemius.
- C. N. Glossopharyngeus.
- D. N. hypoglossus.
- E. N. glossopharyngeus and n. vagus.

**210.** After a brain injury a person lost his sight. Damage of what areas of cerebral cortex can cause such a state?

- A. Front.
- B. Temporal.
- C. Occipital.
- D. Pariental.
- E. Temporal and pariental.

**211.** A man who is riding the carousel presents with increased heart rate, sweating, nausea. This condition is caused primarily by the stimulation of the following receptors:

- A. Auditory
- B. Vestibular otolithic
- C. Visual
- D. Proprioceptors
- E. Vestibular ampullar

**212.** A person has got a hemorrhage into the back central gyrus. Violation of what sensitivity on the opposite side will it cause?

- A. Auditory and visual.
- B. Visual.
- C. Auditory.
- D. Smell and taste.
- E. Skin and proprioceptive.

**213.** As a result of the affection by a pathological process of conduction tracts of the spinal cord the pain sensitivity of skin and muscles was damaged. What pathways were damaged?

- A. Lateral spinothalamic.
- B. Spinothalamic.
- C. Medial spinothalamic.
- D. Anterior spinothalamic.
- E. Posterior spinothalamic.

**214.** While shifting the gaze to the closely situated object the refracting power of eye's optical mediums will increase by 10 diopters. It results from changing of such eye structure:

- A. Lens
- B. Cornea
- C. Vitreous body
- D. Liquid of the anterior chamber of eye
- E. Muscle that dilates pupil

**215.** After a 2 y.o. child has had flu, there appeared complaints about ear ache. A doctor revealed hearing impairment and inflammation of the middle ear. How did the infection penetrate into the middle ear?

- A. Through *atrium mastoideum*
- B. Through *foramen jugularis*
- C. Through *canalis caroticus*
- D. Through the auditory tube
- E. Through *canalis nasolacrimalis*

**216.** According to audiometry data a patient has a disturbed perception of medium-frequency sounds. It might have been caused by a damage of:

- A. Middle part of helix
- B. Cochlear nuclei
- C. Spiral ganglion

- D. Quadrigeminal structure
- E. Lateral geniculate bodies

**217.** An ophthalmologist used a 1% mesaton solution for the diagnostic purpose (pupil dilation for eye-ground examination). What is the cause of mydriasis induced by the drug?

- A. Block of  $\alpha_1$  adrenoreceptors
- B. Activation of  $\alpha_2$  adrenoreceptors
- C. Activation of  $\alpha_1$  adrenoreceptors
- D. Activation of  $\beta_1$  adrenoreceptors
- E. Activation of M-cholinoreceptors

**218.** During the air and bone conduction tests it was revealed that in the left ear the tones were louder by bone conduction. This might be associated with the disease of:

- A. Left inner ear
- B. Right middle ear
- C. Left middle ear
- D. Right inner ear
- E. Right external ear

**219.** A male working as a blacksmith has been tested for auditory acuity. The tests revealed 50% hearing loss in the low frequency range and a near-normal auditory acuity in the high-frequency range. This condition has been caused by the damage to the following structures of the auditory system:

- A. Corti's organ – closer to the oval foramen
- B. Corti's organ – closer to helicotrema
- C. Median part of the Corti's organ
- D. Muscles of the middle ear
- E. Eardrum

**220.** A 60 year old patient has impaired perception of high-frequency sounds. These changes were caused by damage of the following auditory analyzer structures:

- A. Main cochlea membrane near the oval window
- B. Main cochlea membrane near the helicotrema
- C. Eustachian tube
- D. Middle ear muscles
- E. Tympanic membrane

**221.** A 75-year-old-female patient with complaints of visual impairment has been

delivered to the ophthalmologic department. Objective examination revealed a brain tumor in area of the left optic tract. The patient has a visual field defect in the following area:

- A. Right half of both eyes retina
- B. Left half of both eyes retina
- C. Left and right halves of the left eye retina
- D. Left and right halves of the right eye retina
- E. Left and right halves of both eyes retina

222. In course of an experiment a toad's right labyrinth was destroyed. It will cause amyotonia of the following muscles:

- A. Right extensors
- B. Left flexors
- C. Left extensors
- D. Right flexors
- E. Right and left extensors

## 5. BEHAVIOR

223. A 60-year-old man after cerebral hemorrhage felt asleep for a long time. Damage of what structure caused this state?

- A. Cortex of the large hemisphereslack substance
- B. Nuclear s of the cerebral nerves
- C. Black substances
- D. Reticular formation
- E. Hippocampus

224. During the merry-go-round riding a 25-year-old woman began having nausea, vomiting and intensive sweat. Activation of which receptors caused the reflex development of these symptoms?

- A. Vestibular receptors of semicircular duct
- B. Proprioceptors of skeletal muscles
- C. Receptors of Corti's organ
- D. Optic receptors
- E. Otolith vestibular receptors

225. The insult in the site of hypothalamic lateral nuclei localization is diagnosed in 60-year-old patient. Which changes in patient's behavior may be expected?

- A. Aggressive behaviour

- B. Depression
- C. The rejection of food
- D. Thirst
- E. Unsatisfied hunger

226. The cold receptors predominate on the heat receptors:

- A. In the pre-optical region of hypothalamus
- B. In the posterior hypothalamus
- C. In the inner organs
- D. On the body surface
- E. In the liver

227. Heat receptors predominate on the cold receptors:

- A. In the pre-optical region of the hypothalamus
- B. On the body surface
- C. In the posterior hypothalamus
- D. In the inner organs
- E. In the liver

228. It is necessary for a researcher to develop a conditioned reflex of a dog as soon as possible. On the basis of what unconditioned reflex is it possible to develop a conditioned one?

- A. Orientative.
- B. Food.
- C. Sexual.
- D. Defense.
- E. Myotatic.

229. A loud sound during a conditioned reflex activity caused its inhibition. What kind of inhibition is it?

- A. Beyond maximum.
- B. External.
- C. Extinctional.
- D. Differential.
- E. Being late.

230. During a long drought a river dried up. For some time animals continued to come to the place of watering, but then stopped coming. What kind of inhibition of conditioned reflexes caused the change in animals' behavior?

- A. Beyond maximum.
- B. External.
- C. Extinctional.

- D. Differential.
- E. Being late.

231. A man of 60 slept after brain hemorrhage for a long time. The damage of what structures caused such state?

- A. Substantia nigra.
- B. Hippocampus.
- C. Nuclei of cranial nerves.
- D. Cortex of large hemispheres.
- E. Reticular formation.

232. During an examination it was determined that a patient had a strong balanced inert type of higher nervous activity according to Pavlov. What temperament according to Hippocrate does this type correspond to?

- A. Melancholic.
- B. Sanguine.
- C. Choleric.
- D. Phlegmatic.
- E. Hysterical.

233. During an examination of a sick old man a motor aphasia was detected. Where is the area of cerebral affection?

- A. In the precentral gyrus.
- B. In the Herschl's gyrus.
- C. In the angular gyrus.
- D. In the postcentral gyrus.
- E. In the Broca's center.

234. During an examination of a sick old man a sensory aphasia was detected. What area of cerebral cortex is damaged?

- A. Wernicke's center.
- B. Postcentral gyrus.
- C. Angular gyrus.
- D. Broca's center.
- E. Precentral gyrus.

235. Psychological research determined: a person has a good ability to adapt quickly to a new situation, good memory, emotional stability, high capacity for work. What type of temperament do these signs belong to?

- A. Sanguine.
- B. Choleric.

- C. Melancholic.
- D. Phlegmatic.
- E. Phlegmatic with the elements of melancholic.

## 6. BLOOD SYSTEM

236. A woman with *III (B), Rh<sup>-</sup>* blood group born a child with *II (A)* blood group. The child is diagnosed with hemolytic disease of newborn as a result of rhesus incompatibility. What blood group is the child's father likely to have?

- A. *II (A), Rh<sup>+</sup>*
- B. *I (0), Rh<sup>+</sup>*
- C. *III (B), Rh<sup>+</sup>*
- D. *I (0), Rh<sup>-</sup>*
- E. *II (A), Rh<sup>-</sup>*

237. A patient with liver disease revealed the decreasing of protrombin level in the blood. It can first of all, result in the impairment of:

- A. The second phase of the coagulator hemostasis
- B. Anticoagulative properties of the blood
- C. Vascular-thrombocytic hemostatic
- D. Fibrinolysis
- E. The first phase of the coagulatory hemostasis

238. A patient with tissue trauma was taken a blood sample for the determination of blood clothing parameters. Specify the right sequence of extrinsic pathway activation.

- A. III – VIII: TF – Xa
- B. III – VIIa – Xa
- C. III – IV – Xa
- D. IV – VIII: TF – Xa
- E. IV – VIIa – Xa

239. Blood sampling for bulk analysis is recommended to be performed on an empty stomach and in the morning. What changes in blood composition can occur if to perform blood sampling after food intake?

- A. Reduced contents of erythrocytes
- B. Increased contents of erythrocytes
- C. Increased contents of leukocytes
- D. Increased plasma proteins
- E. Reduced contents of thrombocytes

**240.** If strong oxidizers get into the bloodstream, a methemoglobin is formed. It is compound, where iron (II) becomes iron (III). What has to be done to save the patient?

- A. He has to be given pure oxygen
- B. He has to be calmed down and put to bed
- C. Respiratory centers have to be stimulated
- D. Interchangeable hemotransfusion has to be done
- E. Patient has to be exposed to the fresh air

**241.** Long-term starvation cure of a patient resulted in diminished ratio of albumines and globulines in plasma. What of the following will be result of this change?

- A. Increase of ESR
- B. Decrease of hematocrit
- C. Increase of hematocrit
- D. Hypercoagulation
- E. Decrease of ESR

**242.** On blood grouping on the system ABO, standard serum of the I and II groups caused erythrocytes agglutination of the examined blood and serum group of the III didn't. What agglutinogens are in these erythrocytes?

- A. A
- B. D and C
- C. B
- D. C
- E. A and B

**243.** Osmotic pressure of a man's blood plasma is 350 mOsmole/L (standard pressure is 300 mOsmole/L). This will cause hypersecretion of the following hormone:

- A. Vasopressin
- B. Adrenocorticotropin
- C. Cortisol
- D. Natriuretic
- E. Aldosteron

**244.** It was established that agglutination of the recipient's blood erythrocytes had been caused by the standard sera from the I and II groups. Serum from the III group as well as anti-Rh serum hadn't provoke any agglutination. Which blood group and rhesus is allowed to be transfused this recipient?

- A.  $A, \beta$  (II) Rh<sup>-</sup>.
- B.  $O, \alpha, \beta$  (I) Rh<sup>+</sup>.
- C. AB (IV) Rh<sup>-</sup>.
- D. B  $\alpha$  (III) Rh<sup>-</sup>.
- E. AB (IV) Rh<sup>+</sup>.

**245.** The concentration of albumins in human blood sample is lower than normal. This leads to edema of tissues. What blood function is damaged?

- A. Maintaining the body temperature
- B. Maintaining the oncotic blood pressure
- C. Maintaining the blood sedimentation system
- D. Maintaining the pH level
- E. All answers are correct

**246.** The concentration of albumins in human blood sample is lower than normal. This leads to edema of tissues. What function of the blood suffered?

- A. Maintaining the oncotic blood pressure
- B. Maintaining the Ph level
- C. Maintaining the body temperature
- D. Maintaining the blood sedimentation system
- E. All answers are correct

**247.** A woman had an acute blood loss after a car accident. What is the main physiological mechanism of stabilizing the internal parameters of the organism after a blood loss?

- A. Releasing blood from the blood depot
- B. Activation of proper skeletal muscles
- C. Inhibition of blood vessels' volume-receptors
- D. Increase of bone marrow activity
- E. Increase of water reabsorption

**248.** A patient who has thrombosis of blood vessels has a lowered activity of anticoagulant blood system. What factor concentration can be lowered?

- A. X-factor
- B. Heparin
- C. Fibrinogen
- D. Prothrombin
- E. Prothrombinase

**249.** Hemophilia is:

- A. Absence of blood clotting
- B. Acceleration of blood clotting
- C. Erythrocyte destruction
- D. Deceleration of blood clotting
- E. Increase of bleeding time

**250.** One has a decreased total erythrocyte number:  $1.5 \times 10^{12}$  in 5 L. It is accompanied with dyspnoea, loss of consciousness, noise in the ears. Why?

- A. Hypoxia
- B. Change in transport function of blood
- C. Decrease of hemoglobin quantity
- D. Poor oxygen capacity of blood
- E. All answers are correct

**251.** If strong oxidizers get into the bloodstream, a methemoglobin is formed. It is a compound, where iron (II) becomes iron (III). What has to be done to save the patient?

- A. +Interchangeable hemotransfusion has to be done
- B. Patient has to be exposed to the fresh air
- C. He has to be calmed down and put to bed
- D. He has to be given pure oxygen
- E. Respiratory centers have to be stimulated

**252.** After a long period of taking antibiotics a patient got allergy – skin redness, vasodilatation and increased inflow of blood. What leucocytes take part in allergy reactions?

- A. Lymphocytes
- B. Basophils
- C. Eosinophils
- D. Monocytes
- E. Neutrophils

**253.** Patient's smear shows, that the number of young neutrophils is 20%, quantity of segment-nucleated neutrophils is 50%. How this leucocyte formula change is called?

- A. Leukemoid reaction
- B. Agranulocytosis
- C. Regenerative shift
- D. Degenerative shift
- E. Leukemic dip

**254.** A patient with blood loss was admitted to a reanimation department. In order to restore the VCB he needs the plasma-substituting solution. Which solution has to be used?

- A. 0,9% NaCl
- B. 0,65% NaCl
- C. 5,0% glucose
- D. 40% glucose
- E. 1,2% KCl

**255.** A woman, 29 years old, pregnant – 11-23 weeks, pregnancy is normal. Mother is Rh+, fetus is Rh-. How normal pregnancy can be explained?

- A. Fetus is not able to produce antibodies
- B. Low concentration of anti-rhesus agglutinins will not cause erythrocytes sticking together
- C. The placental barrier is not permeable for fetal erythrocytes
- D. The placental barrier is not permeable for mother's erythrocytes
- E. The placental barrier is not permeable for anti-rhesus agglutinins

**256.** People who live in highlands have got the increased content of erythrocytes. It can be caused by the increase of the production of certain matter by kidneys. What matter is it?

- A. Rennin.
- B. Erhythropoietin.
- C. Urokinase.
- D. Prostagalndins.
- E. Vitamin D<sub>3</sub>.

**257.** During the examination in the state of rest a healthy person has the number of erythrocytes  $5.65 \times 10^{12}/L$ . The reason for this can be the fact that the examined person is:

- A. A miner.
- B. An inhabitant of highlands.
- C. A student.
- D. An expectant mother.
- E. A responsible ministry worker.

**258.** A man suffering from a kidneys disease has anemia. The most probable reason for anemia can be a disorder in the secretion of a certain matter. What matter is it?



- A. Antidiuretic hormone.
- B. Rennin.
- C. Aldosterone.
- D. Atrial natriuretic factor.
- E. Erythropoietin.

**259.** As a result of poisoning with carbon monoxide a person has got a headache, short breath, vertigo. The decline of the content of what compound in blood resulted in this?

- A. Oxyhemoglobin.
- B. Carboxyhemoglobin.
- C. Carphemoglobin.
- D. Methemoglobin.
- E. Deoxyhemoglobin.

**260.** What compound of hemoglobin will have the inhabitants of the house, where the flue was blocked untimely?

- A. Deoxyhemoglobin.
- B. Carphemoglobin.
- C. Carboxyhemoglobin.
- D. Methemoglobin.
- E. Oxyhemoglobin.

**261.** An expectant mother had her blood type defined. The reaction of agglutination of erythrocytes took place with standard serums of blood groups  $O_{\alpha\beta}$  (I),  $B_{\alpha}$ (III), and did not appear with the serum of blood group  $A_{\beta}$ (II). What group does the blood belong to?

- A.  $B_{\alpha}$  (III).
- B.  $A_{\beta}$  (II).
- C.  $O_{\alpha\beta}$  (I).
- D.  $AB_0$  (IV).
- E. Defining is impossible.

**262.** It was found that the common time of blood coagulation of a 40-year-old man with the weigh of 80 kg was 2 minutes during the stress. The modified index of the time of blood coagulation is the result of a certain hormone influence on blood coagulation. What hormone is it?

- A. Aldosterone.
- B. Cortisol.
- C. Catecholamines.
- D. Somatotropin.

E. Vasopressin.

**263.** In an experiment in two weeks after the narrowing of the kidney arteria of a rabbit the increase of erythrocytes number and hemoglobin is found in its blood as a result of the stimulation of erythropoiesis by erythropoietins. What increases the formation of erythropoietins?

- A. Hypercapnia.
- B. Hypoxemia.
- C. Hyperosmia.
- D. Hypoosmia.
- E. Hypovolemia.

**264.** When defining a blood type according to the AB0 system the agglutination of erythrocytes of the explored blood was stimulated by standard serums of the I and II blood groups and wasn't stimulated by the standard serum of the III blood group. What agglutinogens are in these erythrocytes?

- A. A and B.
- B. A.
- C. B.
- D. C.
- E. D and C.

**265.** During a surgery there was a necessity of massive blood transfusion. A victim's blood type is  $B(III)Rh^-$ . What must be the blood type of a donor?

- A.  $AB(IV)Rh^-$ .
- B.  $O(I)Rh^-$ .
- C.  $A(II)Rh^+$ .
- D.  $B(III)Rh^+$ .
- E.  $B(III)Rh^-$ .

**266.** During a laboratory blood analysis of a 33-year-old patient the reaction of agglutination of erythrocytes is detected with standard serum of the I and the II blood groups. The reactions of agglutinations did not take place with the serum of the III blood group and with antirhesus serum. What type of blood can be transfused if it is necessary to take into consideration the CDE system?

- A.  $B(III)Rh^-$ .
- B.  $O(I)Rh^+$ .

- C. A (II) Rh<sup>+</sup>.
- D. AB (IV) Rh<sup>+</sup>.
- E. AB (IV) Rh<sup>-</sup>.

**267.** In 3 years after the surgery of stomach removal a 45-year-old man has the number of erythrocytes in blood  $2.0 \cdot 10^{12}/L$ , Hb – 85 g/L, color index – 1.27. The violation of the absorption of what vitamin caused the changes of erythropoiesis?

- A. C.
- B. B<sub>12</sub>.
- C. A.
- D. P.
- E. B<sub>6</sub>.

**268.** After applying a tourniquet an examined person has punctuated hemorrhages on the of the forearm. The dysfunction of what blood corpuscles is it connected with?

- A. Basophils.
- B. Erythrocytes.
- C. Thrombocytes.
- D. Neutrophils.
- E. Macrophages.

**269.** When defining a blood type according to AB0 system with the help of standard serum such results was got: agglutination took place with the serums of the I and II blood groups and did not take place with the serum of the III blood group. What is the group of the examined blood?

- A. AB (IV).
- B. A (II).
- C. B (III).
- D. 0 (I).
- E. It is impossible to define.

**270.** When defining a blood type according to AB0 system with the help of standard serums such results were got: agglutination took place with the serums of the I, II, and III blood groups. What is the group of the examined blood?

- A. AB (IV).
- B. A (II).
- C. B (III).
- D. 0 (I).

**E.** It is impossible to define.

**271.** A women's blood test showed the increase of SRE. What is the reason for it?

- A. Physical activity.
- B. Pregnancy.
- C. Loss of blood.
- D. Stress.
- E. Food intake.

**272.** The result of a blood test showed an insignificant increase of the number of leukocytes (leukocytosis) without any change of other indexes. What actions of a patient can be the reason for leukocytosis?

- A. That he slept dally.
- B. Did not have breakfast.
- C. Had breakfast.
- D. Smoked.
- E. Drank 200 ml of water.

**273.** An emergency doctor stated the signs of poisoning by carbon monoxide. What compound became the reason for it?

- A. Carboxyhemoglobin.
- B. Carbhemoglobin.
- C. Methemoglobin.
- D. Deoxyhemoglobin.
- E. Oxyhemoglobin.

**274.** During the last month of pregnancy the content of fibrinogen in blood plasma was twice as much as the norm. What values of SRE are expected?

- A. 3 – 12 mm/h.
- B. 0 – 5 mm/h.
- C. 10 – 15 mm/h.
- D. 5 – 10 mm/h.
- E. 40 – 50 mm/h.

**275.** As a result of a long stay in the mountains at 3, 000 m above the sea level a person had an increase of the oxygen capacity of blood. The increased formation of what substances in the organism is the direct reason for it?

- A. Leukopietins.
- B. Erythropoetins.
- C. Carbhemoglobin.

- D. Catecholamines.
- E. 2,3-di phosphoglycerate.

**276.** As a result of physical activity a person's speed of blood coagulation increased. The increased concentration of what hormone in blood is the reason for this phenomenon?

- A. Somatotropin.
- B. Thyroxin.
- C. Adrenaline.
- D. Cortisol.
- E. Plasmins.

**277.** As a result of a chronic disease of the liver the protein synthesis function of the person is substantially defective. It will result in the decrease of some parameter of homeostasis. What parameter is it?

- A. Density of blood.
- B. Osmotic pressure.
- C. pH.
- D. Oncotic pressure of blood plasma.
- E. Hematocrit index.

**278.** A patient has got sharp decrease of the content of a albumins in blood plasma and oncotic pressure. What phenomenon will be the result of these changes?

- A. Decrease of SRE.
- B. Decrease of diuresis.
- C. Increase of blood volume.
- D. Edemas.
- E. Increase of blood density.

**279.** A child has helminthes. What changes in the peripheral blood will be observed?

- A. Monocytosis.
- B. Leukocytosis.
- C. Neutrophilia.
- D. Basophilia.
- E. Eosinophilia.

**280.** After applying a tourniquet an examined person has got punctuated hemorrhages. The dysfunction of what blood cells is it connected with?

- A. Thrombocytes.
- B. Eosinophils.

- C. Monocytes.
- D. Lymphocytes.
- E. Neutrophils.

**281.** As a result of physical activity the oxygen capacity of blood of a person increased from 180 to 200 ml. what index's increase during the physical activity is the principal reason for this phenomenon?

- A. Hemoglobin content in the unit of blood volume.
- B. Diffusion capacity of lungs.
- C. Oxygen content in alveoli.
- D. Affinity of hemoglobin with oxygen.
- E. Minute respiratory volume.

**282.** Trying to lose weight a woman limited the amount of products in her dietary intake. Three months later she had edemata, diuresis increased. The deficit of what components in food is the reason for it?

- A. Mineral substances.
- B. Fats.
- C. Carbohydrates.
- D. Vitamins.
- E. Proteins.

**283.** After running, possible changes in a common blood analysis could be found?

- A. Anemia.
- B. Leukopenia.
- C. Leukocytosis.
- D. Increase of SRE.
- E. Increase of the Color Index.

**284.** After a long-term starvation a patient got edemata of tissues. What is the reason for this phenomenon?

- A. Reduction of the oncotic pressure of blood plasma.
- B. Increase of the osmotic pressure of blood plasma.
- C. Reduction of the osmotic pressure of blood plasma.
- D. Reduction of hydrostatic blood pressure.
- E. Increase of oncotic blood pressure.

**285.** At a clinic a 49-year-old man is being observed. He is suffering from the substantial

increase of the time of blood coagulation, gastroenteric bleeding, and subcutaneous hemorrhages. Such symptoms can be explained by the lack of a certain vitamin. What vitamin is it?

- A. E.
- B. B<sub>1</sub>.
- C. PP.
- D. H.
- E. K.

**286.** A 40-year-old man with a removed kidney has got symptoms of anemia. What is the reason for such symptoms?

- A. Lack of iron.
- B. Intensive destruction of erythrocytes.
- C. Decline of synthesis of erythropoietins.
- D. Lack of vitamin B<sub>12</sub>.
- E. Lack of folic acid.

**287.** A hypertensive solution of glucose was intravenously infused to a patient. How will it enhance the water motion?

- A. The changes of water motion will not be present.
- B. From intercellular liquid to capillaries.
- C. From intercellular liquid to cell.
- D. From capillaries to intercellular liquid.
- E. From cells to intercellular liquid.

**288.** A 25-year-old woman, pregnant for the third time, got into a clinic with a threat of miscarriage. What combination of her Rh-factor and the fetus' Rh-factor may be the reason for it?

- A. +Rh<sup>-</sup> of the mother and Rh<sup>+</sup> of the fetus.
- B. Rh<sup>-</sup> of the mother and Rh<sup>-</sup> of the fetus.
- C. Rh<sup>+</sup> of the mother and Rh<sup>-</sup> of the fetus.
- D. Rh<sup>+</sup> of the mother and Rh<sup>+</sup> of the fetus.
- E. Defining is impossible.

**289.** When defining a blood type according to the AB0 system the agglutination of erythrocytes of the examined blood was caused by standard serums of the I and II blood groups and wasn't caused by the serum of the III blood group. What blood type is it?

- A. O<sub>αβ</sub> (I).

- B. A<sub>β</sub> (II).
- C. AB<sub>0</sub> (IV).
- D. B<sub>α</sub> (III).
- E. It is impossible to define.

**290.** A patient with chronic glomerulonephritis has disorders in the incretory function of the kidneys. The deficit of what blood cells observed?

- A. Thrombocytes.
- B. Leukocytes.
- C. Erythrocytes.
- D. Leukocytes and thrombocytes.
- E. Erythrocytes and leukocytes.

**291.** A woman with the blood type AB (IV) Rh<sup>-</sup>, who has a 3-year-old child with the blood type AB (IV) Rh<sup>+</sup>, was taken to a hospital with posttraumatic bleeding. It is necessary to transfuse blood. Which of the following blood types is it possible to transfuse?

- A. AB(IV) Rh<sup>-</sup>.
- B. O(I) Rh<sup>-</sup>.
- C. A(II) Rh<sup>+</sup>.
- D. A(II) Rh<sup>-</sup>.
- E. AB(IV) Rh<sup>+</sup>.

**292.** During a long stay in the mountains climbers have an increase of the number of erythrocytes (erythrocytosis). The influence of what biologically active substance caused these changes?

- A. Cortisol.
- B. Rennin.
- C. Erythropoietin.
- D. Adrenaline.
- E. Testosterone.

**293.** Laboratory blood analysis of a 44-year-old patient showed that the content of proteins in blood plasma is 40 g/l. How does it influence the transcapillary exchange of water.

- A. The exchange does not change.
- B. Filtration and reabsorption are increased.
- C. Filtration and reabsorption are decreased.
- D. Filtration is decreased, reabsorption is increased.
- E. Filtration is increased, reabsorption is decreased.

**294.** Punctata hemorrhage was found out in the patient after application of a tourniquet. With disfunction of what blood cells is it connected?

- A. Platelets
- B. Eosinophiles
- C. Monocytes
- D. Lymphocytes
- E. Neutrophiles

**295.** The B cells of endocrine portion of pancreas are selectively damaged by alloxan poisoning. How will it be reflected in blood plasma?

- A. The level of sugar decreases
- B. The content of fibrinogen decrease
- C. The content of sugar increases
- D. The content of globulins decreases
- E. The content of albumins decreases

**296.** At the laboratory experiment the leukocyte culture was mixed with staphylococci. Neutrophile leukocytes engulfed and digested bacterial cells. These processes are termed:

- A. Pinocytosis
- B. Phagocytosis
- C. Diffusion
- D. Facilitated diffusion
- E. Osmosis

**297.** The concentration of albumins in human blood sample is lower than normal. This leads to edema of tissues. What blood function is damaged?

- A. Maintaining the blood sedimentation system
- B. Maintaining the Ph level
- C. Maintaining the body temperature
- D. Maintaining the oncotic blood pressure
- E. All answers are correct

**298.** Patient with diabetes mellitus experienced loss of consciousness and convulsions after an injection of insulin. What might be the result of biochemical blood analysis for concentration of sugar?

- A. 10,0 mmol/L
- B. 8,0 mmol/L
- C. 5,5 mmol/L

- D. 3,3 mmol/L
- E. 1,5 mmol/L

**299.** Donor skin transplantation was performed to a patient with extensive burns. On the 8-th day the graft became swollen and changed colour; on the 11-th day graft rejection started. What cells take part in this process?

- A. T-lymphocytes
- B. Erythrocytes
- C. Basophils
- D. Eosinophils
- E. B-lymphocytes

**300.** A teenager was irradiated with high radiation dose that resulted in serious damages of lymphoid system, lysis of many lymphocytes. Restoration of normal hemogram is possible due to the functioning of the following gland:

- A. Thyroid
- B. Thymus
- C. Liver
- D. Pancreas
- E. Adrenal

**301.** 2 years ago a patient underwent resection of pyloric part of stomach. He complains of weakness, periodical dark shadows beneath his eyes, dyspnea. In blood: Hb - 70 g/l, erythrocytes -  $3,0 \cdot 10^{12}/l$ , colour index - 0,7. What changes of erythrocytes in blood smears are the most typical for this condition?

- A. Macrocytes
- B. Megalocytes
- C. Schizocytes
- D. Ovalocytes
- E. Microcytes

**302.** Packed cell volume of a man was 40% before the trauma. What packed cell volume will be observed 24 hours after blood loss of 750 ml?

- A. 30%
- B. 40%
- C. 45%
- D. 50%
- E. 55%

**303.** A 16 year old boy after an illness has diminished function of protein synthesis in liver as a result of vitamin *K* deficiency. It will cause disturbance of:

- A. Erythropoietin secretion
- B. Erythrocyte sedimentation rate
- C. Anticoagulant generation
- D. Blood coagulation
- E. Osmotic blood pressure

**304.** A blood drop has been put into a test tube with 0,3% solution of *NaCl*. What will happen to erythrocytes?

- A. Osmotic haemolysis
- B. Shrinkage
- C. Mechanical haemolysis
- D. Any changes will be observed
- E. Biological haemolysis

**305.** A boy has I (*IOIO*) blood group and his sister has IV(*IAIB*) blood group. What blood groups do their parents have?

- A. II (*IAIO*) and III (*IBIO*)
- B. II (*IAIA*) and III (*IBIO*)
- C. I (*IOIO*) and IV (*IAIB*)
- D. III (*IBIO*) and IV (*IAIB*)
- E. I (*IOIO*) and III (*IBIO*)

**306.** After a surgery a 36-year-old woman was given an intravenous injection of concentrated albumin solution. This has induced intensified water movement in the following direction:

- A. From the cells to the intercellular fluid
- B. From the intercellular fluid to the cells
- C. From the intercellular fluid to the capillaries
- D. From the capillaries to the intercellular fluid
- E. No changes of water movement will be observed

**307.** A patient suffers from the hemorrhagic syndrome that shows itself in frequent nasal bleedings, posttraumatic and spontaneous intracutaneous and intra-articular hemorrhages. After a laboratory study a patient was diagnosed with the type B hemophilia. This disease is provoked by the deficit of the following factor of blood coagulation:

- A. VIII

- B. IX
- C. XI
- D. V
- E. VII

**308.** Blood group of a 30 year old man was specified before an operation. His blood is Rh-positive. Reaction of erythrocyte agglutination was absent with standard sera of  $O\alpha\beta$  (I),  $A\beta$  (II),  $B\alpha$  (III) groups. The blood under examination is of the following group:

- A.  $+O\alpha\beta$  (I)
- B.  $A\beta$  (II)
- C.  $B\alpha$  (III)
- D. AB (IV)
- E. –

**309.** Examination of a pregnant woman revealed twice as much concentration of fibrinogen in blood plasm. What ESR can this woman have?

- A. 0-5 mm/h
- B. 10-15 mm/h
- C. 2-12 mm/h
- D. 5-10 mm/h
- E. 40-50 mm/h

**310.** A 5 year old child is ill with measles. Blood analysis revealed increase of total number of leukocytes up to  $13 \cdot 10^9/l$ . Leukogram: basophils - 0, eosinophils - 1, myelocytes - 0, juvenile neutrophils - 0, band neutrophils - 2, segmented neutrophils - 41, lymphocytes - 28, monocytes - 28. Name this phenomenon:

- A. Lymphocytosis
- B. Agranulocytosis
- C. Monocytosis
- D. Eosinopenia
- E. Neutropenia

**311.** After a tourniquet application a patient was found to have petechial haemorrhages. The reason for it is the dysfunction of the following cells:

- A. Platelets
- B. Eosinophils
- C. Monocytes
- D. Lymphocytes

## E. Neutrophils

**312.** After implantation of a cardiac valve a young man constantly takes indirect anticoagulants. His state was complicated by hemorrhage. What substance content has decreased in blood?

- A. Haptoglobin
- B. Prothrombin
- C. Heparin
- D. Creatin
- E. Ceruloplasmin

**313.** Hemoglobin catabolism results in release of iron which is transported to the bone marrow by a certain transfer protein and used again for the synthesis of hemoglobin. Specify this transfer protein:

- A. Ceruloplasmin
- B. Transcobalamin
- C. Haptoglobin
- D. Transferrin (siderophilin)
- E. Albumin

**314.** A pregnant woman underwent ABO blood typing. Red blood cells were agglutinated with standard sera of the I and II blood groups, and were not agglutinated with the III group serum. What is the patient's blood group?

- A. 0(I)
- B. A(II)
- C. B(III)
- D. AB(IV)
- E. –

**315.** When defining blood group according to the ABO system, using salt solutions of monoclonal antibodies, agglutination didn't occur with any of the solutions. What blood group is it?

- A. +0 (I)
- B. A (II)
- C. B (III)
- D. AB (IV)
- E. –

**316.** A patient has severe blood loss caused by an injury. What kind of dehydration will be observed in this particular case?

- A. Normosmolar
- B. Hyposmolar
- C. Hyperosmolar
- D. Iso-osmolar
- E. –

**317.** A man weighs 80 kg, after long physical activity his circulating blood volume is reduced down to 5,4 l, hematocrit makes up 50%, whole blood protein is 80 g/l. These blood characteristics are determined first of all by:

- A. Water loss with sweat
- B. Increased number of erythrocytes
- C. Increased protein concentration in plasma
- D. Increased circulating blood volume
- E. Increased diuresis

**318.** A person lost consciousness in a car salon, where he had been waiting for a friend with a turned on engine for a long time. What compound of hemoglobin was found in his blood?

- A. Methemoglobin.
- B. Deoxyhemoglobin.
- C. Carbhemoglobin.
- D. Carboxyhemoglobin.
- E. Oxyhemoglobin.

**319.** What type of hemoglobin provides greater oxygen capacity of fetus's blood than that of mother's?

- A. Hb F.
- B. Hb A.
- C. Hb H.
- D. Hb S.
- E. Hb P.

## 7. CIRCULATORY SYSTEM

**320.** A 2-year-old child convulsion as a result of lowered concentration of calcium ions in blood plasma. Function of what structure is decreased?

- A. Pineal gland
- B. Thymus
- C. Hypophysis
- D. Adrenal cortex
- E. Parathyroid glands

**321.** ECG study showed that the T-waves were positive in the standard extremity leads, their amplitude and duration was normal. The right conclusion would be that the following process runs normally in the heart ventricles:

- A. Excitement
- B. Contraction
- C. Relaxation
- D. Depolarization
- E. Repolarization

**322.** An isolated cell of human heart automatically generates excitation impulses with frequency 60 times per minute. What heart structure was this cell obtained from?

- A. Atrioventricular node
- B. His' bundle
- C. Ventricle
- D. Sinoatrial node
- E. Atrium

**323.** After the trauma, the patient's right *n. vagus* was damaged. Which violation of the cardiac activity is possible in this case?

- A. Violation of conductivity in the right auricle
- B. Violation of the automatism of a atrioventricular node
- C. Block of a conductivity in the atrioventricular node
- D. Arrhythmia
- E. Violation of the automatism of a Kiss-Fleck node

**324.** A 63-year-old man with collapse symptoms was delivered to the emergency hospital. A doctor chose noradrenaline in order to prevent hypotension. What is the action mechanism of this medication?

- A. Activation of serotonin receptors
- B. Activation of  $\beta$ -adrenoreceptors
- C. Block of M-cholinoreceptors
- D. Activation of  $\alpha_1$ -adrenoreceptors
- E. Activation of dopamine receptors

**325.** A 49-year-old woman consulted a doctor about heightened fatigue and dyspnea during physical activity. ECG: heart rate is 50 per min, PQ is extended, QRS is unchanged, and P- wave

quantity exceeds quantity of QRS complexes. What type of arrhythmia does the patient have?

- A. Atrioventricular block
- B. Sinoatrial block
- C. Sinus bradycardia
- D. Ciliary arrhythmia
- E. Extrasystole

**326.** A patient has extrasystole. ECG shows no P wave, QRS complex is deformed; there is a full compensatory pause. What extra systoles are these?

- A. Sinus
- B. Atrioventricular
- C. –
- D. Ventricular
- E. Atrial

**327.** A peripheral segment of vagus nerve on a dog's neck was being stimulated in course of an experiment. The following changes of cardiac activity could be meanwhile observed:

- A. Enhancement of atrioventricular conduction
- B. Increased excitability of myocardium
- C. Heart rate and heart force amplification
- D. Heart rate fall
- E. Heart hurry

**328.** A person has steady HP not exceeding 40 bpm. What is the pacemaker of the heart rhythm in this person?

- A. Branches of His' bundle
- B. Sinoatrial node
- C. Atrioventricular node
- D. Purkinje' fibers
- E. His' bundle

**329.** During ultrasound examination of the heart the doctor observed the leaves of the mitral valve. What happens to them during the systole?

- A. They turn inside the cavity of the ventricle
- B. They clasp with the walls of the atrium
- C. They clasp with the walls of the vessels
- D. They turn inside the cavity of the atrium
- E. They close up covering the lumen of the orifice



**330.** Electrocardiogram of a 45-year-old man showed absence of P-wave in all the leads. What part of the conducting system is blocked?

- A. Common branch of the bundle of His
- B. Sinu-atrial node
- C. Branches of the bundle of His
- D. Atrioventricular node
- E. Purkinje's fibres

**331.** Examination of a man established that cardiac output equaled 3500 ml, systolic output – 50 ml. What is the man's heart rate per minute?

- A. 80
- B. 50
- C. 90
- D. 70
- E. 60

**332.** Examination of an isolated cardiomyocyte revealed that it didn't generate excitation impulses automatically. This cardiomyocyte was obtained from:

- A. Atrioventricular node
- B. Purkinje's fibers
- C. His' bundle
- D. Ventricles
- E. Sinoatrial node

**333.** On examination of the person it was revealed that minute volume of heart is 3500 mL, systolic volume is 50 mL. What is the frequency of cardiac contraction?

- A. 60 bpm
- B. 70 bpm
- C. 50 bpm
- D. 90 bpm
- E. 80 bpm

**334.** Person has stable HR, not more than 40 bpm. What is the pacemaker of the heart rhythm in this person?

- A. His' bundle
- B. Purkinje' fibers
- C. Atrioventricular node
- D. Branches of His' bundle
- E. Sinoatrial node

**335.** Short-term physical activity resulted in reflex amplification of heart rate and raise of systemic arterial pressure. What receptors activation was the main cause of pressor reflex realization?

- A. Vascular volume receptors
- B. Vascular baroreceptors
- C. Hypothalamus thermoreceptors
- D. Vascular chemoreceptors
- E. Proprioceptors of active muscles

**336.** The electrocardiogram analysis demonstrated that the duration of man's heart cycle is 1 sec. What is the heart rate per minute?

- A. 50
- B. 100
- C. 60
- D. 70
- E. 80

**337.** The speed of excitement conduction through the atrioventricular node in a healthy adult is 0,02-0,05 m.p.s. What does atrioventricular delay supply?

- A. Simultaneous contraction of both ventricles
- B. Sufficient force of ventricles contraction
- C. Sufficient force of atria contraction
- D. Sequence of atria and ventricles contraction
- E. Simultaneous contraction of both atria

**338.** The heart rate and the systemic arterial blood pressure of a man have increased due to voluntary respiratory delay for 40 sec. Realization of what regulation mechanism caused these changes?

- A. Unconditioned sympathetic reflexes
- B. Conditioned sympathetic reflexes
- C. –
- D. Conditioned parasympathetic reflexes
- E. Unconditioned parasympathetic reflexes

**339.** During an experiment vagus branches that innervate heart are being stimulated. This has stopped conduction of excitement from the atria to the ventricles. The reasons for it are electrophysical changes in the following structures:

- A. Atria

- B. Atrioventricular node
- C. Ventricles
- D. Sinoatrial node
- E. His' bundle

**340.** In a patient with transplanted heart stroke volume, heart rate and minute volume increased on physical exert. What is the first mechanism to provide this reaction?

- A. Extracardiac
- B. Hypothalamus
- C. Cortex
- D. Intracardiac
- E. Basal ganglia

**341.** Electrocardiogram of a 45-year-old man showed absence of P-wave in all the leads. The block of what part of the conducting system can it be an evidence of?

- A. Atrioventricular node
- B. Sinuatrial node
- C. Common branch of the bundle of His
- D. Branches of the bundle of His
- E. Purkinje's fibres

**342.** In a patient the velocity of impulse conduction along the atrioventricular node is decreased. This will cause

- A. Decrease in heart rate
- B. Increase in P-wave amplitude
- C. Segment ST widening
- D. +Interval PQ prolongation
- E. QRS complex widening

**343.** Pulse pressure is 50 mm Hg, and systolic pressure is 120 mm Hg. What is the diastolic pressure?

- A. +70 mm Hg
- B. 50 mm Hg
- C. 60 mm Hg
- D. 90 mm Hg
- E. 170 mm Hg

**344.** Mean arterial blood pressure is 100 mm Hg, and total peripheral resistance is 20 mm Hg/min/L. What is the total blood flow?

- A. 1 L/min
- B. 2 L/min

- C. 5 L/min
- D. 10 L/min
- E. 50 L/min

**345.** Functioning of certain structures of an isolated heart is stopped as the result of their cooling. What structure was cooled down if the heart stops and then starts beating at two times' lower heart rate?

- A. Sinuatrial node
- B. Atrioventricular node
- C. Common branch of the bundle of His
- D. Branches of the bundle of His
- E. Purkinje's

**346.** In a 30-year-old lady the amount of blood that flows along the blood vessels is 5 l/per minute. What amount of blood flows along pulmonary blood vessels?

- A. 3,75L
- B. 5 L
- C. 2,5 L
- D. 2 L
- E. 1,5 L

**347.** On an isolated heart of rabbit calcium channels of cardiac cells were blocked. How will it influence heart work?

- A. Heart stops in systole
- B. Heart rate increases
- C. Heart rate decreases
- D. Heart stops in diastole
- E. Heart rate and stroke volume decrease

**348.** In a patient with hyperfunction of thyroid gland electrocardiogram showed tachycardia. Analyses of what segments of ECG proves tachycardia

- A. P-Q segment
- B. P-Q interval
- C. P-T interval
- D. R-R interval
- E. QRS complex

**349.** Stroke volume is 70 ml, and heart rate is 80 bpm. What is the cardiac output?

- A. 5600 ml/min
- B. 1000 ml/min

- C. 5000 ml/min
- D. 5600 ml
- E. 6400 ml

**350.** Capillary hydrostatic pressure is 35 mm Hg, capillary colloidal osmotic pressure is 28 mm Hg, and interstitial fluid colloidal osmotic pressure is 3 mm Hg. The net filtration or absorption pressure is:

- A. 4 mm Hg (absorption).
- B. 4 mm Hg (filtration).
- C. 10 mm Hg (absorption)
- D. 10 mm Hg (filtration).
- E. 7 mm Hg (filtration)

**351.** An individual's blood pressure is measured as 120/90 mm Hg. What is the mean arterial pressure?

- A. 30 mm Hg
- B. 90 mm Hg
- C. 120 mm Hg
- D. 100 mmHg
- E. 210 mm Hg

**352.** In a healthy adult the probe of heart cavities and big vessels is performed. Where to is the probe inserted if the pressure changed from 0 to 120 mm Hg during the heart cycle?

- A. Aorta
- B. Right ventricle
- C. Left ventricle
- D. Pulmonary artery
- E. Atrium

**353.** All heart valves are closed in the phase of heart cycle:

- A. Isometric contraction
- B. Asynchronic contraction
- C. Fast ejection
- D. Slow ejection
- E. Active filling

**354.** The patient takes drugs that block  $Ca^{2+}$ -channels. Which processes in the myocardium do they act on?

- A. Excitation
- B. Conductivity
- C. Electromechanical interface

- D. Automatism
- E. Mastering the rhythm

**355.** The calcium canals of cardiomyocytes have been blocked on an isolated heart of a rabbit. What changes in a heart activity happen as a result?

- A. Decreased heart beat rate
- B. Decreased force of the contraction
- C. Decreased rate and force of heart beat
- D. Heart stops in systole
- E. Heart stops in diastole

**356.** During the emotional excitation, the heart beat rate of a 30-year-old person reaches 112 beats per minute. Which part of a heart conductive system provides these changes?

- A. Purkinje fibres
- B. Kiss-Fleck node
- C. Hiss bundle
- D. Atrio-ventricular node
- E. Hiss bundle branches

**357.** The heart beat rate of an adult male after the disease is 40 beats per minute. Which part of a heart conductive system provides such rate?

- A. +Atrio-ventricular node
- B. Kiss-Fleck node
- C. Hiss bundle
- D. Purkinje fibers
- E. Bahaman bundle

**358.** After the trauma, the patient's right n. va-gus was damaged. Which violation of a cardiac activity is possible in this case?

- A. Violation of the automatism of a Kiss-Fleck node
- B. Violation of the automatism of a atrio-ventricular node
- C. Violation of conductivity in the right auricle
- D. Block of a conductivity in the atrio-ventricular node
- E. Arrhythmia

**359.** During the diastole the blood flow in ventricle sometimes causes:

- A. The first tone

- B. The second tone
- C. The sound of blood ejection
- D. Noise made by the heart emission
- E. The third tone

**360.** Duration of the 1st heart tone:

- A. 7-8 sec
- B. 8-9 sec
- C. 9-10sec
- D. 10-11 sec
- E. 11-12 seconds

**361.** Where is the mitral valve heard?

- A. At the basis of xiphoid process
- B. In the 5th intercostal space 1-1.5 cm to the right of media-clavicular line
- C. In the 2nd intercostal space on the left edge of the sternum
- D. In the 2nd intercostal space on the right edge of the sternum
- E. In the 5th intercostal space on the level of anterior axillary line

**362.** Normal duration of a QRS complex:

- A. 0.08-0.1
- B. 0.02-0.05
- C. 0.06-0.09 sec
- D. 0.04-0.12
- E. There is no true answer

**363.** Due to the arrhythmogenic influence of the stress-reaction on the heart the normal sequence of the waves on ECG was violated. Mark the correct sequence of waves on ECG:

- A. PQRST
- B. QPRST
- C. RSTPQ
- D. TSRPQ
- E. QPSTR

**364.** The heart makes single contractions due to:

- A. The prolonged phase of absolute refractory
- B. The contractive phase of relative refractory
- C. Exaltation phase
- D. The contractive phase of absolute refractory
- E. All answers are true

**365.** A student, 18 years old. During physical activity redistribution of blood flow in organism is reographically registered. In the vessels of what organ did the blood flow increase most of all?

- A. Liver.
- B. Skeletal muscles.
- C. Cerebrum.
- D. Kidneys.
- E. Digestive tract.

**366.** When analysis an ECG it is necessary to define the pacemaker of the heart. On the basis of the measuring of what index is it possible to do?

- A. Duration of waves.
- B. Amplitude of waves.
- C. Direction of waves.
- D. Duration of R-R interval.
- E. Duration of QRS complex.

**367.** As a result of arbitrary breath-holding during 40 s. the frequency of heart beats and system arteriotony increased. The realization of what mechanisms of regulation caused the changes of indexes?

- A. Reflexes.
- B. Unconditional parasympathetic reflexes.
- C. Conditional sympathetic reflexes.
- D. Conditional parasympathetic reflexes.
- E. Unconditional sympathetic reflexes.

**368.** In the course of an experiment on animals it was stated that arteriotony depends on the size of vascular resistance. In what vessels is it the greatest?

- A. Aorta.
- B. Arteries.
- C. Arterioles.
- D. Veins.
- E. Capillaries.

**369.** A 40 y. o. man the rise of arteriotony was diagnosed after emotional excitement. What is the possible reason for this effect?

- A. Hyperpolarization of cardiomyocytes.
- B. Dilatation of arterioles.
- C. Decrease of frequency of heart beats.

- D.** Increase of tone of sympathetic part of the nervous system.
- E.** Increase of tone of parasympathetic part of the nervous system.

**370.** In an experiment during the study of the processes of the excitation of cardiomyocytes it was determined that in the phase of rapid depolarization sodium ions can move additionally. What channels can they additionally move through?

- A.** Calcium.
- B.** Potassium.
- C.** Choric.
- D.** Magnesium.
- E.** Lithium.

**371.** During physical activity the minute volume of blood of a man with a transplanted heart increased. What mechanism of regulation provides these changes?

- A.** Sympathetic conditional reflexes.
- B.** Sympathetic unconditional reflexes.
- C.** Parasympathetic unconditional reflexes.
- D.** Catecholamines.
- E.** Parasympathetic conditional reflexes.

**372.** Analysis the ECG it was stated that in the II standard lead from the extremities the T waves are positive, their amplitude and duration are normal. What process takes place in the ventricles of the heart normally?

- A.** Exsitation.
- B.** Depolarization.
- C.** Repolarization.
- D.** Contraction.
- E.** Relaxation.

**373.** Working up atypical cardiomyocytes with the biologically active substance the increase of their membrane potential is registered due to the increased permeability of potassium ions. What substance influenced the cardiomyocytes?

- A.** Thyroxin.
- B.** Adrenaline.
- C.** Noradrenaline.
- D.** Acetylcholine.
- E.** Atrial natriuretic factor.

**374.** A woman of 30 y. o. her minute volume of blood passed through her lungs' vessels in 1 minute?

- A.** 1.5 L.
- B.** 3.75 L.
- C.** 2.5 L.
- D.** 2 L.
- E.** 5 L.

**375.** In a month after a surgical narrowing of the kidney arteria of a rabbit the substantial increase of system arteriotony is registered. A certain substance influenced the change of the pressure of the animal. What sort of substance is it?

- A.** Angiotensin II.
- B.** Vasopressin.
- C.** Adrenaline.
- D.** Noradrenaline.
- E.** Serotonine.

**376.** Immediately after the transition from horizontal position to vertical one the frequency of heart beats of a man increased by 15 per minute. What mechanisms of regulation mainly predetermine this change?

- A.** Conditional sympathetic reflexes.
- B.** Unconditional sympathetic reflexes.
- C.** Conditional and unconditional sympathetic reflexes.
- D.** Catecholamines.
- E.** Sympathetic reflexes and catecholamines.

**377.** After long physical activity the volume of circulatory blood of a man with body weight of 0 kg decreased. Hematocrit value was 50%, general blood protein – 80 g/L. the result of what process are such indexes of blood?

- A.** Loss of water with sweat.
- B.** Increase of quantity of erythrocytes.
- C.** Increase of proteins content in blood plasma.
- D.** Increase of oncotic pressure of blood plasma.
- E.** Increase of diuresis.

**378.** Calcium canals of cardiomyocytes were partly blocked on the isolated heart of a rabbit. What changes in cardiac activity will take place as a result of it?

- A.** Decrease of the frequency of contractions.

- B. Decrease of the frequency and force of contraction.
- C. Decrease of the force of contractions.
- D. Cardiac arrest in diastole.
- E. Cardiac arrest in systole.

**379.** Physical activity of a healthy man caused moderate of diastolic pressure. What is the reason for such phenomenon?

- A. Enhancement of heart work.
- B. Decline of the tone of vessels in muscle.
- C. Decrease of the elasticity of vessels.
- D. Decrease of the volume of circulatory blood.
- E. Increase of the resistance of vessels.

**380.** In an experiment on an animal a cardiac cycle is examined. All valves of heart are closed. What phase does it correspond to?

- A. Isometric contraction.
- B. Asynchronous contraction.
- C. Protodiastolic period.
- D. Rapid filling.
- E. Slow filling.

**381.** A patient has got a diminishing speed contraction of experiment on an atrioventricular node. The increase of the duration of a certain index will be registered on the ECG. What index is it?

- A.  $R - R$  interval.
- B. Wave  $P$ .
- C.  $P - Q$  interval.
- D.  $QRS$  complex.
- E.  $ST$  segment.

**382.** The catheterization of the chambers and large vessels of a healthy grown-up is made. Where is the probe, if during a cardiac cycle the changes of pressure are registered from 0 to 120 mm?

- A. In the pulmonary artery.
- B. In the right ventricle.
- C. In the aorta.
- D. In the left ventricle.
- E. In the auricle.

**383.** In an experiment on a dog a peripheral part of the vagus nerve on the neck is irritated. What changes of cardiac activity take place?

- A. Increase of excitability of myocardium.
- B. Increase of the force of contraction.
- C. Increase of atrioventricular conduction.
- D. Increase of the frequency and force of contractions.
- E. Decrease of the frequency of contraction.

**384.** In an experiment an isolated heart of a dog was perfused with the solution overconcentration of calcium chloride. What changed in the work of the heart took place?

- A. Decrease of the frequency of contractions.
- B. Decrease of the force of contractions.
- C. Increase of the frequency of contractions.
- D. Increase of the frequency and force of contractions.
- E. Decrease of the frequency and force of contractions.

**385.** The ECG a patient showed the increase of the duration of  $T$  wave. The increasing of this index was caused by the diminishing speed of certain processes in ventricles. What processes are there?

- A. Depolarization and repolarization.
- B. Repolarization.
- C. Depolarization.
- D. Contraction.
- E. Relaxation.

**386.** What change in the isolated heart of a frog can be expected after introducing surplus amount of calcium chloride into perfusion solution?

- A. Decrease of the force of contractions.
- B. Increase of the frequency and force of contractions.
- C. Increase of the frequency of contractions.
- D. Increase of the force of contractions.
- E. Cardiac arrest in diastole.

**387.** The ECG of a patient showed the increase of the duration of the  $Q - T$  interval. The increasing of this index was caused by the diminishing speed of certain processes in the ventricles. What processes are there?

- A. Depolarization.
- B. Depolarization and repolarization.

- C. Repolarization.
- D. Contraction.
- E. Relaxation.

**388.** Before a competition a sportsman has got the increase of arteriotony and frequency of heart beats. By the influence of what parts of the CNS is it possible to explain these hemispheres.

- A. Cortex of large hemispheres.
- B. Medulla oblongata.
- C. Mecencephalon.
- D. Diencephalon.
- E. Hypothalamus.

**389.** What compensatory mechanisms arise when a healthy person passes from a lying position to a standing position?

- A. Decline of diastolic arteriotony.
- B. Decrease of the frequency of heartbeats.
- C. Increase of the frequency of heartbeats.
- D. Decrease of the tone of vessels.
- E. Decrease of common peripheral resistance.

**390.** The speed of the conduction of excitement through the atrioventricular node of a healthy grown-up is 0.02 – 0.05 m/sec. What process does the atrioventricular delay provide?

- A. Sufficient force of auricle contraction.
- B. Simultaneity of the contraction of both auricles.
- C. Simultaneity of the contraction of both ventricles.
- D. Sequence of the contraction of auricles and ventricles.
- E. Sufficient force of the contraction of ventricles.

**391.** What effect will the electrostimulation of baroreceptors of carotid sinus lead to in an experiment on a dog?

- A. Expansion of vessels.
- B. Vasoconstriction.
- C. Increase of the frequency of heartbeats.
- D. Increase of the minute volume of blood.
- E. Increase of systolic volume.

**392.** The frequency of heartbeats of a man is constantly at the level of 40 per min. What structure is the conductor of the rhythm?

- A. His'bundle.
- B. Sinoatrial node.
- C. Atrioventricular node.
- D. Crura of His' bundle.
- E. Pukinje's fibres.

**393.** A reflex cardiac arrest happened during a surgical operation on the organs of abdominal cavity. Where is the center of this reflex located?

- A. In the diencephalon.
- B. In the spinal cord.
- C. In the mesencephalon.
- D. In the medulla oblongata.
- E. In the cortex of large hemispheres.

**394.** During the research of the isolated cardiomyosyte it was determined that it doesn't generate the impulses of excitation automatically. What structure is the cardiomyocyte got from?

- A. From the atrioventricular node.
- B. From the sinoatrial node.
- C. From the ventricles.
- D. From the His' bundle.
- E. From the Purkinje's fibres.

**395.** In an experiment on a mammal by the destruction of a certain heart structure the conduction of experiment from atrium to ventricles is destroyed?

- A. Crura of His' bundle.
- B. Sinoatrial node.
- C. His' bundle.
- D. Atrioventricular node.
- E. Purkinje's fibres.

**396.** While examining a person it was determined that his minute volume of blood is 3500 ml, systolic volume – 50 ml. What frequency of heart beats does this man have?

- A. 90 per min.
- B. 60 per min.
- C. 50 per min.
- D. 80 per min.
- E. 70 per min.

- 397.** When analyzing an ECG it is determined that the duration of the cardiac cycle of a person is 1 sec. What frequency of heartbeats per minute does the person have?
- A. 60.
  - B. 50.
  - C. 70.
  - D. 80.
  - E. 100.
- 398.** It is necessary to examine the elasticity of a person's large arterial vessels. Which of the instrumental methods of research is it better to use for this purpose?
- A. Electrocardiography.
  - B. Sphygmography.
  - C. Phonocardiography.
  - D. Phlebography.
  - E. Vectorcardiography.
- 399.** It is necessary to examine the state of the person's heart valves. Which of the instrumental methods of research is it better to use for this purpose?
- A. Sphygmography.
  - B. Electrocardiography.
  - C. Phonocardiography.
  - D. Phlebography.
  - E. Probing of vessels.
- 400.** The processes of the repolarization in the myocardium of the ventricles of an examined patient are defective. The violation of amplitude, configuration, duration of what wave will it lead to?
- A. *S*.
  - B. *Q*.
  - C. *R*.
  - D. *T*.
  - E. *P*.
- 401.** In the course of an experiment on a rabbit a bandaging of the kidney artery was done. As a result of it the level of arteriotony increased considerably. The increase of the secretion of what substance caused it?
- A. Atrial natriuretic factor.
  - B. Adrenaline.
  - C. Vasopressin.
  - D. Noradrenaline.
  - E. Rennin.
- 402.** In an experiment the linear speed of blood movement is measured. It is the least in a capillary. What is the reason for this phenomenon?
- A. Small diameter of the capillary.
  - B. Small length of the capillary.
  - C. The biggest total area of transversal section of capillaries.
  - D. Small hydrostatical pressure in capillaries.
  - E. Superfine wall of capillary.
- 403.** What changes of the function of the isolated heart will take place after the increase of the concentration of calcium chloride in the perfusion solution?
- A. Decrease of the frequency of contractions.
  - B. Decrease of the force of contractions.
  - C. Increase of the frequency and force of contractions.
  - D. Cardiac arrest in diastole.
  - E. Decrease of the frequency and force of contractions.
- 404.** A student got tachycardia before an examination. What changes in the ECG will testify its presence?
- A. Lengthening of QRS complex.
  - B. Lengthening of R – R interval.
  - C. Shortening of R – R interval.
  - D. Lengthening of P – Q interval.
  - E. Lengthening of QT segment.
- 405.** During the research it was determined that normally the liquid outlet in intersticium exceeds its reverse inflow through a capillary wall. Where does the surplus of liquid get?
- A. Into arterial vessels.
  - B. Into venous vessels.
  - C. Into interpleural space.
  - D. Into abdominal cavity.
  - E. Into lymphatic vessels.
- 406.** After several hours' sitting in the force position in a bus a passenger noticed an edema



of his feet and ankles. What is the reason for such edema?

- A. Venous congestion.
- B. Dilatation of arterioles.
- C. Increased permeability of capillaries.
- D. Decline of proteins level in plasma.
- E. High level of histamine.

**407.** The duration of the P – Q interval exceeds the norm against the background of the normal duration of the P wave. The reason for it is the lowering of the speed of excitement conduction in a certain structure. What structure is it?

- A. Atrioventricular node.
- B. Sinoatrial node.
- C. His' bundle.
- D. Crucia of His' bundle.
- E. Purkinje's fibres.

**408.** A patient has got an increasing tone of arterioles against the background of normal indexes of heart work. How will it influence the value of arteriotony?

- A. Pressure will not change.
- B. Systolic pressure will increase mainly.
- C. Diastolic pressure will increase mainly.
- D. Diastolic pressure will diminish mainly.
- E. Systolic pressure will diminish mainly.

**409.** As a result of bleeding the volume of circulatory blood of a patient is reduced. How will it influence the value of arteriotony?

- A. Diastolic pressure will decrease only.
- B. Systolic pressure will decrease only.
- C. Systolic and diastolic pressure will decrease.
- D. Systolic pressure will decrease at increasing of diastolic.
- E. Diastolic pressure will decrease at increasing of systolic.

**410.** In an experiment on a dog it was necessary to reduce the excitability of myocardium. What solution is it advisable to introduce intravenously?

- A. Glucose.
- B. Calcium chloride.
- C. Sodium chloride.
- D. Sodium hydrocarbonate.

E. Potassium chloride.

**411.** A sportsman has the increase of arteriotony and frequency of heartbeats before a competition. By the influence of what parts of the CNS is it possible to explain these changes?

- A. Cortex of large hemispheres.
- B. Diencephalon.
- C. Medulla oblongata.
- D. Mesencephalon.
- E. Hypothalamus.

**412.** In an experiment on a dog a peripheral part of the vagus nerve on the neck is irritated. What changes of cardiac activity are observed here?

- A. Increase of the force of contractions.
- B. Increase of the frequency and force of contractions.
- C. Increase of the excitability of myocardium.
- D. Increase of the conduction of excitation on myocardium.
- E. Decrease of the frequency of contractions.

**413.** The change of body position from horizontal to vertical caused the decrease of venous return of blood to the heart, and as a result there is a decrease of the stroke volume of blood and system arteriotony. Signals from what receptors, first of all, start compensatory mechanisms of the renewal of hemodynamics?

- A. Baroreceptors of pulmonary artery.
- B. Chemoreceptors of sinocarotid zone.
- C. Mechanoreceptors of right atrium.
- D. Baroreceptors of the arch of aorta and carotid sinuses.
- E. Volume receptors of the vena cava inferior.

**414.** During physical activity the activity of sympathetic part of the nervous system increases, which results in the increase of minute blood volume and narrowing of resistant vessels, but the vessels of working muscles dilate sharply. What is the reason for their dilatation?

- A. Strengthening of the impulsion from baroreceptors of the arch of aorta.
- B. Decrease of the sensitiveness of adrenoreceptors.

- C. Strengthening of the impulsion from arterial chemoreceptors.
- D. Strengthening of the impulsion from proprioceptors of muscles.
- E. Accumulation of the products of metabolism.

**415.** The volume blood volume in a patient with transplanted heart has increased as a result of physical activity. What regulative mechanism is responsible for these changes?

- A. Parasympathetic conditioned reflexes
- B. Sympathetic conditioned reflexes
- C. Catecholamines
- D. Sympathetic unconditioned reflexes
- E. Parasympathetic unconditioned reflexes

**416.** In response to a change in body position from horizontal to vertical blood circulation system develops reflectory pressor reaction. Which of the following is its compulsory component?

- A. Weakening of the pumping ability of heart
- B. Increase in the heart rate
- C. Decrease in the circulating blood volume
- D. Systemic constriction of the venous vessels
- E. Systemic dilatation of the arterial resistive

**417.** A patient who suffers from severe disorder of water-salt metabolism experienced cardiac arrest in diastole. What is the most probable mechanism of cardiac arrest in diastole?

- A. Hyperkaliemia
- B. Hyponatremia
- C. Organism dehydration
- D. Hypokaliemia
- E. Hyponatremia

**418.** An injured man has bleeding from branches of carotid artery. For a temporary arrest of bleeding it is necessary to press the carotid artery to the tubercle of a cervical vertebra. Which vertebra is it?

- A. II
- B. III
- C. IV
- D. V
- E. VI

**419.** A 50 y.o. patient was admitted to the hospital with complaints about pain behind his breastbone, asphyxia during physical activity. Angiography revealed pathological changes in the posterior interventricular branch of the right coronary artery. What heart parts are affected?

- A. Posterior wall of the right and left ventricles
- B. Left atrium
- C. Anterior wall of the right and left ventricles
- D. Right atrium
- E. Right atrioventricular valve

**420.** Arterial pressure of a surgeon who performed a long operation rised up to 140/110mm Hg. What changes of humoral regulation could have caused the rise of arterial pressure in this case?

- A. Activation of renin angiotensive system
- B. Activation of formation and excretion of aldosterone
- C. Activation of sympathoadrenal system
- D. Activation of kallikrein kinin system
- E. Inhibition of sympathoadrenal system

**421.** An aged man had raise of arterial pressure under a stress. It was caused by activation of:

- A. Sympathoadrenal system
- B. Parasympathetic nucleus of vagus
- C. Functions of thyroid gland
- D. Functions of adrenal cortex
- E. Hypophysis function

**422.** An animal with aortic valve insufficiency got hypertrophy of its left heart ventricle. Some of its parts have local contractures. What substance accumulated in the myocardiocytes caused these contractures?

- A. Sodium
- B. Potassium
- C. Lactic acid
- D. Carbon dioxide
- E. Calcium

**423.** Prophylactic medical examination of a 36 year old driver revealed that his AP was 150/90 mm Hg. At the end of working day he usually hears ear noise, feels slight indisposition that passes after some rest. He was diagnosed with

essential hypertension. What is the leading pathogenetic mechanism in this case?

- A. Nephric
- B. Neurogenetic
- C. Humoral
- D. Endocrinal
- E. Reflexogenic

**424.** Systemic arterial pressure of an adult dropped from 120/70 to 90/50 mm Hg that led to reflectory vasoconstriction. The vasoconstriction will be maximal in the following organ:

- A. Brain
- B. Heart
- C. Bowels
- D. Kidneys
- E. Adrenals

**425.** A fixed-run taxi passenger has a sudden and expressed attack of tachycardia. A doctor travelling by the same taxi has managed to slow down his heart rate by pressing upon the eyeballs and thus causing the following reflex:

- A. Dagnini-Aschner reflex
- B. Bainbridge reflex
- C. Holtz's reflex
- D. Hering-Breuer reflex
- E. Frank-Starling mechanism

**426.** A patient complains of pain in the heart area during acute attack of gastric ulcer. What vegetative reflex can cause this painful feeling?

- A. Visceromotor reflex
- B. Viscerodermal reflex
- C. Viscerovisceral reflex
- D. Dermatovisceral reflex
- E. Motor-visceral reflex

**427.** Experimental stimulation of the sympathetic nerve branches that innervate the heart caused an increase in force of heart contractions because the membrane of typical cardiomyocytes permitted an increase in:

- A. Calcium and potassium ion exit
- B. Calcium ion exit
- C. Potassium ion exit
- D. Potassium ion entry

E. Calcium ion entry

**428.** As a result of a home injury, a patient suffered a significant blood loss, which led to a fall in blood pressure. Rapid blood pressure recovery after the blood loss is provided by the following hormones:

- A. Sex hormones
- B. Cortisol
- C. Adrenaline, vasopressin
- D. Oxytocin
- E. Aldosterone

**429.** ECG of a patient displays an abnormally long R wave (up to 0,18 s). This is caused by a decrease in the conduction velocity of the following heart structures:

- A. Atria
- B. Ventricles
- C. Atrio-ventricular node
- D. Right ventricle
- E. Left ventricle

**430.** During the fight, a man had a cardiac arrest due to the strong blow to the upper region of the anterior abdominal wall. Which of the following mechanisms has led to the cardiac arrest?

- A. Sympathetic unconditioned reflexes
- B. Parasympathetic unconditioned reflexes
- C. Parasympathetic conditioned reflexes
- D. Sympathetic conditioned reflexes
- E. Peripheral reflexes

**431.** A 49 year old woman spent a lot of time standing. As a result of it she got leg edema. What is the most likely cause of the edema?

- A. Increase in oncotic pressure of blood plasma
- B. Decrease in hydrostatic pressure of blood in veins
- C. Decrease in hydrostatic pressure of blood in arteries
- D. Increase in hydrostatic pressure of blood in veins
- E. Increase in systemic arterial pressure

**432.** ECG of a patient shows prolongation of T-wave. This is caused by deceleration in ventricles of:

- A. Repolarization
- B. Depolarization and repolarization
- C. Depolarization
- D. Contraction
- E. Relaxation

**433.** A patient under test was subjected to a moderate physical stress. His minute blood volume amounted 10 l/min. What blood volume was pumped through his lung vessels every minute?

- A. 6 l/min
- B. 5 l/min
- C. 4 l/min
- D. 10 l/min
- E. 7 l/min

**434.** A month after surgical constriction of rabbit's renal artery the considerable increase of systematic arterial pressure was observed. What of the following regulation mechanisms caused the animal's pressure change?

- A. Vasopressin
- B. Angiotensin-II
- C. Adrenaline
- D. Noradrenaline
- E. Serotonin

**435.** A 35-year-old man developed acute heart failure while running for a long time. What changes in ionic composition can be observed in the cardiac muscle?

- A. Accumulation of  $Na^+$  and  $Ca^{2+}$  ions in the myocardium cells
- B. Accumulation of  $K^+$  and  $Mg^{2+}$  ions in the myocardium cells
- C. Reduction of  $Na^+$  and  $Ca^{2+}$  ions in the myocardium cells
- D. Reduction of  $K^+$  and  $Mg^{2+}$  ions in the extracellular space
- E. Reduction of  $Na^+$  and  $Ca^{2+}$  ions in the extracellular space

**436.** In response to a change in body position from horizontal to vertical blood circulation system develops reflectory pressor reaction. Which of the following is its compulsory component?

- A. Systemic dilatation of the arterial resistive vessels
- B. Systemic constriction of the venous vessels
- C. Decrease in the circulating blood volume
- D. Increase in the heart rate
- E. Weakening of the pumping ability of heart

**437.** An adult man presents with systemic arterial pressure drop from 120/70 to 90/50 mm Hg. This resulted in reflex vasoconstriction. Vasoconstriction will be minimal in the following organ:

- A. Skeletal muscles
- B. Skin
- C. Bowels
- D. Heart
- E. Liver

**438.** A 45-year-old patient was admitted to the cardiological department. ECG data: negative *P* wave overlaps *QRS* complex, diastolic interval is prolonged after extrasystole. What type of extrasystole is it?

- A. Ventricular
- B. Sinus
- C. Atrial
- D. Atrioventricular
- E. Bundle-branch

**439.** During fighting a man had a cardiac arrest as a result of a hard blow to the upper region of anterior abdominal wall. Which of the described mechanisms might have provoked the cardiac arrest?

- A. Parasympathetic conditioned reflexes
- B. Sympathetic unconditioned reflexes
- C. Parasympathetic unconditioned reflexes
- D. Sympathetic conditioned reflexes
- E. Peripheric reflexes

**440.** The minute blood volume in a patient with transplanted heart has increased as a result of physical activity. What regulative mechanism is responsible for these changes?

- A. Sympathetic conditioned reflexes
- B. Sympathetic unconditioned reflexes
- C. Parasympathetic unconditioned reflexes
- D. Catecholamines
- E. Parasympathetic conditioned reflexes

**441.** An aged man had raise of arterial pressure under a stress. It was caused by activation of:

- A. Functions of adrenal cortex
- B. Parasympathetic nucleus of vagus
- C. Functions of thyroid gland
- D. Sympathoadrenal system
- E. Hypophysis function

**442.** Vagus branches that innervate heart are being stimulated during an experiment. This caused reduction of heart rate due to the intensification of the following process (through the cell membrane of cardiac pacemaker):

- A. Potassium ion yield
- B. Potassium ion entry
- C. Calcium ion entry
- D. Calcium ion yield
- E. Calcium and potassium ion yield

**443.** A cardiac electric stimulator was implanted to a 75 year old man with heart rate of 40 bpm. Thereafter the heart rate rose up to 70 bpm. The electric stimulator has undertaken the function of the following heart part:

- A. Sinoatrial node
- B. Atrioventricular node
- C. His' bundle branches
- D. His' bundle fibers
- E. Purkinje's fibers

## **8. RESPIRATORY SYSTEM**

**444.** A patient with bronchial asthma is administered inhalation of 0,5% isadrine solution. Bronchospasm was releaved, but the patient began complaining of pain in the heart region and palpitation. It is connected with the stimulation of:

- A. M-cholinergic receptors
- B. Acetylcholine synthesis
- C.  $\alpha_1$ - adrenoreceptors
- D.  $\beta_1$ - adrenoreceptors
- E.  $\beta_2$ - adrenoreceptors

**445.** A patient has a transverse disruption of spinal cord below the IV thoracic segment. What changes of respiration will it cause?

- A. Respiration will stop
- B. Respiration will become more frequent
- C. Respiration will stay unchanged
- D. Respiration will become less frequent
- E. Respiration will become deeper

**446.** Child asked you to puff up the balloon as much as possible for a one exhalation. What is air volume will you use?

- A. Vital volume of the lungs
- B. Functional residual volume
- C. Back up volume of the inspiration
- D. Total volume of the lungs
- E. Inspiration volume

**447.** Intrapleural pressure is being measured in a person. In what phase does a person hold his breath if the pressure is  $-25$  cm  $H_2O$ ?

- A. Quiet expiration
- B. Quiet inspiration
- C. –
- D. Forced expiration
- E. Forced inspiration

**448.** A patient has a tidal volume of 500 ml, a breathing rate of 16 breaths/mm, a dead space volume of 150 ml, and a FRC (functional residual capacity) of 3 liters. Minute ventilation for this patient would be:

- A. 2.4 L/min
- B. 2.9 L/min
- C. 4.8 L/min
- D. 5.6 L/mm
- E. 8 L/min

**449.** A patient has an alveolar ventilation of 5 L/min, a frequency of 10 breaths per min, and a tidal volume of 700 ml. What is the patient's dead space ventilation?

- A. 2.0 L/min
- B. 0.7 L/min
- C. 1.0 L/min
- D. 4.3 L/min
- E. –

**450.** In an animal medulla oblongata is destroyed. How will the respiration change?

- A. Respiration grows deeper and less frequent

- B. Respiration becomes superficial
- C. Respiration stops
- D. Respiration becomes more frequent
- E. Respiration grows deeper and more frequent

**451.** A trained athlete has a forced vital capacity of 5.0 liters, a functional residual volume of 2.4 liters, and a residual volume of 1.2 liters. What is the person's total lung capacity?

- A. 8 liters
- B. 7.4 liters
- C. 5.0 liters
- D. 6.2 liters
- E. 9.6 liters

**452.** A person expires into a spirometer for 10 minutes. Her expired volume was 54 liters, her respiration rate was 12 breaths/min, and her alveolar ventilation was 4.2 L/min during the 10-minute period. What is this person's tidal volume?

- A. 300 ml
- B. 1.2 liters
- C. 420ml
- D. +450 ml
- E.-

**453.** Lungs discharge:

- A. All enumerated substances
- B. Water
- C. Volatile aromatic compounds that contains in nutritious and medical substances
- D. Carbonic acid
- E. Products of incomplete oxygenation of the fat (at the diabetes)

**454.** The respiratory system compensates the metabolic acidosis by:

- A. Decreasing the frequency of breathing and excretion CO<sub>2</sub>
- B. Decreasing the frequency of breathing and delay excretion CO<sub>2</sub>
- C. Increasing the frequency of breathing and excretion CO<sub>2</sub>
- D. Increasing the frequency of breathing and delay excretion CO<sub>2</sub>
- E. All is wrong

**455.** An examined person's tidal volume makes 500 ml, respiratory rate – 15 per 1 min, volume of dead space – 100 ml. How much air will pass through his alveoli in 1 minute?

- A. 9000 ml.
- B. 7500 ml.
- C. 1500 ml.
- D. 6000 ml.
- E. 7400 ml.

**456.** In a pressure chamber the pressure was reduced to 400 mm Hg. How will the breathing of a person change in this pressure chamber?

- A. Respiration depth will decrease and respiration frequency will increase.
- B. Respiration depth and frequency will decrease.
- C. Respiration depth and frequency will increase.
- D. Respiration depth will increase, and respiration frequency will decrease.
- E. Will remain without changes.

**457.** The sharp reduction of the activity of lungs surfactant of a patient is determined. What will the result of it be?

- A. Increase of the ventilation of lungs.
- B. Decrease of the resistance of respiratory tract.
- C. Decrease of the work of respiratory muscles.
- D. Inclination of the alveoli to falling.
- E. Hyperoxemia.

**458.** Tidal volume is 450 ml and breathing frequency is 20 per min. What will alveolar ventilation per minute be?

- A. 5000 ml.
- B. 3000 ml.
- C. 4000 ml.
- D. 6000 ml.
- E. 8000 ml.

**459.** After a craniocerebral trauma a patient's breathing become infrequent and deep. What structure of cerebrum is damaged?

- A. Medulla oblongata.
- B. Hypothalamus.
- C. Metencephalon.

- D. Cortex of large hemispheres.
- E. Cerebellum.

**460.** There is an increased content of carbon dioxide in an apartment. How will the breathing of a person entering the apartment change?

- A. Depth and frequency will increase.
- B. Depth will decrease.
- C. Depth will increase.
- D. Frequency will decrease.
- E. Frequency will increase.

**461.** A patient has a spasm of smooth muscle of the bronchi. The use of the activators of what receptors will be physiologically grounded for the removal of the spasm?

- A. N-Cholinoreceptors.
- B.  $\alpha$ -Adrenoreceptors.
- C.  $\alpha$ - and  $\beta$ -adrenoreceptors.
- D.  $\beta$ -Adrenoreceptors.
- E. M-Cholinoreceptors.

**462.** A patient has got a trauma of the spinal cord above the 5<sup>th</sup> neck segment. How will the breathing character change?

- A. Will become superficial and more frequent.
- B. Will become superficial and more seldom.
- C. Will become deep and more frequent.
- D. Will stop.
- E. Will become deep and more seldom.

**463.** During an experiment on an animal its spinal cord was cut above the 5<sup>th</sup> neck segment. How will the breathing character change?

- A. Will stop.
- B. Will become superficial and more seldom.
- C. Will become deep and frequent.
- D. Will become superficial and frequent.
- E. Will become deep and more seldom.

**464.** When analysis a patient's spirogram the decrease of the frequency and depth of breathing is determined. The decrease of what index will it cause?

- A. Expiratory reserve volume.
- B. Vital capacity of the lungs.
- C. Inspiratory reserve volume.
- D. Minute volume of respiration.

- E. Residual volume.

**465.** In the pre-start condition it is necessary for a runner to increase the content of oxygen in his muscle. In what way can the runner do it?

- A. To breathe with low frequency.
- B. To breathe in the mode of hypoventilation.
- C. To take a rapid inspiration and slow expiration.
- D. To breathe superficially.
- E. To breathe in the mode of hyperventilation.

**466.** After inhalation of dust a man had a cough. By the excitation of what receptors is it caused?

- A. Irritant.
- B. Juxtacapillar.
- C. Chemoreceptors of lungs.
- D. Thermoreceptors of lungs.
- E. Pain.

**467.** While smoking a man often has a cough. Irritation of what receptors starts this reflex.

- A. Chemoreceptors of carotid sinuses.
- B. Central chemoreceptors.
- C. Chemoreceptors of the arch of aorta.
- D. Irritant.
- E. Mechanoreceptors of lungs.

**468.** As a result of physical activity a person has got hyperventilation. Which of the following indexes of his breathing are considerably higher than in the state of rest?

- A. Tidal volume.
- B. Vital capacity of lungs.
- C. Inspiratory reserve volume.
- D. Expiratory reserve volume.
- E. Total lung capacity.

**469.** As a result of some pathological process a person has got an increased thickness of alveolarcapillar membrane. The decrease of what indexes will be the direct result of it?

- A. Oxygen capacity of blood.
- B. Diffusive capacity of lungs.
- C. Minute respiratory volume.
- D. Alveolar ventilation of lungs per minute.
- E. Expiratory reserve volume.

**470.** A man who went out warm a warm apartment into cold air often had a cough. The irritation of what receptors started the coughing reflex?

- A. Mechanoreceptors of lung.
- B. Central chemoreceptors.
- C. Chemoreceptors of the arch of aorta.
- D. Chemoreceptors of carotid sinuses.
- E. Irritant.

**471.** After hyperventilation a sportsman has a short stop of breathing. What changes in blood are the reasons for it?

- A. Decrease of pH.
- B. Decrease of the tension of CO<sub>2</sub>.
- C. Increase of the tension of CO<sub>2</sub>.
- D. Decrease of the tension of O<sub>2</sub>.
- E. Increase of the tension of CO<sub>2</sub> and O<sub>2</sub>.

**472.** During the registration of the electric activity of neurons it was determined that they become excited before inspiration and its beginning. Where are there neurons situated?

- A. In medulla oblongata.
- B. In diencephalon.
- C. In metencephalon.
- D. In the spinal cord.
- E. In cerebral cortex.

**473.** A man with the attack of bronchospasm needs to have the influence of the vagus nerve on the smooth muscles of the bronchi decreased. What membranous cytotransmitters is it advisable to block this?

- A. N-Cholinoreceptors.
- B. M-Cholinoreceptors.
- C.  $\alpha$ - and  $\beta$ -adrenoreceptors.
- D.  $\alpha$ -Adrenoreceptors.
- E.  $\beta$ -Adrenoreceptors.

**474.** There are many people in a cramped enclosed space. What changes in the air will cause hyperventilation of the people?

- A. Increase of water vapour content.
- B. Decrease of oxygen content.
- C. Increase of carbon dioxide content.
- D. Rise of temperature.
- E. Temperature reduction.

**475.** During an examination it is necessary to determine what part of the alveolar air is renewed at every person's breath. Which of the following indexes must be calculated for this purpose?

- A. Vital capacity of lungs.
- B. Minute respiratory volume.
- C. Alveolar ventilation per minute.
- D. Coefficient of pulmonary ventilation.
- E. Functional residual capacity.

**476.** A person made a quiet expiration. What is the air volume contained in his lungs called?

- A. Vital capacity of lungs.
- B. Residual volume.
- C. Expiratory reserve volume.
- D. Tidal volume.
- E. Functional residual capacity.

**477.** A person took a maximum deep breath. What is the air volume contained in his lungs called?

- A. Total lung capacity.
- B. Vital capacity of lungs.
- C. Inspiratory capacity.
- D. Functional residual capacity.
- E. Tidal volume.

**478.** A person made a maximum deep expiration. What is the air volume contained in his lungs called?

- A. Functional residual capacity.
- B. Residual volume.
- C. Inspiratory capacity.
- D. Expiratory reserve volume.
- E. Alveolar volume.

**479.** In the state of rest a person has considerably increased work in inspiration muscles. Which of the following can be the reason for it?

- A. Infrequent respiration.
- B. Hypopnea.
- C. Constriction of respiratory tracts.
- D. Negative intrapleural pressure.
- E. Decrease of minute respiratory volume.



**480.** Intrapleural pressure of a person is taken. In what phase did the person hold breath if the value of pressure is  $-7.5$  cm Hg?

- A. Quiet inspiration.
- B. Quiet expiration.
- C. Forced inspiration.
- D. Forced expiration.
- E. Pauses between inspiration and expiration.

**481.** Intrapleural pressure of a person is taken. In what phase did the person hold breath if the value of pressure is  $-25$  cm of water?

- A. Quiet inspiration.
- B. Quiet expiration.
- C. Forced inspiration.
- D. Forced expiration.
- E. Pauses between inspiration and expiration.

**482.** Intrapleural pressure of a person is taken. In what phase did the person hold breath if the value of pressure is  $3$  cm of water?

- A. Quiet expiration.
- B. Forced expiration.
- C. Forced inspiration.
- D. Quiet inspiration.
- E. Pauses between inspiration and expiration.

**483.** The pressure in the lung's alveoli of a healthy person is taken. In what phase of breathing is the pressure  $0$  mm Hg?

- A. Quiet expiration.
- B. Quiet inspiration.
- C. Pauses between inspiration and expiration.
- D. Forced inspiration.
- E. Forced expiration.

**484.** The transection of the brainstem between pons and medulla oblongata caused the lengthening of inspiration phase. It caused the violation of connection between medulla oblongata and a certain structure of cerebrum. What structure is it?

- A. Cerebellum.
- B. Reticular formation.
- C. Pneumotaxic center.
- D. Cortex of large hemisphere.
- E. Red nuclei.

**485.** Lung ventilation in a person is increased as a result of physical activity. Which of the following indices of the external respiration is much higher than in a state of rest?

- A. Respiratory volume
- B. Expiratory reserve volume
- C. Inspiratory reserve volume
- D. Total lung capacity
- E. Vital capacity of lung

**486.** Vagus nerves of an experimental animal have been cut on the both sides. What respiratory changes will result from this?

- A. There will be no respiratory changes
- B. Respiration will become deep and frequent
- C. Respiration will become deep and infrequent
- D. Respiration will become shallow and frequent
- E. Respiration will become shallow and infrequent

**487.** A patient has a transversal laceration in the spinal cord. What respiratory changes will result from this?

- A. Respiration will become less frequent
- B. Respiration will present no significant changes
- C. Respiration will stop
- D. Respiration will become more frequent
- E. Respiration will become deeper

**488.** A child has inhaled a button. Where is it likely to be?

- A. In the trachea
- B. In the left main bronchus
- C. In the right main bronchus
- D. In the larynx
- E. In the esophagus

**489.** Objective examination of a patient revealed: slender figure, big skull, highly developed frontal region of face, short extremities. What constitutional type is it characteristic for?

- A. Respiratory
- B. Muscular
- C. Digestive
- D. Cerebral

E. Mixed

**490.** A group of mountain climbers went through the blood analysis at the height of 3000 m. It revealed decrease of  $HCO_3^-$  to 15 micromole/l (standard is 22-26 micromole/l). What is the mechanism of  $HCO_3^-$  decrease?

- A. Intensification of acidogenesis
- B. Hyperventilation
- C. Hypoventilation
- D. Decrease of ammoniogenesis
- E. Decrease of bicarbonate reabsorption in kidneys

**491.** A man took a quiet expiration. Name an air volume that is meanwhile contained in his lungs:

- A. Respiratory volume
- B. Residual volume
- C. Expiratory reserve volume
- D. Functional residual capacity
- E. Vital lung capacity

**492.** Vagi of an experimental animal were cut on both sides. What respiration changes will be observed?

- A. It will become deep and infrequent
- B. It will become shallow and frequent
- C. It will become deep and frequent
- D. It will become shallow and infrequent
- E. No changes will be observed

**493.** Voluntary breath-holding caused increase of respiration depth and frequency. The main factor stimulating these changes of external respiration is:

- A. Increased tension of  $CO_2$  in blood
- B. Increased tension of  $O_2$  in blood
- C. Decreased tension of  $O_2$  in blood
- D. Decreased tension of  $CO_2$  in blood
- E. Decreased concentration of  $H^+$  in blood

**494.** A young woman who entered a production department where it strongly smelt of paints and varnishes had a bronchospasm. This reflex was caused by irritation of the following receptors:

- A. Irritant
- B. Juxtaglomerular
- C. Pleura receptors

- D. Central chemoreceptors
- E. Peripheral chemoreceptors

**495.** A doctor asked a patient to breathe out fully after taking a normal breath. What muscles contract during such exhalation?

- A. Trapezius muscles
- B. External intercostal muscles
- C. Diaphragm
- D. Abdominal muscles
- E. Pectoral muscles

**496.** A patient has a trauma of sternocleidomastoid muscle. This caused a decrease in value of the following indicator of external respiration:

- A. Inspiratory reserve volume
- B. Expiratory reserve volume
- C. Respiratory capacity
- D. Residual volume
- E. Functional residual lung capacity

**497.** Analysis of the experimental spirogram of a 55-year-old person revealed a decrease in tidal volume and respiratory amplitude compared to the situation of ten years ago. The change in these indicators is caused by:

- A. Body mass of a person
- B. Gas composition of the air
- C. Physical builds of a person
- D. Height of a person
- E. Decreased force of respiratory muscle contraction

**498.** A female patient, having visited the factory premises with lots of dust in the air for the first time, has got cough and burning pain in the throat. What respiratory receptors, when irritated, cause this kind of reaction?

- A. Proprioceptors of respiratory muscles
- B. Juxtacapillary (J) receptors
- C. Stretch receptors of lungs
- D. Irritant receptors
- E. Thermoreceptors

**499.** The toxin produced by *Clostridium botulinum* blocked the entrance of calcium ions into the nerve endings of the axons of

motoneurons. Poisoning with it is dangerous to life by:

- A. Vomiting development
- B. Cardiac arrest
- C. Disorder of vascular tone
- D. Respiratory standstill
- E. Development of diarrhea

## 9. ENERGY METABOLISM AND THERMOREGULATION

**500.** A patient with the symptoms of acute alcoholic poisoning was brought to the hospital. What carbohydrates metabolism changes are typical for this condition?

- A. The anaerobic glucose metabolism predominates in muscles
- B. The gluconeogenesis is increased in liver
- C. The breakage of glycogen is increased in liver
- D. The gluconeogenesis velocity in liver is decreased
- E. The anaerobic breakage of glucose is increased in muscles

**501.** A young man increased his energy inputs from 500 to 2000 kJ per hour. What from the suggested can cause it?

- A. Rising of external temperature
- B. Food taken
- C. Change of sleeping for waking
- D. Mental activity
- E. Physical activity

**502.** Inhabitants of territories with cold climate have high content of an adaptive thermoregulatory hormone. What hormone is meant?

- A. Glicagon
- B. Somatotropin
- C. Thyroxin
- D. Insulin
- E. Cortisol

**503.** Which mechanism of thermoregulation protects overheating of the organism in sauna:

- A. Heat radiation

- B. Heat transformation
- C. Convection
- D. Evaporation
- E. Vasodilatation

**504.** The regulation of the water balance in organism is a function of:

- A. Thalamus
- B. Hypothalamus
- C. Cerebellum
- D. Medulla oblongata
- E. Limbic system

**505.** The patient with the symptoms of acute alcoholic poisoning was brought in clinic. Which changes of carbohydrates metabolism are typical for this condition?

- A. The speed of gluconeogenesis in liver is decreased
- B. The gluconeogenesis is increased in liver
- C. The breakage of glycogen is increased in liver
- D. The anaerobic glucose metabolism predominates in muscles
- E. The anaerobic breakage of glucose is increased in muscles

**506.** The utilization of glucose by cells is promoted by...

- A. Insulin
- B. Glucagon
- C. Adrenalin
- D. Thyroxin
- E. Somatotropin

**507.** Energy waster of a young man increased from 500 to 2000 kilojoules in 1 hour. Which of the following below can be the reason for it?

- A. Physical activity.
- B. Increase of external temperature.
- C. Mental work.
- D. Food intake.
- E. Transition from sleep to wakeful state.

**508.** During physical activity a young man's oxygen consumption and carbon dioxide elimination per minute make 1000 ml. What substances are oxidized in the cells of his organism?

- A. Carbohydrates.
- B. Proteins.
- C. Fats.
- D. Carbohydrates and fats.
- E. Carbohydrates and proteins.

**509.** The air temperature is 38°C, relative humidity of the air – 80%, wind speed – 0 m per sec. Due to what mechanism will there be heat emission under these condition?

- A. Convection.
- B. Radiation.
- C. Evaporation of sweat.
- D. Heat conduction.
- E. Radiation convection.

**510.** The curve of the dissociation of oxyhemoglobin is shifted to the right. What changes in a person's organism can be the reason for it?

- A. Increase of the concentration of 2,3-phosphoglycerate in erythrocytes.
- B. Hyperthermia.
- C. Alkalosis.
- D. Hypoocapnia.
- E. Hypoxemia.

**511.** A man dressed in light clothes is standing in a room where air temperature is 14°C. Windows and doors are closed. In what way does the man give the biggest quantity of heat?

- A. By convection.
- B. By heat conduction.
- C. By heat radiation.
- D. By evaporation.
- E. By perspiration.

**512.** By the method of indirect calorimetry it was determined that the basic exchange of an examined person is 40 % lower than it should be. The violation of the activity of what endocrine gland is the reason for such state?

- A. Pancreas.
- B. Thymus.
- C. Thyroid.
- D. Epiphysis.
- E. Adrenal gland.

**513.** What mechanism of heat emission is the most effective if a person is in the conditions of 80% air humidity and the temperature of the environment is 35°C?

- A. Sweat secretion.
- B. Radiation.
- C. Heat conduction.
- D. Convection.
- E. Conduction.

**514.** Cooling of the human body in water is much faster than in the air. What way of heat emission in water is much more effective?

- A. –
- B. Sweat evaporation
- C. Heat radiation
- D. Convection
- E. Heat conduction

**515.** Air temperature in production premises is 36°C; relative air humidity is 80%. In what way does a human organism give its warm under such conditions?

- A. By evaporation of sweat.
- B. By heat conduction.
- C. By radiation.
- D. By convection.
- E. By conduction.

**516.** Carotid bodies of an animal were ablated on both sides. The influence of which of the following factors will not cause hyperventilation?

- A. Increase of the temperature of the main body.
- B. Physical activity.
- C. Hypercapnia.
- D. Acidosis.
- E. Hypoxemia.

**517.** During a patient's examination the increase of basic exchange by 50% was determined. The increasing secretion of what hormone caused this change?

- A. Prolactine.
- B. Insulin.
- C. Parathohormone.
- D. Somatotropin.
- E. Thyroxin.

**518.** A teenager of 14 has got positive nitrogen balance. Which of the following can be the reason for it?

- A. Starvation.
- B. Growth of organism.
- C. Reduction of protein content in food.
- D. Considerable physical activity.
- E. Emotional tension.

**519.** In what state is a person if the index of his energy wasted is lower than the value of basal metabolism?

- A. Calmness.
- B. Rest.
- C. Easy work.
- D. Nervous tension.
- E. Sleep.

**520.** One measures a person's energy wastes on an empty stomach, in the lying position, in the conditions of physical and psychic rest, conform temperature. At what time will the energy wastes be the least?

- A. 5 – 6 p.m.
- B. 7 – 8 a.m.
- C. 10 – 12 a.m.
- D. 2 – 4 p.m.
- E. 3 – 4 a.m.

**521.** One measures a person's energy wastes on an empty stomach, in the lying position, in the conditions of physical and psychic rest, conform temperature. At what time will the energy wastes be the greatest?

- A. 3 – 4 a.m.
- B. 7 – 8 a.m.
- C. 10 – 12 a.m.
- D. 5 – 6 p.m.
- E. 2 – 4 p.m.

**522.** Measuring the energy wasted of a human organism by the method of indirect calorimetry it was determined that the oxygen consumption per minute is 1000 ml and carbon dioxide elimination per minute is 800 ml. what respiratory coefficient does the examined person have?

- A. 1.0.
- B. 1.25.
- C. 0.9.
- D. 0.84.
- E. 0.8

**523.** Measuring the energy wasted of a human organism it was determined that the respiratory coefficient is 1.0. What substances are mainly oxidized in the person's cells?

- A. Carbohydrates.
- B. Proteins.
- C. Fats.
- D. Protein and carbohydrates.
- E. Carbohydrates and fats.

**524.** Measuring the energy wasted of a human organism it was determined that the respiratory coefficient is 0.7. What substances are mainly oxidized in the person's cells?

- A. Carbohydrates.
- B. Proteins.
- C. Fats.
- D. Protein and carbohydrates.
- E. Carbohydrates and fats.

**525.** The inhabitants of territories with cold climate have an increased content of a hormone in blood, which has an adaptive thermoregulatory meaning. What hormone is it?

- A. Thyroxin.
- B. Insulin.
- C. Glucagon.
- D. Somatotropin.
- E. Cortisol.

**526.** In a laboratory experiment rats were adapted to living in the conditions of cold at a temperature of 5°C. The increasing secretion of what hormone caused the development of this adaptation?

- A. Thyroxin.
- B. Glucagon.
- C. Somatotropin.
- D. Testosterone.
- E. Adrenaline.

**527.** People adapted to the action of high external temperature do not lose with sweat a

large quantity of sodium chloride with hydrosis. The action of what hormone on sweat glands causes such effect?

- A. Atrial natriuretic factor.
- B. Vasopressin.
- C. Cortisol.
- D. Thyroxin.
- E. Aldosteron.

**528.** The processes of heat emission of an undressed man at a room temperature are researched. In what way is the maximum quantity of heat emitted under such conditions?

- A. Convection.
- B. Heat conduction.
- C. Heat radiation.
- D. Evaporation.
- E. Conduction.

**529.** A man went out from an apartment with air conditioning into the street where the air temperature was 40°C, air humidity was 60 %. In what way will the heat be emitted from the organism in the street?

- A. By the evaporation of sweat.
- B. By convection.
- C. By radiation.
- D. By conduction.
- E. –

**530.** During the thermometry it was determined that the temperature of the open parts of skin is by 1 – 1.5°C lower than the temperature of the parts covered with clothes of natural fabrics. In what way do clothes reduce heat emission?

- A. By radiation.
- B. By convection.
- C. By conduction.
- D. By the evaporation.
- E. –

**531.** In cold weather with wind people freeze quicker than without any wind increase heat emission?

- A. By evaporation.
- B. By radiation.
- C. By heat conduction.
- D. +By convection.

E. By conduction.

**532.** During the experimentation of a 35-year-old woman there was the increase of the indexes of basic exchange. The surplus of which of the following hormones probably caused this state?

- A. Triiodothyronine.
- B. Somatotropin.
- C. Insulin.
- D. Cortisol.
- E. Glucagon.

**533.** The workers of hot workshops of metallurgical enterprises lose a lot of water with sweat. What drink is it necessary to take for optimum compensation for this state?

- A. Water with some salt added.
- B. Soda water.
- C. Milk.
- D. Natural juices.
- E. Kvass.

**534.** By the method of indirect calorimetry the decrease of indexes of basal metabolism of a 30-year-old man by 30% was determined. The decrease concentration of what hormones in blood plasma can be the reason for it?

- A. Triiodoteranine, tetraiodothyronine.
- B. Thyrocalcitonin, parathormone.
- C. Glucocorticoids.
- D. Catecholamine.
- E. Somatoliberin, somatostatin.

**535.** The energy inputs of a healthy man have been measured. In what position was the patient if his energy inputs were less than the main exchange?

- A. Rest
- B. Sleep
- C. Easy work
- D. Nervous exertion
- E. Calmness

**536.** A patient who has been strictly keeping to a certain diet for 10 days went through examination of respiratory coefficient. It was determined that it was equal 1. What have the patient been keeping to?

- A. With domination of carbohydrates
- B. With domination of proteins and fat
- C. With domination of fat and carbohydrates
- D. Mixed
- E. With domination of proteins and carbohydrates

**537.** There is a severe time restriction for people's staying at a height of over 800 m above the sea level without oxygen bombs. What is the life limiting factor in this case?

- A. Earth gravity
- B. Ultraviolet intensity
- C. Moisture level
- D. Temperature
- E. Partial oxygen pressure

**538.** Workers of a conveyor workshop received recommendations for the effective organization of working time and higher working efficiency. What peculiarity of work in this workshop causes the greatest stress for the workers?

- A. State of "operating rest"
- B. Monotony of work
- C. Increased intellectual component
- D. Increased responsibility
- E. Social inefficiency of labor

**539.** The temperature in a production room is  $36^{\circ}\text{C}$ . Relative air humidity is 80%. Under these conditions the human body transfers heat mainly through:

- A. Heat conduction
- B. Sweat evaporation
- C. Radiation
- D. Convection
- E. –

**540.** A man is being measured power inputs on an empty stomach, in the lying position, under conditions of physical and psychic rest at a comfortable temperature. Power inputs will reach the maximum at:

- A. 5-6 p.m.
- B. 7-8 a.m.
- C. 10-12 a.m.
- D. 2-3 p.m.
- E. 3-4 a.m.

**541.** The temperature of the ambient environment is  $38^{\circ}\text{C}$  and relative air humidity is 50%. What ways of heat emission provide maintaining a constant temperature of the human body?

- A. Convection and conduction
- B. Radiation
- C. Heat conduction
- D. Convection
- E. Evaporation

**542.** Which way of heat emission by the bodies of greenhouse workers is the most effective at the temperature of  $36^{\circ}\text{C}$  degrees and relative humidity of 70%?

- A. Liquid evaporation
- B. Thermal conduction
- C. Heat radiation
- D. Convection
- E. –

## 10. DIGESTIVE SYSTEM

**543.** An experimental dog by means of stomach tube was given 150 ml of meat broth. The concentration of which of the below mentioned substances will be increased in animal's blood?

- A. Gastrin
- B. Insulin
- C. Vasoactive intestinal polypeptide
- D. Neurotensin
- E. Somatostatin

**544.** A 60-year-old patient presents with weakened peristaltic activity of the bowels. Which of the following foodstuffs would stimulate peristalsis most of all?

- A. Brown bread
- B. Tea
- C. Meat
- D. Lard
- E. White bread

**545.** When the pH level of the stomach lumen decreases to less than 3, the antrum of the stomach releases peptide that acts in paracrine fashion to inhibit gastrin release. This peptide is:

- A. Acetylcholin
- B. Vasoactive intestinal peptide (VIP)
- C. Somatostatin
- D. GIF
- E. Gastrin-releasing peptide (GRP)

**546.** During a sharp experiment an animal's chorda tympani was electrically irritated. How does it influence the secretion of the parotid salivary gland?

- A. Saliva is not secreted.
- B. Little liquid saliva secreted.
- C. Much liquid saliva secreted.
- D. Little viscid saliva secreted.
- E. Much viscid saliva secreted.

**547.** A part of a patient's pancreas was ablated. What products is it necessary for him to limit in his food ration?

- A. Fruit.
- B. Boiled vegetables.
- C. Dairy produce.
- D. Vegetable rich in proteins (beans, soy).
- E. Fat meat, beef tea.

**548.** 150 ml of meat broth was introduced through a probe into the gastric cavity of an experimental animal. The content of what matter will increase in its blood quickly?

- A. Insulin.
- B. Somatostatin.
- C. Gastrin.
- D. Glucagon.
- E. Neurotensin.

**549.** During an examination a student's mouth is dry. The increased realization of what reflexes is the mechanism causing the development of this state?

- A. Unconditional sympathetic.
- B. Unconditional parasympathetic.
- C. Conditional parasympathetic.
- D. Conditional sympathetic.
- E. Unconditional metasympathetic.

**550.** Energy wastes of a 40-year-old miner are more than 5000 kcal per day. What component in his food ration is it necessary to increase for the renewal of such energy wastes?

- A. Vitamin.
- B. Liquid.
- C. Proteins.
- D. Carbohydrates.
- E. Fats.

**551.** In Ancient India a person suspected of committing a crime was offered to swallow a handful of dry rice. Criminals could not swallow the rice because of decreased salivation. What process is the reason for such state?

- A. Inhibition of the sympathoadrenal system.
- B. Activation of the parasympathetic nucleus of the facial nerve.
- C. Decrease of blood circulation salivary glands.
- D. Activation of the parasympathetic nucleus of the glossopharyngeal nerve.
- E. Activation of the sympathoadrenal system.

**552.** A peripheral part of chorda tympani of an experimental animal is irritated. How does it influence the secretion of parotid salivary glands?

- A. Much liquid saliva secreted.
- B. Little liquid saliva secreted.
- C. Saliva is not secreted.
- D. Little viscid saliva secreted.
- E. Much viscid saliva secreted.

**553.** A peripheral part of sympathetic fibers which innervate the sublingual salivary gland of an experimental animal is irritated. How does it influence the secretion of the sublingual salivary gland?

- A. Much viscid saliva secreted.
- B. Little liquid saliva secreted.
- C. Saliva is not secreted.
- D. Much liquid saliva secreted.
- E. Little viscid saliva secreted.

**554.** The content of what products is it advisable to increase in the food ration of a person with reduced secretory functional of the stomach?

- A. Sweet.
- B. Broth.
- C. Salt.
- D. Milk.
- E. Lard.



**555.** Lean solution of hydrochloric acid was introduced into the duodenum of an animal through a probe. The content of what hormone will be increased as a result of it?

- A. Gastrin.
- B. Cholecystokinin pancreozymin.
- C. Secretin.
- D. Glucagon.
- E. Neurotensin.

**556.** A patient has got a chronic neuritis of the trigemenu. Which of the digestive processes is considerably broken?

- A. Mastication.
- B. Salivation.
- C. Formation of taste feeling.
- D. Swallowing.
- E. Formation of saliva.

**557.** 150 g of meat broth was introduced into the gastric cavity of an experimental dog through a probe. The content of which of the following substances will be quickly increased in the dog's blood?

- A. Vasointestinal polypeptide.
- B. Somatostatin.
- C. Insulin.
- D. Neurotensin.
- E. Gastrin.

**558.** After taken 100 ml of 25% concentrated solution of magnesium sulfate there will be a lot of fluid experiments. Why?

- A. Because the work of the bowels is inhibited.
- B. Because the secretion of gastric juices is stimulated.
- C. Because osmolality is increased in the bowels.
- D. Because the secretion of hormones of the duodenum is stimulated.
- E. Because osmolality decreased.

**559.** Deficit of what enzyme is the most often the reason for incomplete digestion of fats in the digestive tract and the increase of the neutral fat quantity in experiments?

- A. Hepatic lipase.

- B. Gastric lipase.
- C. Pancreatic lipase.
- D. Intestinal lipase.
- E. Enterokinase.

**560.** During the coprological research it is determined that experiments are discolored, neutral fat drops are found in them. The violation of what process is the most probable reason for such results?

- A. Processes of an intestine.
- B. Acidity of gastric juice.
- C. Secretion of pancreatic juice.
- D. Secretion of intestinal juice.
- E. Permeation of bile into the bowels.

**561.** A person has got little viscid saliva, its enzyme activity is reduced, and content of mucus is increased. The function violation of what glands is the most possible reason for this state?

- A. Parotid.
- B. Own glands of tunica mucosa of oral cavity.
- C. Sublingual.
- D. Submandibular.
- E. Own lingual glands.

**562.** During an examination of a 45-year-old person who had been keeping to a vegetable diet for a long time negative nitrogen balance was determined. What peculiarity of the ration becomes the reason for such state?

- A. Excessive peculiarity of carbohydrates.
- B. Excessive peculiarity of water.
- C. Insufficient peculiarity of proteins.
- D. Insufficient peculiarity of fats.
- E. Insufficient peculiarity of fats and proteins.

**563.** During a patient's examination the decrease of the motor and evacuatory functions of the stomach was determined. The deficit of which of the following substances can it be connected with?

- A. Secretin.
- B. Gastrin.
- C. Adenosine.
- D. Somatostatin.
- E. Gastric-inhibiting peptide.

**564.** In the process of aging of a human being there is a decrease of the synthesis and secretion of the pancreatic juice, a decrease of trypsin content in it. To the violation of the splitting of what substances does it lead first of all?

- A. Polysaccharides.
- B. Phospholipids.
- C. Proteins.
- D. Nucleic acid.
- E. Lipids.

**565.** A patient's duodenum is ablated. The decrease of the secretion of what hormone will it cause?

- A. Gastrin.
- B. Cholecystokinin and secretin.
- C. Histamine.
- D. Gastrin and histamine.
- E. Neurotensin.

**566.** A lean solution of hydrochloric acid was introduced into an experimental dog's duodenum through a probe. The secretion increase of what hormone will it cause?

- A. Gastrin.
- B. Secretin.
- C. Histamin.
- D. Cholecystokinin.
- E. Neurotensin.

**567.** A patient's tip of the tongue was anointed with a local anesthetic. To the absence of perception of what taste sensation will it lead?

- A. Sour.
- B. Salt.
- C. Sweet.
- D. Bitter.
- E. Sour and salt.

**568.** Which of the following processes of a hungry man who sees tasty food will be activated first of all?

- A. Secretion of gastric juice.
- B. Secretion of intestinal juice.
- C. Colonis motility.
- D. Contraction of Oddi's sphincter.
- E. Small intestine motor activity.

**569.** There is no conductivity in the glossopharyngeal nerve of a patient. What taste sensation will disappear?

- A. Sour and salt.
- B. Sour.
- C. Sweet.
- D. Salt.
- E. Bitter.

**570.** A patient's tip of the tongue was anointed with Novocaine. What taste sensations will disappear?

- A. Salt.
- B. Sweet.
- C. Sour.
- D. Bitter.
- E. Sour and salt.

**571.** A patient has normally colored excrements, which contain a lot of free fatty acids. Violation of what process is the reason for this phenomenon?

- A. Hydrolysis of fats.
- B. Absorption of fats.
- C. Biliary excretion.
- D. Bile production.
- E. Secretions of lipase.

**572.** 150 g meat broth was introduced into the gastric cavity of an experimental dog through a probe. Which of the following substances will be quickly increased in the dog's blood?

- A. Insulin.
- B. Gastrin.
- C. Vasointestinal polypeptide.
- D. Neurotensin.
- E. Somatostatin.

**573.** A stone in the common bile coming into the bowels. Violation of what process observed here?

- A. Absorption of proteins.
- B. Digestion of carbohydrates.
- C. Absorption of carbohydrates.
- D. Digestion of fats.
- E. Digestion of proteins.

**574.** With the violation of cerebral circulation a patient has got a broken act of swallowing. What part of the brain has suffered?

- A. Prosencephalon.
- B. Cervical part of the spinal cord.
- C. Brainstem.
- D. Diencephalon.
- E. Mesencephalon.

**575.** In an experiment cerebral structures are electrostimulated. As a result of it polyphagia (excessive yearning for food) appeared. What department of cerebrum are electrodes put in?

- A. Adenohypophysis.
- B. Ventromedial nuclei of hypothalamus.
- C. Supraoptical nuclei of hypothalamus.
- D. Lateral nuclei of hypothalamus.
- E. Red nucleus.

**576.** In an experiment cerebral neurons of an animal are electrostimulated. As a result of it hypophagia (excessive yearning for food) appeared. What department of cerebrum are electrodes put in?

- A. Ventromedial nuclei of hypothalamus.
- B. Lateral nuclei of hypothalamus.
- C. Neurohypophysis.
- D. Adenohypophysis.
- E. Red nucleus.

**577.** According to the result of the analysis of a patient's saliva it is determined that the pH is 8.0. What changes in the mouth cavity will this state of saliva result in?

- A. Development of hyperplasia of tooth tissue.
- B. Development of caries.
- C. Development of fluorosis.
- D. Formation of dental calculus.
- E. Development of the hypoplasia of tooth tissue.

**578.** A person has got considerable violation in direction of proteins, fats and carbohydrates. Reduced secretion of what digestive juice is the result of it?

- A. Saliva.
- B. Pancreatic.
- C. Gastric.
- D. Bile.

E. Intestinal.

**579.** A patient with the symptoms of acute alcoholic poisoning was brought to the hospital. What carbohydrates metabolism changes are typical for this condition?

- A. The gluconeogenesis velocity in liver is decreased
- B. The gluconeogenesis is increased in liver
- C. The breakage of glycogen is increased in liver
- D. The anaerobic glucose metabolism predominates in muscles
- E. The anaerobic breakage of glucose is increased in muscles

**580.** A 30-year-old woman was diagnosed with insufficiency of exocrinous function of pancreas. Hydrolisis of what nutrients will be disturbed?

- A. Fats, carbohydrates
- B. Proteins, fats
- C. Proteins, carbohydrates
- D. Proteins, fats, carbohydrates
- E. Proteins

**581.** Removal of gall bladder of a patient has disturbed processes of *Ca* absorption through the intestinal wall. What vitamin will stimulate this process?

- A. *D3*
- B. *PP*
- C. *C*
- D. *B12*
- E. *K*

**582.** Examination of a 35 year old patient revealed high acidity of gastric juice. What receptors should be blocked in order to reduce it?

- A. Histamine
- B.  $\alpha$ 1-adrenoreceptors
- C.  $\alpha$ 2-adrenoreceptors
- D.  $\beta$ 1-adrenoreceptors
- E.  $\beta$ 2-adrenoreceptors

**583.** A 30 year old woman has subnormal concentration of enzymes in the pancreatic juice. This might be caused by the

hyopsecretion of the following gastrointestinal hormone:

- A. Vaso-intestinal peptide
- B. Somatostatin
- C. Secretin
- D. Gastro-inhibiting peptide
- E. Cholecystokinin-pancreozymin

**584.** A 60 year old patient was found to have a dysfunction of main digestive enzyme of saliva. This causes the disturbance of primary hydrolysis of:

- A. Fats
- B. Proteins
- C. Carbohydrates
- D. Cellulose
- E. Lactose

**585.** A patient has normally colored stool including a large amount of free fatty acids. The reason for this is a disturbance of the following process:

- A. Fat hydrolysis
- B. Fat absorption
- C. Biliary excretion
- D. Choleresis
- E. Lipase secretion

**586.** A patient has a critical impairment of protein, fat and hydrocarbon digestion. Most likely it has been caused by low secretion of the following digestive juice:

- A. Pancreatic juice
- B. Saliva
- C. Gastric juice
- D. Bile
- E. Intestinal juice

## 11. EXCRETORY SYSTEM

**587.** A man after 1,5 liter blood loss has suddenly reduced diuresis. The increased secretion of what hormone caused such diuresis alteration?

- A. Natriuretic
- B. Vasopressin
- C. Cortisol
- D. Corticotropin

E. Parathormone

**588.** A 35-year-old patient who often consumes alcohol was treated with diuretics. There appeared serious muscle and heart weakness, vomiting, diarrhea, AP – 100/60 mm Hg, depression. This condition is caused by intensified excretion with urine of:

- A. Sodium
- B. Potassium
- C. Chlorine
- D. Phosphates
- E. Calcium

**589.** The peculiarity of renal circulation of the blood is:

- A. The afferent arteriole's diameter is larger than diameter of efferent arteriole
- B. Near 90% of the circulating blood passes through kidneys
- C. The low circulation rate
- D. There is one capillary system
- E. Kidneys absorb little oxygen and are not sensitive to its lack

**590.** What is the difference between the initial urine and the blood?

- A. Absence of blood cells and large-molecular proteins
- B. Presence of exchange products
- C. Absence of aminoacids
- D. Absence of glucose
- E. Absence of vitamins

**591.** The qualitative content of the creatine in urine is:

- A. 1.2 mmole/L
- B. 0.15 mmole/L
- C. 0.25 mmole/L
- D. 0.05 mmole/L
- E. 0.3 mmole/L

**592.** The level of natrium's serum of 73 years old patient is 170 mmole/l. What is the most probably reason of hypernatremia?

- A. Dehydration
- B. High use of salt with the food
- C. Uraemia

- D. Unproportional secretion of vasopressin
- E. Overdose of diuretics

**593.** The low specific weight of the secondary urine (1002) was found out at the sick person. At what part of nephron the substance of the secondary urine concentrate to the outmost?

- A. At the nephron's glomerulus
- B. At proximal tubuli of nephron
- C. At the ductus papillares
- D. At ascending part of Genley's loop
- E. At distalis tubuli of nephron

**594.** Indicate the substances that create osmotic concentration gradient of kidneys:

- A. Natrium and urea
- B. Natrium and creatinine
- C. Natrium and phosphates
- D. Natrium and calcium
- E. Natrium and uric acid

**595.** For the compensation kidney's acidosis is taken out:

- A. More ions of natrium
- B. Less ions of hydrogen
- C. More bicarbonate
- D. Less phosphates
- E. More ions of hydrogen

**596.** Which point is not correct about regulation acid-base balance?

- A. Ammoniogenesis – it is a formation  $H_2CO_3$  in kidneys
- B. Kidneys take out nonvolatile acid from organism
- C. Respiratory compensation of metabolic acidosis includes tachypnea
- D. Respiratory acidosis is a consequence of violation external breathing
- E. Kidneys realize regeneration of bicarbonate buffer

**597.** Indicate the changes of homeostatic parameters which increase the rate of glomerular filtration:

- A. Hyperproteinemia
- B. Hypoglycemia
- C. Hypoproteinemia

- D. Hypersomia
- E. Hypervolemia

**598.** As a result of a long stay in heat a person gets thirsty. Signaling from what receptors caused its development?

- A. Glucoreceptors of the hypothalamus.
- B. Sodiums receptors of the hypothalamus.
- C. Osmoreceptors of the liver.
- D. Osmoreceptors of the hypothalamus.
- E. Baroreceptors of the arch of aorta.

**599.** The loss of 0.5 L of blood by a dog was compensated by an intravenous injection of a balanced saline solution with glucose. It is accompanied by the increase of glomerular filtration rate. What is the credible reason for the increase of this index of the dog?

- A. Increase of kidneys filter permeability.
- B. Increase of system arteriotony.
- C. Decrease of the hydrostatic pressure.
- D. Decrease of the oncotic pressure of blood plasma.
- E. Increase of effective renal blood flow.

**600.** An increase of arteriotony, especially diastolic, of a person suffering from a kidney disease was diagnosed. The concentration of what biologically active substance was increased in the patient's blood.

- A. Noradrenaline.
- B. Adrenaline.
- C. Rennin.
- D. Vasopressin.
- E. Catecholamines.

**601.** A person was injected intravenously 0.5 l of isotonic solution of a pharmaceutical substance. Which of the following receptors will react to the changes of the water-salt balance of the organism first of all?

- A. Osmoreceptors of the liver.
- B. Osmoreceptors of the hypothalamus.
- C. Volume receptors of venous cavas and atrium.
- D. Sodium receptors of the hypothalamus.
- E. Baroreceptors of the arch of aorta.

**602.** As a result of a trauma a person lost 500 ml blood which resulted in the decrease of diuresis. The influence on the kidneys of what hormone caused this adaptive change?

- A. Cortisol.
- B. Atrial natriuretic factor.
- C. Aldosterone.
- D. Vasopressin.
- E. Rennin.

**603.** At dinner a person ate salt herring and potato with a pickled cucumber. Some time later he felt thirsty. Excitation of what receptors caused this feeling?

- A. Baroreceptors of the arch of aorta.
- B. Volume receptors of venous cavas and atriums.
- C. Baroreceptors of carotid sinuses.
- D. Volumoreceptors of the hypothalamus.
- E. Osmoreceptors of the hypothalamus.

**604.** After giving blood as a donor, a student felt thirsty. The increased secretion of what biologically active substance stimulated it?

- A. Angiotensin II.
- B. Aldosterone.
- C. Erythropoetin.
- D. Adrenaline.
- E. Noradrenaline.

**605.** During an experiment a dog under anesthetic was injected with vasopressin. As a result of that the quantity of urine decreased. What influence of vasopressin caused it?

- A. Decrease of the reabsorption of water.
- B. Increase of the reabsorption of sodium.
- C. Increase of the reabsorption of water.
- D. Decrease of the reabsorption of calcium.
- E. Increase of the reabsorption of calcium.

**606.** A transplanted kidney reacts to pain stimulations by the stop of urinary excretion. What is the reason for this reaction?

- A. Increase of the secretion of antidiuretic hormone.
- B. Decrease of the secretion of antidiuretic hormone.

C. Influence of the parasympathetic part of the nervous system.

D. Influence of the sympathetic part of the nervous system.

E. Decrease of the secretion of corticotrophin.

**607.** As a result of long starvation glomerular filtration rate of a person increased by 20 %. What is the credible reason for the change of filtration in the mentioned conditions?

A. Increase of renal plasma current.

B. Increase of system arteriotony.

C. Increase of the permeability of the renal filter.

D. Increase of glomerular capillary filtration coefficient.

E. Decrease of the oncotic pressure of blood plasma.

**608.** A person has a decreased diuresis, hypernatremia, and hypokaliemia in blood plasma. Hypersecretion of what hormone can be the reason for such changes?

A. Aldosterone.

B. Vasopressin.

C. Atrial diuretic factor.

D. Adrenaline.

E. Parathormone.

**609.** During the laboratory research the presence of glucose was detected in the urine of an 18-year-old patient, while its concentration in blood plasma was normal. Violation of what process is the most possible reason for this state?

A. Secretion of insulin.

B. Glomerular filtration.

C. Tubular secretion.

D. Tubular reabsorption.

E. Secretion of glucocorticoids.

**610.** A person has a decreased diuresis as a result of increased secretion of vasopressin. The increase of what index stimulates the secretion of vasopressin?

A. Osmotic pressure of plasma.

B. Concentration of sodium.

C. Volume of circulatory blood.

D. Oncotic pressure of plasma.

E. Concentration of potassium.

**611.** During an experiment the processes of energy formation in the epithelium of renal tubules were blocked. As a result of it diuresis increased by a factor of four. The decrease of what index is the most possible reason for polyuria?

- A. Glomerular filtration rate.
- B. Reabsorption of sodium ions.
- C. Secretion of potassium ions.
- D. Renal blood flow.
- E. Secretion of urea.

**612.** As a result of long starvation glomerular filtration rate of a person increased by 20%. What is the credible reason for the change of filtration in the mentioned conditions?

- A. Increase of the permeability of renal filter.
- B. Increase of system arteriotony.
- C. Decrease of the oncotic pressure of blood plasma.
- D. Increase of glomerular capillary filtration coefficient.
- E. Increase of renal plasma current.

**613.** A long abuse of potassium preparations by a person resulted in the increased of potassium content in blood plasma. The change of secretion of what hormone will it cause?

- A. Increase of aldosterone secretion.
- B. Decrease of aldosterone secretion.
- C. Increase of vasopressin secretion.
- D. Decrease of vasopressin secretion.
- E. Decrease of rennin secretion.

**614.** During an experiment a rabbit was intravenously injected 300 ml of isotonic of sodium chloride, which resulted in the considerable increase of circularity blood volume. Concentration of what substance will be increased in the rabbit's blood these conditions provided?

- A. Atrial natriuretic factor.
- B. Rennin.
- C. Aldosterone.
- D. Angiotensin II.
- E. Adrenaline.

**615.** During a laboratory examination of a 54-year-old man it was determined that inuline clearance is 120 ml per minute. What index of this man meets the norm?

- A. Glomerular filtration rate.
- B. Tubular reabsorption.
- C. Tubular secretion.
- D. Renal blood flow.
- E. Renal plasma current.

**616.** A man of 35 had had the flu complicated by the affection of the CNS. His day's amount of urine considerably increased after the disease. Which of the cerebral department was the most probably affected?

- A. Spinal cord.
- B. Mesencephalon.
- C. Prosencephalon.
- D. Metencephalon.
- E. Diencephalon.

**617.** In an experiment on an animal by overstretching of atriums by blood the decrease of the reabsorption of sodium ions and water in renal tubules was caused. The influence on kidney of what hormones can it is explained by?

- A. Rennin.
- B. Aldosterone.
- C. Atrial natriuretic factor.
- D. Angiotensin.
- E. Vasopressin.

**618.** A person has got a considerable reduction of urine quantity after salt food intake. The influence of what hormone cans it is explained by?

- A. Somatostatin.
- B. Adrenaline.
- C. Corticotropin.
- D. Oxytocin.
- E. Antidiuretic.

**619.** Long-lasting vomiting of a 32-year-old patient resulted in fluid loss. The increased secretion of what hormone promotes water preservation in the organism?

- A. Thyroxin.
- B. Calcitonin.

- C. Vasopressin.
- D. Somatostatin.
- E. Aldosterone.

**620.** Hyponatremia and hyperkalemia of a patient were diagnosed. The reduced secretion of what hormone can cause such changes?

- A. Cortisol.
- B. Vasopressin.
- C. Aldosterone.
- D. Parathormone.
- E. Atrial natriuretic factor.

**621.** During the research of a new low-molecular preparation X it was determined that its clearance was higher than the clearance of inuline. What is the mechanism of the excretion of the preparation by kidneys?

- A. Secretion.
- B. Filtration.
- C. Filtration and secretion.
- D. Filtration and reabsorption.
- E. Secretion and reabsorption.

**622.** A great number of protein and erythrocytes were detected in urine. The increase of what index can be the reason for it?

- A. Permeability of renal filter.
- B. Net filtration pressure.
- C. Hydrostatic blood pressure in glomerular capillaries.
- D. Hydrostatic pressure of primary urine in the capsule.
- E. Oncotic pressure of blood plasma.

**623.** A man's glomerular filtration rate is 80 ml per min (norm –  $125 \pm 25$  ml per min). The increase of what index can be the reason for it?

- A. Renal blood flow.
- B. Net filtration pressure.
- C. Hydrostatic blood pressure in glomerular capillaries.
- D. Oncotic pressure of blood plasma.
- E. Permeability of renal filter.

**624.** A man's glomerular filtration rate is 180 ml per min (norm –  $125 \pm 25$  ml per min). The reduction of what index can be the reason for it?

- A. Oncotic pressure of blood plasma.
- B. Net filtration pressure.
- C. Hydrostatic blood pressure in glomerular capillaries.
- D. Renal blood flow.
- E. Permeability of renal filter.

**625.** A person has hyponatremia and hyperkalemia. The increased secretion of what hormone will it cause?

- A. Vasopressin.
- B. Cortisol.
- C. Aldosterone.
- D. Atrial natriuretic factor.
- E. Parathormone.

**626.** A person's osmotic pressure of blood plasma is 350 mosmol/L (norm – 300 mosmol/L). The increased secretion of what hormone will it cause?

- A. Vasopressin.
- B. Aldosterone.
- C. Cortisol.
- D. Corticotropin.
- E. Atrial natriuretic factor.

**627.** As a result of the loss of 1.5 l of blood a person has got sharp decrease of diuresis. The increased secretion of what hormone caused the change in diuresis?

- A. Cortisol.
- B. Corticotropin.
- C. Atrial natriuretic factor.
- D. Vasopressin.
- E. Parathormone.

**628.** In experiment on a rabbit the narrowing of kidney arteria resulted in the increase of system arteriotony. The increase of concentration of what biologically active substance in blood plasma caused hypertension?

- A. Medullinum.
- B. Erythropoietin.
- C. Prostaglandins.
- D. Vasopressin.
- E. Rennin.

**629.** A patient who lost about 500 ml blood was delivered to a hospital. During an examination it



was determined that considerable decrease of the volume of circulatory blood was absent. The increased secretion of which of the following hormones is the reason for it?

- A. Thyroxin.
- B. Adrenaline.
- C. Noradrenaline.
- D. Aldosterone.
- E. Cortisol.

**630.** The substance, which was introduced to a dog during an experiment, resulted in the damage of the renal filter. Which of the following substances can be detected in the animal's urine as a result of it?

- A. Ions of sodium.
- B. Glucose.
- C. Amino acids.
- D. Proteins.
- E. Ions of calcium.

**631.** A boy of 10 drank 1.5 L of water at once. The change in secretion of which of the following hormones will result in the increase of the volume of circulatory blood?

- A. Aldosterone.
- B. Atrial natriuretic factor.
- C. Vasopressin.
- D. Corticotropin.
- E. Rennin.

**632.** The decline of synthesis of vasopressin of a patient was determined, that caused polyuria, the result of which was evident fluid loss. What is the mechanism of polyuria development?

- A. Increase of glomerular filtration.
- B. Reduction of tubular reabsorption of sodium ions.
- C. Reduction of the tubular reabsorption of proteins.
- D. Reduction of the reabsorption of glucose.
- E. Reduction of tubular reabsorption of water.

**633.** In the kidneys of a patient the reabsorption of calcium ions is increased, and that of phosphate ions is reduced. The influence of what hormone was the reason for such changes?

- A. Parathormone.

- B. Thyrocalcitonin.
- C. Hormonal form of vitamin D<sub>3</sub>.
- D. Aldosterone.
- E. Vasopressin.

**634.** The level of glucose in a person's blood is 15 millimoles/L (threshold of reabsorption is 10 mmol/L). What process will become the result of the glucose level increase?

- A. Decrease of vasopressin secretion.
- B. Decrease of diuresis.
- C. Decrease of glucose reabsorption.
- D. Glucosuria.
- E. Decrease of aldosterone secretion.

**635.** The low specific gravity of the secondary urine (1002) was found out in the sick person. What is the most distant part of nephron where concentration of secondary urine takes place?

- A. In the collecting duct
- B. In the nephron's glomerulus
- C. In proximal tubule of nephron
- D. In ascending part of loop of Henle
- E. In distal tubule of nephron

**636.** Glomerular filtration rate (GFR) increased by 20% due to prolonged starvation of the person. The most evident cause of filtration changes under this condition is:

- A. Increase of filtration coefficient
- B. Increase of systemic blood pressure
- C. Increase of penetration of the renal filter
- D. Decrease of oncotic pressure of blood plasma
- E. Increase of renal plasma stream

**637.** A 58-year-old patient with acute cardiac insufficiency has decreased volume of daily urine - oliguria. What is the mechanism of this phenomenon?

- A. Rise of hydrostatic blood pressure in capillars
- B. Decreased number of functioning glomerules
- C. Drop of oncotic blood pressure
- D. Decreased glomerular filtration
- E. Reduced permeability of renal filter

**638.** Kidneys of a man under examination show increased resorption of calcium ions and

decreased resorption of phosphate ions. What hormone causes this phenomenon?

- A. Parathormone
- B. Thyrocalcitonin
- C. Hormonal form  $D_3$
- D. Aldosterone
- E. Vasopressin

**639.** As a result of long-term starvation the glomerular filtration of a man was accelerated by 20%. The most probable cause of filtration changes under such conditions is:

- A. Increased permeability of renal filter
- B. Rise of systemic arterial pressure
- C. Fall of oncotic pressure of blood plasma
- D. Growth of filtration coefficient
- E. Increase of renal plasma flow

**640.** A concentrated solution of sodium chloride was intravenously injected to an animal. This caused decreased reabsorption of sodium ions in the renal tubules. It is the result of the following changes of hormonal secretion:

- A. Aldosterone reduction
- B. Aldosterone increase
- C. Vasopressin reduction
- D. Vasopressin increase
- E. Reduction of atrial natriuretic factor

**641.** A patient has a decreased vasopressin synthesis that causes polyuria and as a result of it evident organism dehydration. What is the mechanism of polyuria development?

- A. Reduced tubular reabsorption of protein
- B. Reduced tubular reabsorption of  $Na$  ions
- C. Reduced tubular reabsorption of water
- D. Reduced glucose reabsorption
- E. Acceleration of glomerular filtration

**642.** A driver who got a trauma in a road accident and is shocked has reduction of daily urinary output down to 300 ml. What is the main pathogenetic factor of such diuresis change?

- A. Drop of oncotic blood pressure
- B. Drop of arterial pressure
- C. Increased vascular permeability
- D. Decreased number of functioning glomerules

E. Secondary hyperaldosteronism

**643.** A concentrated solution of sodium chloride was intravenously injected to an animal. This caused decreased reabsorption of sodium ions in the renal tubules. It is the result of the following changes of hormonal secretion:

- A. Aldosterone reduction
- B. Aldosterone increase
- C. Vasopressin reduction
- D. Vasopressin increase
- E. Reduction of atrial natriuretic factor

**644.** A child has an acute renal failure. What biochemical factor found in saliva can confirm this diagnosis?

- A. Decrease in nucleic acid concentration
- B. Increase in glucose concentration
- C. Decrease in glucose concentration
- D. Increase in concentration of higher fatty acids
- E. Increase in urea concentration

**645.** Atria of an experimental animal were superdistended by blood that resulted in decreased reabsorption of  $Na^+$  and water in renal tubules. This can be explained by the influence of the following factor upon kidneys:

- A. Angiotensin
- B. Aldosterone
- C. Renin
- D. Natriuretic hormone
- E. Vasopressin

**646.** Due to the use of poor-quality measles vaccine for preventive vaccination, a 1-year-old child developed an autoimmune renal injury. The urine was found to contain macromolecular proteins. What process of urine formation was disturbed?

- A. Reabsorption and secretion
- B. Reabsorption
- C. Secretion
- D. Filtration
- E. Secretion and filtration

**647.** Urine analysis has shown high levels of protein and erythrocytes in urine. This can be caused by the following:

- A. Effective filter pressure
- B. Renal filter permeability
- C. Hydrostatic blood pressure in glomerular capillaries
- D. Hydrostatic primary urine pressure in capsule
- E. Oncotic pressure of blood plasma

**648.** According to the results of glucose tolerance test, the patient has no disorder of carbohydrate tolerance. Despite that, glucose is detected in the patients's urine (5 mmol/l). The patient has been diagnosed with renal diabetes. What renal changes cause glucosuria in this case?

- A. Decreased activity of glucose reabsorption enzymes
- B. Increased activity of glucose reabsorption enzymes
- C. Exceeded glucose reabsorption threshold
- D. Increased glucose secretion
- E. Increased glucose filtration

**649.** Due to the use of poor quality measles vaccine for preventive vaccination, a 1-year-old child has developed an autoimmune renal injury. The urine was found to contain macromolecular proteins. What process of urine formation has been disturbed?

- A. Secretion
- B. Reabsorption
- C. Filtration
- D. Reabsorption and secretion
- E. Secretion and filtration

## KEYS OF RIGHT ANSWERS

1. A	2. D	3. A	4. B	5. C	6. D	7. A	8. A	9. B	10. E
11. A	12. E	13. B	14. E	15. E	16. A	17. B	18. C	19. D	20. E
21. C	22. A	23. C	24. A	25. C	26. A	27. D	28. C	29. B	30. B
31. A	32. C	33. B	34. C	35. A	36. E	37. A	38. B	39. D	40. A
41. B	42. A	43. A	44. C	45. D	46. E	47. A	48. D	49. E	50. A
51. E	52. A	53. E	54. B	55. D	56. C	57. A	58. E	59. B	60. E
61. B	62. E	63. C	64. E	65. D	66. A	67. E	68. C	69. E	70. B
71. E	72. B	73. D	74. D	75. E	76. C	77. D	78. E	79. B	80. B
81. E	82. C	83. A	84. B	85. A	86. D	87. C	88. E	89. C	90. B
91. C	92. D	93. C	94. D	95. D	96. A	97. E	98. B	99. A	100. E
101. A	102. C	103. D	104. C	105. B	106. A	107. C	108. E	109. B	110. D
111. A	112. B	113. E	114. A	115. B	116. A	117. C	118. D	119. A	120. D
121. C	122. A	123. C	124. A	125. B	126. A	127. E	128. B	129. A	130. E
131. C	132. E	133. D	134. E	135. A	136. B	137. B	138. A	139. A	140. A
141. E	142. D	143. C	144. D	145. E	146. A	147. A	148. C	149. E	150. D
151. B	152. E	153. A	154. D	155. E	156. A	157. A	158. A	159. C	160. E
161. C	162. A	163. D	164. E	165. B	166. E	167. A	168. C	169. A	170. A
171. D	172. A	173. A	174. D	175. C	176. C	177. E	178. A	179. C	180. A
181. E	182. A	183. D	184. B	185. A	186. C	187. A	188. A	189. A	190. A
191. B	192. E	193. C	194. A	195. B	196. D	197. E	198. B	199. C	200. D
201. A	202. E	203. B	204. A	205. D	206. B	207. D	208. D	209. B	210. C
211. E	212. E	213. B	214. A	215. D	216. A	217. C	218. C	219. B	220. A
221. B	222. A	223. D	224. A	225. C	226. D	227. A	228. D	229. B	230. D
231. E	232. D	233. E	234. A	235. A	236. A	237. A	238. C	239. C	240. D
241. A	242. C	243. A	244. D	245. B	246. A	247. A	248. B	249. A	250. E
251. A	252. B	253. C	254. A	255. A	256. B	257. B	258. E	259. A	260. C
261. B	262. C	263. B	264. C	265. D	266. A	267. B	268. C	269. C	270. A
271. B	272. C	273. A	274. E	275. B	276. C	277. D	278. D	279. E	280. A

281. A	282. E	283. C	284. A	285. E	286. C	287. E	288. A	289. D	290. C
291. A	292. C	293. E	294. A	295. C	296. B	297. D	298. E	299. A	300. B
301. E	302. A	303. D	304. A	305. A	306. C	307. B	308. A	309. E	310. C
311. A	312. B	313. D	314. C	315. A	316. D	317. A	318. D	319. A	320. E
321. E	322. D	323. E	324. D	325. A	326. D	327. D	328. C	329. A	330. B
331. D	332. D	333. B	334. C	335. E	336. C	337. D	338. A	339. B	340. D
341. B	342. D	343. A	344. C	345. A	346. B	347. A	348. D	349. A	350. B
351. D	352. C	353. A	354. C	355. C	356. B	357. A	358. A	359. E	360. E
361. C	362. A	363. A	364. B	365. D	366. E	367. C	368. D	369. A	370. D
371. C	372. D	373. E	374. A	375. B	376. A	377. B	378. B	379. A	380. C
381. D	382. E	383. D	384. B	385. B	386. B	387. B	388. A	389. C	390. D
391. A	392. C	393. D	394. C	395. D	396. E	397. A	398. B	399. C	400. D
401. E	402. C	403. C	404. C	405. E	406. A	407. A	408. C	409. C	410. E
411. A	412. E	413. D	414. E	415. C	416. D	417. A	418. E	419. A	420. B
421. A	422. E	423. B	424. C	425. A	426. C	427. E	428. C	429. B	430. C
431. D	432. A	433. D	434. B	435. A	436. B	437. D	438. D	439. C	440. D
441. D	442. A	443. A	444. D	445. C	446. A	447. E	448. E	449. A	450. A
451. B	452. D	453. A	454. C	455. D	456. E	457. D	458. D	459. C	460. A
461. D	462. D	463. A	464. D	465. E	466. A	467. D	468. A	469. B	470. E
471. B	472. A	473. B	474. C	475. D	476. E	477. A	478. B	479. C	480. A
481. C	482. B	483. C	484. C	485. A	486. C	487. B	488. C	489. A	490. B
491. D	492. A	493. A	494. A	495. D	496. A	497. E	498. D	499. D	500. D
501. E	502. C	503. D	504. B	505. A	506. A	507. A	508. A	509. C	510. B
511. C	512. C	513. A	514. E	515. A	516. E	517. E	518. B	519. E	520. E
521. D	522. E	523. A	524. C	525. A	526. A	527. E	528. C	529. A	530. B
531. D	532. A	533. A	534. A	535. B	536. A	537. E	538. B	539. B	540. A
541. E	542. A	543. A	544. A	545. D	546. C	547. E	548. C	549. D	550. E
551. E	552. A	553. E	554. B	555. C	556. A	557. E	558. C	559. C	560. E
561. A	562. C	563. B	564. C	565. B	566. B	567. C	568. A	569. E	570. B
571. B	572. B	573. D	574. C	575. D	576. A	577. D	578. B	579. A	580. D

581. A	582. A	583. E	584. C	585. B	586. A	587. B	588. B	589. A	590. A
591. D	592. A	593. C	594. A	595. E	596. A	597. C	598. D	599. D	600. C
601. C	602. D	603. E	604. A	605. C	606. A	607. E	608. A	609. D	610. A
611. B	612. C	613. A	614. A	615. A	616. E	617. C	618. E	619. C	620. C
621. C	622. A	623. D	624. A	625. C	626. A	627. D	628. E	629. B	630. D
631. C	632. E	633. A	634. D	635. A	636. D	637. D	638. A	639. C	640. A
641. C	642. B	643. A	644. E	645. D	646. D	647. B	648. A	649. C	