

Ministry of Health, Ukraine  
The Odessa National Medical University  
Department of Physiology

**TESTS FOR SELF-PREPARATION  
FOR THE INTEGRATED  
TEST CONTROL ON THE PHYSIOLOGY  
FOR STUDENTS OF THE GENERAL  
MEDICINE SPECIALTY  
OF THE II-nd GRATE**

Odessa  
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## EXCITABLE TISSUES

Edited, compiled and translated by

Onufrienko O. V., Topal M. M.,  
Lyashenko S. L., Pryshchepa O. O., Denysenko O. V.,  
Volokhova G. O., Kaschenko O. A.

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Proposed educational and methodological tests contain test tasks on the subject “Physiology”.

Present educational and methodical tests are designed for students of the 2-nd grade of the Medical faculty studying Physiology.

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1. What level of stimulation must be applied to the nerve fiber to cause excitation in the relative refractory phase?
  - A. suprathreshold
  - B. Subthreshold
  - C. Threshold
  - D. Subthreshold for a long
  - E. threshold for a long
2. In experiment, the threshold of stimulation of cells of various tissues has been studied. Where it was the lowest?
  - A. In motor neurons of the spinal cord
  - B. in glandular cells
  - C. In skeletal muscle myocytes
  - D. In smooth muscle myocytes
  - E. In cardiomyocytes
3. In the cell, the synthesis of ATP has been completely blocked. How will change the value of the resting potential?
  - A. Disappear
  - B. increase slightly
  - C. Significantly increase
  - D. first increase and then decrease
  - E. first decrease, then increase
4. Due to the action of the electric current on excitable cell the depolarization of membrane has occurred. Movement of what ions through the membrane plays a major role in the development of depolarization?
  - A.  $\text{Na}^+$
  - B.  $\text{HCO}_3^-$
  - C.  $\text{Ca}^{2+}$
  - D.  $\text{Cl}^-$
  - E.  $\text{K}^+$
5. Due to the activation of ion channels of the outer membrane of excitable cell its resting potential significantly increased. What channels have been activated?
  - A. Potassium
  - B. Sodium
  - C. fast calcium
  - D. Slow calcium
  - E. sodium and calcium
6. Studies on isolated muscle fibers are in progress. It is established that the threshold of stimulation of cell has significantly decreased. Which of the following could cause this?
  - A. activation of membrane sodium channels
  - B. activation of potassium channels of the membrane
  - C. inactivation of membrane sodium channels
  - D. inactivation of calcium channels of membrane
  - E. Cellular energy production arrest
7. The excitability of cell in the depolarization phase of AP is:
  - A. fast and significantly reduces
  - B. increases sharply
  - C. Slightly increases
  - D. declines slightly
  - E. remains unchanged
8. The action potential is caused mainly by the passive transport of ions:
  - A. of sodium ions into the cell
  - B. sodium ions out of the cell
  - C. potassium ions into the cell
  - D. chloride ions into the cell
  - E. chlorine ions out of the cell
9. An isolated muscle, which is placed in Krebs solution, has underwent subthreshold stimulation. What phenomenon will occur?
  - A. local response
  - B. Ion Channels Inactivation
  - C. action potential
  - D. membrane hyperpolarization
  - E. No changes
10. After the exposure to the toxin the synthesis of ATP has been completely blocked. How will change the value of the resting potential?
  - A. Disappear
  - B. increase slightly
  - C. Significantly increase
  - D. first increase and then decrease
  - E. first decrease, then increase

11. Excitable cell with a resting potential of -90 mV has been treated with a substance that selectively blocks ion channels. What channels are blocked, if the result of this is the resting potential of -70 mV?

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

12. What is the main mechanism of the membrane potential origination?

- A. Diffusion of potassium out of the cell
- B. Diffusion of potassium in the cell
- C. Diffusion of sodium in the cell
- D. Diffusion sodium out of the cell
- E. Diffusion of chlorine in the cell

13. The increased permeability to what ions makes the basis of the postsynaptic membrane hyperpolarization?

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

14. In experiment, the postsynaptic membrane of a neuron has been treated with a substance that caused its hyperpolarization. Which ion permeability in the postsynaptic membrane increased in this situation?

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

15. Why there is no response when a threshold stimulation is applied during the absolute refractory phase?

- A. there is extremely low excitability
- B. Lack of strength of stimulation
- C. decrease in excitability
- D. High excitability
- E. Reduced lability

16. What force of stimulation should be chosen to cause excitation of the nerve fiber in the subnormal refractory phase?

- A. suprathreshold

- B. Subthreshold
- C. Threshold
- D. Subthreshold, long enough
- E. All answers are correct

17. With the microelectrode technique was measured the membrane potential of motor neuron of spinal cord. In this case, the neuron depolarization was detected after exposure to pharmaceuticals. What might be the reason?

- A. increase in sodium permeability of membrane
- B. Increase in potassium permeability
- C. Reduction in sodium permeability
- D. Increase in chlorine permeability
- E. Reduction in calcium permeability

18. With the microelectrode technique measured the membrane potential of motor neuron spinal cord. At the same time was observed hyperpolarization of the neuron after exposure to pharmaceuticals. With might be the reason?

- A. increase in membrane permeability for potassium
- B. increase in membrane permeability for sodium
- C. Increased permeability of the membrane for calcium
- D. reduction in permeability of the membrane for potassium
- E. reduction in permeability of the membrane for chlorine

19. The excitability of cell in the depolarization phase of AP:

- A. fast and significantly reduces
- B. increases sharply
- C. Slightly increases
- D. declines slightly
- E. remains unchanged

20. The main mechanism of the absolute refractory phase is the process:

- A. sodium inactivation
- B. potassium activation
- C. potassium inactivation
- D. sodium and potassium inactivation
- E. sodium inactivation, potassium activation

21. The resting potential of the cell is equal to -80 mV. With the development of AP the magnitude of the membrane potential reached +30 mV during the phase:

- A. overshoot
- B. hyperpolarization
- C. Afterdepolarization
- D. hyperpolarization
- E. depolarization

22. What phase of excitability occurs in the cell if the AP depolarization phase is developing on its membrane?

- A. absolute refractoriness
- B. supernormal excitability (exaltation)
- C. relative refractoriness
- D. Absolute and relative refractoriness
- E. no changes in excitability observed

23. In experiment, was gradually increased the number of  $K^+$  ions in the cytoplasm of excitable cells. How will the membrane potential change?

- A. Increase
- B. Decrease
- C. No changes
- D. Disappear
- E. No correct answer

24. In experiment, was increased the membrane permeability of excitable cells for potassium ions. What changes of the membrane electrical state will happen?

- A. Hyperpolarisation
- B. depolarization
- C. action potential
- D. local response
- E. electrotonic potential

25. In experiment on the white rat the excitability of gastrocnemius muscle was studied. Rapid decrease in excitability of the muscle is required. Which of the following drugs should the researcher apply to provide blockade of sodium channels of the muscle?

- A. Tetrodotoxin
- B. tetraethylammonium
- C. Serotonin
- D. Adrenaline
- E. Dopamine

26. Thickness of the cell membrane increased several times, resulting in increased

electric resistance of the membrane. How will change the rheobase of the cell when compared to typical state?

- A. increase
- B. this parameter will not change
- C. decrease
- D. decrease, then increase
- E. gradually decrease

27. In experiment, the various tissues cell refractivity was studied. Where it was the lowest?

- A. In motor neurons of the spinal cord
- B. in glandular cells
- C. In skeletal muscle myocytes
- D. In smooth muscle myocytes
- E. In cardiomyocytes

28. The Ultra High Frequency (UHF) currents used in physiotherapy do not cause arousal, and have only a thermal effect on the tissues. How can we explain this phenomenon?

- A. Stimulus meets the phase of absolute refractoriness
- B. Duration of stimulus is less than the threshold
- C. Stimulus intensity is less than the threshold
- D. accommodation develops
- E. stimulus meets the phase of relative refractoriness

29. In experiment the excitable cell was put in saline solution containing sodium ions. How will this affect the development of the excitation?

- A. AP does not occur
- B. AP amplitude decreases
- C. Amplitude of AP increases
- D. Duration of AP increases
- E. Duration of AP decreases

30. A tissue sample is being treated with an electric stimulation of cathodic direction, the amplitude of which is equal to the 70% of threshold. What changes in membrane potential this will cause?

- A. Partial depolarisation
- B. Hyperpolarisation
- C. action potential
- D. changes will not occur

31. Thickness of the cell membrane has increased several times, resulting in the increase in the electrical resistance of the membrane. How has the cellular excitability changed?

- A. decreased
- B. hasn't changed
- C. increased
- D. increased and then decreased
- E. temporarily increased

32. In the experiment on white rat the gastrocnemius muscle excitability was investigated. The researcher needed to drastically reduce the excitability of the muscle. Which of the following drugs did the researcher apply to block the sodium channels of the muscle?

- A. tetrodotoxin
- B. tetraethylammonium
- C. Serotonin
- D. adrenaline
- E. dopamine

33. Which of the following receptors of skeletal fibers should neurotransmitter acetylcholine interact with for the EPP to arise on the postsynaptic membrane?

- A. N-cholinergic receptors
- B. M-cholinergic receptors
- C. beta-receptor
- D. alpha-adrenoceptor
- E. All of the above are not true

34. Before opening the boil a surgeon injected round the operative field 1% solution of novocaine. Which of the laws of conduction of excitation along the nerves this would violate?

- A. physiological integrity of the nerve
- B. two-way conduction of excitation
- C. the law of isolated conduction
- D. the «all or none» law
- E. the law of polarity of stimulation

35. Child has bruised the hand finger. His mother immediately plunged the bruised finger in cold water. Which of the laws of conduction of excitation along the nerve would thus become violated?

- A. physiological integrity of the nerve
- B. two-way conduction of excitation

- C. the law of isolated conduction
- D. the «all or none» law
- E. the law of polarity of stimulation

36. In the experiment, the rat sciatic nerve is irritated by direct current and it's been registered excitation of motor neurons of spinal cord, and contraction of the gastrocnemius muscle. The action of which law of conduction of excitation along the nerve has been shown in this case?

- A. two-way conduction of excitation
- B. the law of isolated conduction
- C. the law of anatomical and physiological integrity
- D. the «all or none» law
- E. the law of polarity of stimulation

37. As it is well known, the rat gastrocnemius muscle is innervated by L 4 and L 5 spinal cord segments. In the experiment, there was electrically stimulated L5-ventral root and watched the contractions of flexor muscles, and when stimulated L4 ventral root were observed the extensor muscles contractions. The action of what law of conduction of excitation along the nerve has been shown in this case?

- A. the law of isolated conduction
- B. the law of anatomical and physiological integrity
- C. two-way conduction of excitation
- D. the «all or none» law
- E. the law of polarity of stimulation

38. Isolated conduction of excitation along the nerve is due to:

- A. availability of the myelin sheath
- B. different diameter of fibers comprising the nerve
- C. different speed of conduction along the fibers
- D. short refractory period
- E. axonal properties of the filaments

39. Which of the following cells the greatest lability is the characteristic for?

- A. nerve cell
- B. striated myofibril
- C. smooth myofibril
- D. glandular cell
- E. cardiomyocyte

40. Thickness of the cell membrane has been increased several times, resulting in increased electric resistance of the membrane. How would change the cell rheobase when compared to the normal conditions?

- A. increase of rheobase
- B. change are not going to happen
- C. decrease of rheobase
- D. Rheobase will decrease, then increase
- E. Rheobase will gradually decrease

41. To provide analgesia during surgery doctor used novocaine. Which of the laws of conduction of excitation along the nerves was thus violated?

- A. Physiological Integrity
- B. the «all or none» law
- C. two-way conduction of excitation
- D. the law of isolated conduction
- E. law of nondecremental conduction

42. In experiment was studied the excitability of different parts of neuron. Which part of the neuron would respond by generation of AP to the exciting stimulus of a threshold power?

- A. the axon hill
- B. Base of dendrite
- C. dendritic spines
- D. presynaptic terminal
- E. Soma

43. On the mammalian nerve fiber was investigated the rate of conduction of excitation. Determined the speed of 120 m/s. What group does this fiber belong to?

- A. A-alpha
- B. A-beta
- C. A-delta
- D. B
- E. C

44. In the experiment, the various tissues cells chronaxia was studied. Where was it the lowest?

- A. In motor neurons of the spinal cord
- B. in glandular cells
- C. In skeletal muscle myocytes
- D. In smooth muscle myocytes
- E. In cardiomyocytes

45. In the experiment, the various tissues cells refractivity was studied. Where was it the lowest?

- A. In motor neurons of the spinal cord
- B. in glandular cells
- C. In skeletal muscle myocytes
- D. In smooth muscle myocytes
- E. In cardiomyocytes

46. In the solution, in which the frog gastrocnemius nerve-muscle preparation had been placed, were put a curare-like substance. After a while, the motor nerve of the calf muscle was stimulated. How did the muscle contractions change?

- A. muscle contractions did not occur
- B. contraction reduced
- C. developed a smooth tetanus
- D. developed notched tetanus
- E. muscle contractions did not change

47. In the solution, which contained the frog gastrocnemius nerve-muscle preparation, were introduced drug curare. Why then stimulation of motor nerve did not cause the muscle contraction?

- A. occurred cholinergic blockade of postsynaptic membrane
- B. occurred cholinergic blockade of presynaptic membrane
- C. facilitated the release of acetylcholine to the synaptic cleft
- D. inhibited the release of acetylcholine to the synaptic cleft
- E. Increased permeability of the presynaptic membrane to calcium

48. In the solution, which contained the frog gastrocnemius nerve-muscle preparation, were put eserine, depressing cholinesterase activity. Why didn't the motor nerve stimulation cause contraction of the muscle?

- A. occurred persistent depolarization of the postsynaptic membrane
- B. Increased sodium conductance of postsynaptic membrane
- C. Increased calcium permeability of postsynaptic membrane
- D. Decreased potassium permeability of postsynaptic membrane
- E. Decreased release of acetylcholine to the synaptic cleft

49. Isolated nerve was stimulated by the single electrical stimuli constantly increasing

the power of stimulation. Why the increase in strength of stimulation was accompanied by increase in the amplitude of action potentials, ie nerve did not obey the «all or none» law?

- A. Nerve fibers have different thresholds of intensity of stimulation
- B. nerve fibers have different refractivities
- C. nerve fibers have different labilities
- D. nerve fibers have different rates of accommodation
- E. nerve fibers have different rates of excitation conduction

50. The nerve of the gastrocnemius nerve-muscle preparation of a frog was irritated by electrical stimuli and the AP was recorded in the muscle. Why in the stimulation of the muscles the AP did not arise in the nerve?

- A. neuromuscular synapse had unidirectional conductivity
- B. Amplitude of AP of muscles was insufficient to excite the nerve
- C. In motor nerve, inhibition developed
- D. in the neuromuscular synapse were blocked the production of acetylcholine
- E. No right answer

51. The nerve was stimulated by two consecutive stimuli, and the second stimulus was given in the depolarization phase of AP. Why thus there were only one AP?

- A. The second stimulus matched the phase of absolute refractoriness
- B. occurred an increase in the excitability of the nerve
- C. Decreased the critical level of depolarization of the nerve
- D. Decreased potassium permeability of the membranes of nerve fibers
- E. Increased lability of the nerve

52. With which of the following proteins must calcium ions interact to initiate the output of acetylcholine from vesicles into the synaptic cleft?

- A. calmodulin
- B. Myosin
- C. Actin
- D. Tropomyosin
- E. tubulin

53. Person was taken to the hospital in serious condition. The survey found poisoning with botulinum toxin which blocks calcium channels of synapses. The result was the affected certain process of transmission of nerve excitation in the CNS. What process had been affected?

- A. release of mediators
- B. Transport of mediator through the synaptic cleft
- C. neurotransmitter-receptor binding
- D. Splitting of mediator
- E. Opening of the postsynaptic membrane ion channels

54. It was found the rate of conduction of nerve fibers of 120 m/s. The mentioned fibers are:

- A. axons of motor neurons
- B. preganglionic sympathetic
- C. preganglionic parasympathetic
- D. Postganglionic sympathetic
- E. postganglionic parasympathetic

55. In the experiment with the frog nerve-muscle preparation were studied single muscle contractions in response to electrical stimulation of the nerve. How would the contraction of the muscle change after treatment with a curare-like substance?

- A. Disappear
- B. Increase in strength
- C. Increase in duration
- D. reduction in duration
- E. No changes expected

56. The frog nerve-muscle preparation was treated with poison. After that was preserved the ability of muscles to contract in response to the direct stimulation but lost in response to a nerve stimulation. What does this poison block?

- A. neuromuscular synapse
- B. Coupling of excitation and contraction in muscle
- C. Sodium channels
- D. Potassium Channels
- E. energy production processes

57. A patient visited the hospital with complaints of fatigue and severe muscle weakness. The examination revealed autoimmune

disease that caused the disturbed functional state of receptors in the neuromuscular synapses. The action of which mediator had been blocked?

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

58. After the introduction of curare-like substance arises the relaxation of all skeletal muscles. What is the cause of this phenomenon?

- A. blockade of N-cholinergic receptors of synaptic membrane
- B. Violation of acetylcholine release
- C. presynaptic membrane calcium channels blockade
- D. Violation of synthesis of cholinesterase
- E. Violation of acetylcholine synthesis

59. What type of contraction of muscles occurs in attempt of the upper limb to lift up an unbearable load?

- A. isometric
- B. isotonic
- C. Auxotonic
- D. phasic
- E. twitch contraction

60. In experiment was provided stimulation of skeletal muscle with a series of electrical impulses. What type of muscle contraction occurred if each subsequent impulse met the period of a twitch muscle contraction?

- A. smooth tetanus
- B. Notched (serrated) tetanus
- C. Asynchronous tetanus
- D. Series of single contractions
- E. Muscle contracture

61. In experiment, an isolated frog muscle is being rhythmically annoyed with electrical impulses. Each next impuls meets the period of relaxation of the previous contraction. What type of contraction occurs?

- A. Notched (serrated) tetanus
- B. Single (twitch)
- C. Asynchronous
- D. Smooth tetanus
- E. Tonic contraction

62. Whattype of muscle contraction occurs in the upper limb to hold (without moving) a load in a certain position?

- A. isometric
- B. isotonic
- C. auxotonic
- D. Concentric
- E. eccentric

63. In isotonic contraction of a muscle there also changes its:

- A. Length
- B. Conductivity
- C. automaticity
- D. Tone
- E. No right answer

64. In isometric contraction of a muscle there also changes its:

- A. Tone
- B. automatism
- C. Conductivity
- D. Length
- E. No right answer

65. Student is asked to evaluate the efficiency of muscular work performed by transporting the goods. What law he should use?

- A. Law of medium loads
- B. Starling's Law
- C. power relationship law
- D. Law of Anrep
- E. Law of cephalization

66. In experiment, was provided a skeletal muscle stimulation of a series of electrical impulses. What type of muscle contraction occurred when each subsequent impulse met the period of a twitch muscle contraction?

- A. smooth tetanus
- B. Notched (serrated) tetanus
- C. Asynchronous tetanus
- D. Series of single contractions
- E. Muscle contracture

67. Describe the excitability of muscle during the depolarization phase:

- A. muscle is in the phase of absolute refractoriness
- B. Muscle is in the phase of relative refractoriness
- C. Muscle is in the phase of exaltation (maximum excitability)

- D. reduced excitability  
E. increased excitability
68. In experiment, the muscle taken from the animal ureter was given a load. Muscle had stretched, and remained in the same position after the load had been taken off. What feature is demonstrated by this experiment?
- Plasticity
  - automaticity
  - elasticity
  - Contractility
  - stretchability
69. In the experiment, under the action of a chemical substance was provided decrease in activity of  $\text{Ca}^{++}$  - pump in muscles. What events occurred at the same time?
- increase in the duration of relaxation
  - increase in the duration of AP
  - reduction of the resting potential
  - Reduced of AP rate of conduction
  - Activation of sodium-potassium pump
70. What type of upper limb muscle contraction occurs in need to lift the unbearable weight?
- Isometric
  - isotonic
  - Auxotonic
  - phasic
  - All answers are correct
71. After the long distance race the athlete got contracture of calf muscles (muscles of the lower limbs). The accumulation of what metabolite was the most likely to cause that condition?
- Lactic acid
  - pyruvic acid
  - Creatinine
  - Urea
  - Uric Acid
72. After training, a heavyweight got contracture of the triceps. Reduce of concentration of what substance in the muscles was the most likely to cause that condition?
- ATP
  - pyruvic acid
  - Lactic acid
  - Creatinine
  - Glucose

73. Increase in the amount of calcium ions in the sarcoplasm of a muscle leads to its contraction. Define the possible cause of this:
- activation of active sites of actin
  - activation of calcium pump
  - blockade of the myosin ATPase
  - change in the structure of the molecules of tropomyosin
  - Effect of calcium on the sarcoplasmic reticulum
74. In muscle, has been pharmacologically blocked the ATPase, whereupon it has lost the property to contract. What was the possible reason for that?
- Stopping of the Na-K pump of the surface membrane
  - Opening of reticulum calcium channel
  - opening of potassium channels in the surface membrane
  - sodium inactivation
  - Activation of reticulum calcium pump
75. Which of the following structures is the primary place for fatigue to develop during a long-term physical load?
- Neuromotor centre
  - conductive tracts of spinal cord
  - motorneurons
  - neuromuscular synapses
  - Muscles
76. It is found that a violation of the muscles in a patient is associated with the pathology of production of mediator. Specify this mediator:
- Acetylcholine
  - GABA
  - Dopamine
  - Adrenaline
  - Serotonin
77. It is necessary to evaluate the patient's level of excitability of the nerve. To do this, it is advisable to determine the amount of nerve:
- threshold of intensity of stimulus
  - the resting potential
  - the critical level of depolarization
  - amplitude of the action potential
  - action potential duration

78. In an experiment made by the excitable cell in a salt solution containing no sodium ion. How will this affect the development of the process of excitation?
- action potential arises
  - amplitude of the action potential is reduced
  - amplitude of the action potential increases
  - Duration of the action potential increases
  - Duration of the action potential is reduced
79. In the experiment, it is necessary to assess the level of excitability of the tissue. To do this, it is advisable to determine:
- threshold depolarization
  - The resting potential
  - critical level of depolarization
  - amplitude of AP
  - Time of AP
80. Thickness of the cell membrane increased several times, resulting in an increase in electrical resistance of the membrane. How to change the excitability of the cells?
- decrease
  - No change
  - increase
  - increase and then decrease
  - temporarily increase
81. After administration to a human a curare-like matter arises relaxation of skeletal muscles. What is the cause of this phenomenon?
- blockade of N-cholinergic receptors of the postsynaptic membrane
  - Violation of acetylcholine release
  - blockade of  $\text{Ca}^{2+}$  - channels presynaptic membrane
  - Violation synthesis of cholinesterase
  - Violation of the synthesis of acetylcholine
82. When you remove the tooth you administer novocaine solution to the sensory nerve, resulting in pain relief as a result of violations:
- conduct pain impulses.
  - Training mediators of pain
  - tissue pH

- D. axonal transport  
E. excitability of nociceptors
83. After a long training an athlete developed fatigue with a sharp decline in performance. What link of the reflex arc fatigue occurred in the first order?
- in the nerve centers.
  - In afferent conductors.
  - proprioceptors.
  - in the efferent link.
  - in the muscles
84. 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:
- Depolarization threshold
  - Diameter
  - Conduction velocity
  - Resting potential
  - Critical level of depolarization
85. 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:
- $\text{Na}^{+}$
  - $\text{K}^{+}$  and  $\text{Cl}^{-}$
  - $\text{K}^{+}$  and  $\text{Na}^{+}$
  - $\text{Ca}^{2+}$  and  $\text{Cl}^{-}$
  - $\text{Ca}^{2+}$
86. Poisoning caused by botulinum toxin that prevents calcium ions from entering axone nerve endings of motoneurons is life-threatening because it can lead to:
- Respiratory arrest
  - Cardiac arrest
  - Vasotonic disorder
  - Vomiting
  - Diarrhea
87. Microelectrode analysis of nerve fiber bioelectrical activity revealed, that its membrane potential equals 90 mV. Its initial rest potential was 85 mV. What process occurs in this case?
- Hyperpolarization
  - Depolarization
  - Repolarization
  - Overshoot
  - Supernormality

## CENTRAL NERVOUS SYSTEM

1. In the study of athlete after intense exercise were revealed out a poor motor coordination while maintaining the force of contraction of the muscles. The reason for this may be a decrease in the rate of excitation:

- A. across the central synapses
- B. Across the neuromuscular synapses
- C. in efferent nerves
- D. in afferent nerves
- E. in conducting tracts

2. Self-regulation of functions is carried out in the central nervous system due to the presence of:

- A. feedback loops
- B. summation
- C. Transformation
- D. temporal relationships
- E. reflex arcs

3. The patient at the onset of epilepsy showed generalized seizures (contractions all groups muscles). The mechanism of their development can be attributed primarily to such processes in nerve centres:

- A. irradiation of excitation
- B. Convergence of excitation
- C. Reverberation of excitation
- D. inhibition of irradiation
- E. inhibition of convergence

4. In the study of athletes after intense physical load was found decrease in accuracy of movements while maintaining the strength of muscle contraction. The reason for this may be a reduction in the rate of excitation:

- A. across central synapses
- B. across neuromuscular synapses
- C. in efferent nerves
- D. in afferent nerves
- E. in descending tracts of spinal cord

5. It is known that excitation through the nerve centres is distributed in one direction only. What is the reason for that?

- A. The properties of synapses
- B. Characteristics of nerves
- C. structure of dendrites
- D. Characteristics of axons
- E. Characteristics of mediators

6. In animal were stimulated dorsal roots of spinal cord by single electrical stimuli and recorded the action potentials from the anterior roots. Why during the stimulation of the anterior roots there were not recorded the action potentials from the dorsal roots?

- A. Synapses of spinal cord have as a feature the unilateral conduction of excitation
- B. Fibres of anterior roots do not conduct the excitation to spinal cord
- C. in spinal cord neurons inhibition develops
- D. in spinal cord neurons a neurotransmitter formation is disturbed
- E. dorsal root fibres are less excitable than the fibres of anterior roots

7. Interaction of reflexes occurs in the CNS in accordance with the «common end path.» What properties of nerve centres are the reason for that principle?

- A. convergence
- B. transformation of rhythm
- C. summation
- D. reverberation
- E. occlusion

8. What features of excitation in the central nervous system, are the most likely to be reason for manifestation of the same reflex in stimulation of various receptor fields?

- A. spatial summation
- B. occlusion
- C. convergence
- D. divergence
- E. facilitation

9. In acute experiment, were applied two successive subthreshold stimulations on the dorsal root of spinal cord, in 0.5 msec delay. At the same time, in the anterior root the action potential occurred. What properties of the CNS could this phenomenon be explained by?

- A. temporal summation
- B. transformation
- C. convergence
- D. spatial summation
- E. facilitation

10. In the experiment on an animal, were applied 2 single threshold stimulations on the dorsal root of spinal cord and recorded a discharge of impulses from the anterior roots of spinal cord. What properties of CNS caused this phenomenon?

- A. post-tetanic potentiation
- B. facilitation
- C. spatial summation
- D. transformation
- E. convergence

11. An experiment on the 'spinal' frog is being conducted. After increasing the area of skin which is being acted on by the acid solution, the defensive flexor reflex time decreased from 10 to 6 seconds. Which of these mechanisms caused the decrease in the reflex time?

- A. spatial summation of excitation
- B. principle of dominant
- C. recirculation of excitation
- D. Irradiation of excitation by divergent neural circuits
- E. there is no correct answer

12. Due to the infusion of a chemical solution to a frog, is responded by generalized convulsions to any kind of stimulation. What was introduced to the frog?

- A. Strychnine
- B. Adrenaline
- C. Acetylcholine
- D. Serotonin
- E. Dopamine

13. Which of the following causes the post-synaptic inhibition?

- A. Activation of potassium and chloride channels
- B. Activation of sodium channels
- C. inactivation of potassium and chloride channels
- D. Penetration of inhibitory mediators through the postsynaptic membrane
- E. depolarization of the postsynaptic membrane

14. In experiment were found that during the excitation of the flexor motor neurons, motor neurons that innervate the extensor muscles are in the state of inhibition. What type of inhibition causes this phenomenon?

- A. reciprocal inhibition
- B. inhibition after excitation
- C. pessimal inhibition
- D. recurrent inhibition
- E. Lateral inhibition

15. After introduction of strychnine to a frog it responds to the slightest irritation by generalised convulsions. This is due to the blockade in the central nervous system:

- A. inhibitory synapses
- B. excitatory synapses
- C. Renshaw cell
- D. adrenoceptor
- E. cholinoreceptors

16. In postmortem examination of spinal cord of a 70 year male were found out cell destruction and reduction of cell nuclei of the anterior roots of the both cervical and thoracic regions of spinal cord. What function were violated during his lifetime?

- A. motor functions of the upper limbs
- B. motor functions of the lower extremities
- C. sensitivity and motor functions of the upper limbs
- D. sensitivity of lower extremities
- E. sensitivity of upper limbs

17. Poisoning with botulinic toxin that blocks the entrance of calcium ions into the nerve endings of axons of motor neurons, is life-threatening because as can lead to:

- A. cessation of breathing
- B. Heart failure
- C. Disorder of vascular tone
- D. vomiting
- E. diarrhoea

18. In experiment on animal were cut the dorsal roots of spinal cord. What changes occurred in the area of innervation?

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

19. In experiment on animal were cut the ventral roots of spinal cord. What changes occurred in the area of innervation?

- A. loss of motor functions

- B. Loss of sensation
  - C. reduction in muscle tone
  - D. Increase in muscle tone
  - E. Loss of sensation and motor functions
20. In response to strong rapid muscle contraction is observed its reflex relaxation. With stimulation of what receptors does this reflex reaction begin?
- A. Golgi tendon receptors
  - B. Muscle spindles
  - C. articular receptors
  - D. tactile receptors
  - E. nociceptors
21. In response to stretching of a muscle its reflex contraction is seen. With stimulation of what receptors does this reaction begin?
- A. Muscle spindles
  - B. Golgi tendon receptors
  - C. articular receptors
  - D. Tactile receptors
  - E. nociceptors
22. In the experiment on a frog was studied a myotatic reflex. However, during stretching of skeletal muscle, there were no reflex contraction. Violation of functions of what receptors should you pay attention to?
- A. muscle spindles
  - B. nociceptors
  - C. articular receptors
  - D. Golgi tendon organs
  - E. Tactile receptors
23. The surface on which the intact frog is placed, has been tilted to the right. On this side reflexively increased the tone of extensor muscles, due to the activation of these receptors:
- A. Vestibular receptors of utricle and sacule
  - B. Vestibular receptors of semicircular canals
  - C. mechanoreceptors in the skin of feet
  - D. photoreceptors of the retina
  - E. Proprioceptors
24. The animal has the increased tone of extensor muscles. This is due to the enhanced transmission of information to the spinal motoneurons by one the following tracts:

- A. vestibulospinal
  - B. medial corticospinal
  - C. reticulospinal
  - D. Rubrospinal
  - E. lateral corticospinal
25. Choose from the list of given reflexes a monosynaptic one:
- A. Achilles reflex
  - B. orientating reflex
  - C. Voluntary motor reflexes
  - D. Epithelomuscular reflex
  - E. Vegetative reflex
26. Which of the following is not a reflex?
- A. Contraction of a muscle in response to stimulation of the efferent nerve fibers
  - B. narrowing of the eye pupil in bright light
  - C. Cough in response to stimulation of the upper airways
  - D. relaxation of the muscles in response to their rapid contraction
  - E. contraction of the muscle in response to its stretching
27. As a result of an accident there occurred the dilaceration of spinal cord, and the lower limbs were paralysed. What other functions have been violated?
- A. micturition and defecation
  - B. regulation of vascular tone
  - C. The rhythm of the heart
  - D. Regulation of heat exchange
  - E. Breathing
28. After a car crash accident, in a patient was diagnosed the damage of the pelvic bones, constant urination and defecation. Which region of the brain was damaged?
- A. sacral
  - B. cortical
  - C. Thoracic
  - D. cervical
  - E. Lumbar
29. A 46 year-old man was found to have the gamma motor neurons of spinal cord damaged. What changes of reflex activity are the most likely to be expected?
- A. decrease in activity of proprioceptors
  - B. decrease in postsynaptic inhibition
  - C. increase in presynaptic inhibition

- D. increase in recurrent inhibition
  - E. increase in excitability of the motor neurons
30. Efferent pathway of some reflexes switch onto the anterior root neurons of the spinal cord. Which group do such reflexes belong to?
- A. Motor
  - B. Vegetative
  - C. parasympathetic
  - D. Sympathetic
  - E. None of the above
31. After the injury, a patient has got paralysis, impaired sensitivity to pain on the right. On the left there are no paralysis, but affected pain and temperature sensitivity. What is the reason for this phenomenon?
- A. unilateral spinal cord lesion on the right side
  - B. Damage to the brain stem
  - C. Damage to the midbrain
  - D. Damage to the motor cortex of the brain
  - E. Damage to the cerebellum
32. The spinal cord can independently provide all of the following reflexes, except for:
- A. statokinetic reflexes
  - B. myotatic reflexes
  - C. cutaneous reflexes
  - D. Neck reflexes
  - E. may independently provide all of the above reflexes
33. As a result of a car accident a person got his spinal cord injured at the level of 6-7 thoracic segments. What events will occur after such a damage?
- A. spinal shock
  - B. decerebrate rigidity
  - C. ataxia
  - D. tremor
  - E. plastic tone
34. In the early stages of spinal shock patients show the areflexia phenomenon. What is the primary cause of areflexia?
- A. infringement in descending tracts of spinal cord
  - B. injury and the occurrence of pain
  - C. structural injury of alpha-motoneurons

- D. decrease in blood pressure
  - E. destruction of gamma motor neurons
35. Separating of medulla oblongata from the spinal below CIII - CIV segments is accompanied by areflexia. What mechanisms cause this?
- A. absence of the tonic effects of descending pathways
  - B. depolarization of the soma of motor neurons
  - C. Breaking the descending spinal pathways
  - D. Breaking the ascending pathways of spinal cord
  - E. reduction of excitability of spinal cord neurons due to the injury
36. How will the reflex activity of the spinal cord change if there is a definite injury of gamma motor neurons?
- A. decrease in the activity of proprioceptors
  - B. increase in excitability of the motor neurons
  - C. motor neuron excitability will not change
  - D. Increase in activity of proprioceptors
  - E. Increase in presynaptic inhibition
37. In response to the stretching of a muscle its reflex contraction is observed. With what receptor stimulation does this reflex reaction begin?
- A. muscle spindles
  - B. tendon receptors of Golgi
  - C. articular receptors
  - D. tactile receptors
  - E. nociceptors
38. In response to strong rapid muscle contraction has been observed its reflex relaxation. With stimulation of what receptors does this knee-jerk reaction begin?
- A. tendon receptors of Golgi
  - B. muscle spindles
  - C. Articular receptors
  - D. tactile receptors
  - E. nociceptors
39. On which side of the body comes the loss of pain and temperature sensations in the damage of the left half of spinal cord?



- A. on the right side
  - B. on both sides
  - C. on the left side
  - D. sensitivity will not change
  - E. sensitivity will increase
40. What is the impact of the pyramidal tracts on neurons of the spinal cord?
- A. increase in the excitability of the motor neurons of flexor muscles
  - B. decrease in excitability of the flexor motor neurons
  - C. Do not change the excitability of motor neurons
  - D. increase the excitability of sensory neurons
  - E. reduce the excitability of interneurons
41. How will change the tone of the spinal cord centres after cutting the gamma-loop?
- A. decrease
  - B. will not change
  - C. increase
  - D. increase in the tonus of flexor muscle centres
  - E. increase in the tonus of extensor muscle centres
42. The patient revealed violations of finger-nose test. Impaired function of what a structure of the brain can be the cause of this?
- A. Cerebellum
  - B. Hippocampal
  - C. reticular formation
  - D. Red nuclei
  - E. vestibular nuclei
43. A patient of 70 years has been diagnosed a bleeding in the brain stem. The survey revealed increased tonus of flexor muscles and decreased tonus of extensor muscles. Stimulation of what brain structures can these changes in muscle tonus be explained with?
- A. Red nuclei
  - B. vestibular nuclei
  - C. quadrigeminal bodies
  - D. substantia nigra
  - E. reticular formation
44. During the rotation in a carousel a woman of 25 years was found to have nausea, vomiting, increased sweating. What receptor

- activation caused the development of these symptoms?
- A. vestibular semicircular canals
  - B. skeletal muscle proprioceptors
  - C. in organ of Corti
  - D. optic
  - E. vestibular otolithic
45. Following the destruction of certain structures of the brain stem an animal lost its orientation reflexes in response to strong light stimuli. What structures have been destroyed?
- A. superior colliculi
  - B. inferior colliculi
  - C. Red nuclei
  - D. vestibular nuclei
  - E. substantia nigra
46. While doing exercises on a balance beam a gymnast lost her balance and fell. With excitation of what receptors, first of all, does start the reflexes that ensure the recovery of impaired posture?
- A. otolithic vestibuloreceptors
  - B. ampullary vestibuloreceptors
  - C. Vestibuloreceptors
  - D. Proprioceptors
  - E. Receptors of cochlea
47. In patient with impaired cerebral blood flow the swallowing activity has been found to be disturbed. Specify the affected part of the brain:
- A. brain stem
  - B. cervical part of spinal cord
  - C. forebrain
  - D. diencephalon
  - E. midbrain
48. After destruction of the CNS structures the animal lost its orientating reflexes. What were destroyed?
- A. quadrigemina
  - B. Red nuclei
  - C. lateral vestibular nuclei
  - D. substantia nigra
  - E. medial reticular nuclei
49. The patient was found to have the movement disorders developing: tremor, ataxia and motor hyposynergia, dysarthria. Where the violations are probably to be localized?

- A. Cerebellum
  - B. basal ganglia
  - C. limbic system
  - D. The brain stem
  - E. medulla oblongata
50. Patient walks swaying with the legs wide apart. He has the decreased tonus of muscles in the arms and legs, chanty speech. In what part of the brain is the lesion localized?
- A. Cerebellum
  - B. putamen
  - C. caudate nucleus
  - D. motor cortex
  - E. red nucleus
51. In the experiment on a frog was destroyed labyrinth on the right, which led to a decrease in the tonus of muscles:
- A. extensors on the right
  - B. flexors on the left
  - C. extensors on the left
  - D. flexors on the right
  - E. extensors on both the right and left
52. The animal was found to have increased tonus of extensor muscles. This was due to enhanced information transfer to the motoneurons of the spinal cord by the following descending pathways:
- A. vestibulospinal
  - B. medial corticospinal
  - C. reticulospinal
  - D. Rubrospinal
  - E. lateral corticospinal
53. According to the treatment recommendations, a patient was carried out the removal of one of the structures of the central nervous system. By removing the patient developed atonia, astasia, intention tremor, ataxia, adiadochokinesis. Part of what structure of the central nervous system was removed?
- A. Cerebellum
  - B. amygdaloid complex
  - C. Hippocampus
  - D. basal ganglia
  - E. Limbic System
54. The surface on which the intact frog had been placed was tilted to the right. On this side the tonus of extensor muscles increased

- reflectory, due to activation of these receptors:
- A. Vestibuloreceptors of utricle and saccule
  - B. Vestibuloreceptors of semicircular canals
  - C. mechanoreceptors in the skin of feet
  - D. photoreceptors of the retina
  - E. Proprioceptors
55. A ballet dancer during the dance by rotating to the left side the eyeballs are moving quickly to the left, which is the result of activation of:
- A. Vestibuloreceptors of semicircular canals
  - B. otolithic vestibuloreceptors
  - C. muscle spindles
  - D. articular receptors
  - E. receptors of tendons
56. In experiment on the mesencephalic animal were destroyed the red nuclei. Which of the following reflexes disappear in these conditions?
- A. righting and statokinetic
  - B. Static postural neck reflexes
  - C. myotatic tonic
  - D. myotatic phasic
  - E. Static postural vestibular reflexes
57. In experiment on guinea pig was performed the blockade of the right labyrinth by treating it with chloroform which resulted in the increased muscle tonus of:
- A. extensors on the left
  - B. flexors on the left
  - C. extensors on the right
  - D. flexors on the right
  - E. All extensors
58. On the cat with decerebrate rigidity it's needed to reduce the muscle tonus, which could be done by:
- A. Destruction of the labyrinths
  - B. stimulation of the labyrinths
  - C. stimulation of Deiters nucleus
  - D. vestibulocochlea nerve stimulation
  - E. destruction of the red nucleus
59. What kind of impact does cerebellum have on Deiters nuclei?
- A. Descending inhibitory

- B. Ascending facilitating
  - C. Ascending inhibitory
  - D. Descending facilitating
  - E. All of the above are not true
60. What muscle reflexes are peculiar for decerebrated animals?
- A. Neck and labyrinthine postural-and-tonic
  - B. static righting reflexes
  - C. statokinetic reflexes
  - D. nystagmus of head and eye
  - E. All listed reflexes
61. Cat which had previously undergone the removal of labyrinths was laid on its side. Hereupon it took a normal posture. What type of reflex does this reaction belong to?
- A. righting reflexes
  - B. Static reflexes
  - C. Lift reflexes
  - D. tonic reflexes
  - E. phasic reflexes
62. Decerebrate rigidity occurs as a result of:
- A. transection of the central nervous system below the red nucleus and above the midbrain reticular formation
  - B. transection of the central nervous system at the level of the thoracic part of spinal cord
  - C. tumor of the anterior central gyrus
  - D. transection of the CNS above the red nucleus
  - E. transection of the central nervous system between the medulla and the cervical spinal cord
63. In the emergency unit of neurosurgery department was delivered a man of 37 years with traumatic brain injury who had been injured in a traffic accident. On examination he was diagnosed with the following symptoms: intention tremor, dysmetria, adiadohokinez, dysarthria. Which structure of the brain appears to had been injured?
- A. Cerebellum
  - B. Striatum
  - C. motor cortex
  - D. globus pallidus
  - E. substantia nigra

64. In experiment on the cat, the brain was cut at the level of quadrigemina, hereupon the cat got increased the tonus of extensor muscles. What structure of the brain, in this case, was disconnected from the lower brain structures?
- A. Red nuclei
  - B. substantia nigra
  - C. reticular formation
  - D. nuclei of the oculomotor nerve
  - E. subcortical nuclei of vision and hearing
65. After the introduction of microelectrodes in a structure of the diencephalon the animal completely lost its vision. Which of the subcortical structures was damaged?
- A. The lateral geniculate body
  - B. The medial geniculate body
  - C. quadrigemina
  - D. supraoptic nucleus of the hypothalamus
  - E. Suprachiasmatic nucleus of the hypothalamus
66. A woman of 34 years, who was traveling on a motor ship, was found to have severe dizziness and vomiting when storm arose. The excitation of what structures of the brain, the most likely, was the reason for this phenomenon?
- A. nuclei of Deiters and Bechterew in the medulla
  - B. substantia nigra
  - C. cerebral cortex
  - D. spinal motorneurons
  - E. red nuclei of the midbrain
67. A woman was found to have a violation of the finger-nose test (dysmetria). Injury of which CNS structures, most likely, caused this violation?
- A. cerebellar hemispheres
  - B. cerebellar vermis
  - C. occipital areas of the cerebral cortex
  - D. red nuclei
  - E. nuclei of Deiters
68. As a result of neuroinfection the patient got the symptom of cerebellar dysfunction, accompanied by the impairment in the range of motion. Name this symptom.
- A. dysmetria
  - B. Ataxia

- C. Astasia
- D. Dystonia
- E. Dysarthria

69. A patient of 70 years was diagnosed a bleeding in the brain stem. The survey revealed the increased tonus of flexor muscles associated with the decreased extensor muscle tonus. Stimulation of what brain structures can these changes be explained by?
- A. Red nuclei
  - B. Nuclei of Deiters
  - C. Nuclei of Gaulle
  - D. substantia nigra
  - E. Nuclei of Burdach
70. In experiment, the section of the brain followed by the unmaintained animal's body temperature changings, and movements were not possible, the tonus of extensor muscles dominated over the flexor's one. Breathing and blood pressure remained normal. At what level the transection was made?
- A. between the hindbrain and the midbrain
  - B. between the spinal cord and medulla
  - C. between the midbrain and diencephalon
  - D. between the diencephalon and forebrain
  - E. between the great hemispheres of the brain
71. After brain injury, the patient got impaired the delicate movements of the fingers, and there developed muscle rigidity and tremor. What was the reason for this phenomenon?
- A. Damage of the midbrain in the area of substantia nigra
  - B. Damage of the motor cortex
  - C. Damage of the cerebellum
  - D. Damage of the brain stem
  - E. Spinal cord injury
72. A patient was delivered to hospital with decreased extensor muscles tonus. The increase in the excitability of what brain structures could be the reason of this muscle tonus decrease?
- A. nuclei of Deiters
  - B. red nucleus
  - C. serrated nucleus
  - D. locus coeruleus
  - E. nucleus emboliformis

73. During the experiment, the animal was made its Deiters' nucleus destroyed. Hereupon the tonus of extensor muscles decreased. Destruction of what structure of the hindbrain can cause the same effect?
- A. vestibular nuclei
  - B. red nucleus
  - C. locus coeruleus
  - D. reticular formation of the medulla oblongata
  - E. cochlear nuclei
74. Hereupon a fall a person got a head injury. There was diagnosed the damage of the cerebellum, which was accompanied by the violation of muscle tonus. Through which structures of the brain stem does cerebellum coordinate muscle tonus?
- A. Deiters' nucleus
  - B. red nucleus
  - C. substantia nigra
  - D. bulbar nucleus of reticular formation
  - E. nuclei of Gaulle and Burdach
75. While pushing a barbell an athlete throws his head back in order to maximize the tonus of extensor muscles of the upper extremities. Where are situated the centres of reflexes that occur at the same time?
- A. in the spinal cord
  - B. in the red nucleus
  - C. In the nuclei of Deiters
  - D. in the basal ganglia
  - E. In the motor cortex
76. In the experiment on an animal that is kept at a weight back down, feet up, watching reflex turn of the head, aimed at restoring the normal position of the head in space. With irritation, which is linked receptors specified reflex?
- A. Vestibuloretseptorov vestibule
  - B. tangoreceptor limbs
  - C. Vestibuloretseptors of semicircular canals
  - D. Proprioceptors limbs
  - E. Internal organs
77. During a whirling in a carousel a woman of 25 years developed nausea, increased sweating. Activation of what receptors led to the reflectory development of these symptoms?

- A. vestibular semicircular canals
  - B. skeletal muscle proprioceptors
  - C. vestibular otoliths
  - D. organ of Corti
  - E. optic
78. A 35 year old man, who had been ill with the flu complicated by the CNS disease, was found to have significantly increased the daily amount of urine. Which part of the brain, most likely, had been hit?
- A. diencephalon
  - B. midbrain
  - C. cerebral cortex
  - D. hindbrain
  - E. Spinal cord
79. In experiment, the animals were removed the midbrain substantia nigra, which led to violations of motor function. This was due to the control of the functions of:
- A. auxiliary motions
  - B. extensors
  - C. flexors
  - D. visual orientation
  - E. auditory orientation
80. In a frog, the right vestibular apparatus has been destroyed. To what changes in muscle tonus will this lead?
- A. Decrease in tonus of extensors on the right side
  - B. Increase in extensor tonus on the right side
  - C. Decrease in flexor tonus on the right side
  - D. Decrease in flexor tonus on the left side
  - E. Decrease in tonus of extensors on the left side
81. The animal has got its red nuclei destroyed. Which of the following reflexes it will lose as a result of destruction?
- A. statokinetic
  - B. Vestibular static
  - C. Cervical tonic
  - D. myotatic
  - E. Tendon
82. What receptor influence changes the essence of the tonic reflexes of spinal cord?
- A. labyrinth receptors and proprioceptors of neck muscles

- B. visual
  - C. auditory
  - D. nociceptors
  - E. Proprioceptors of limbs
83. Turning the head to the left in humans and animals is accompanied by occurring of cross-extension reflex. What parts of the central nervous system are involved in this reflex?
- A. medulla oblongata
  - B. hypothalamus
  - C. Thalamus
  - D. cerebral cortex
  - E. Pituitary gland
84. The animal has got its red nuclei destroyed. Which of the following reflexes it will lose as a result of the destruction?
- A. righting
  - B. Vestibular static
  - C. Cervical tonic
  - D. myotatic
  - E. Tendon reflexes
85. An experiment on the decerebrated animal is being conducted. What animal's structures should be destroyed for the rigidity to disappear?
- A. lateral vestibular nuclei
  - B. Red nuclei
  - C. substantia nigra
  - D. medial reticular nuclei
  - E. lateral reticular nuclei
86. What changes in motor activity are associated with the removal of half of the cerebellum in experimental animal?
- A. circling
  - B. Tremor
  - C. decerebrate rigidity
  - D. Plastic tonus
  - E. Muscle contracture
87. How will change the tonus of extensor muscles in decerebrate rigidity under transection of the dorsal root of spinal cord?
- A. rigidity will decrease
  - B. All of the above is correct
  - C. rigidity will not change
  - D. rigidity will increase
  - E. All of the above is not correct

88. How will change the tonus of extensor muscles in decerebrate rigidity under destruction of cerebellum?
- A. Rigidity will increase
  - B. rigidity will decrease
  - C. rigidity will not change
  - D. All of the above is correct
  - E. All of the above is not correct
89. The inclination of the cat's head for 45 degrees to the top from the normal position is accompanied by the increase in the tonus of extensor muscles of the forelimbs. What receptors are involved in this reflex?
- A. Proprioceptors
  - B. Auditory
  - C. visual
  - D. Temperature
  - E. Tactile
90. In the experiment, part of the brain was removed, whereby the animal developed hypsynergia and dysmetria. Which part of the brain was removed from the animal?
- A. Cerebellum
  - B. Frontal Lobe
  - C. Parietal lobe
  - D. midbrain
  - E. reticular formation
91. A 60 year-old man got long-term sleep because of bleeding in the brain. Damage of what structure most likely led to this condition?
- A. reticular formation
  - B. Hippocampus
  - C. quadrigeminal body
  - D. cerebral cortex
  - E. substantia nigra
92. After the brain injury a man has lost his visual ability. Damage of what areas of the cerebral cortex could be the reason for that?
- A. Occipital
  - B. Temporal
  - C. Frontal
  - D. parietal
  - E. temporal and parietal
93. To the neurosurgery unit was delivered a man with a hearing loss as a result of head injuries. Injury of what area of the cortex could be the reason for that?

- A. Temporal
  - B. postcentral gyrus
  - C. parietal
  - D. Occipital
  - E. Frontal
94. To hospital was delivered a man with the following symptoms: chorea-like hyperkinesia, gibbering, the trajectory in finger-nose test was violated (tremor increased at the end of the movement), feeble mind. Huntington's disease was diagnosed. Which synapses failed to transfer excitation in this case?
- A. GABAergic
  - B. glycineergic
  - C. Dopaminergic
  - D. Serotonergic
  - E. Adrenergic
95. In the examination unit, at the time of EEG recording the patient's cell phone rang. What changes occurred in the EEG (electroencephalogram)?
- A. alpha rhythm changed to beta rhythm
  - B. alpha rhythm intensified
  - C. Beta rhythm intensified
  - D. Beta-rhythm changed to alpha rhythm
  - E. alpha rhythm changed to delta rhythm
96. During examination the patient was found to have the hypertonic state of muscles and hypokinesia (hands are drawn to the torso and bent at the elbows, shuffling gait, lack of facial expression). What brain structure damage is accompanied by these phenomena?
- A. globus pallidus
  - B. Putamen
  - C. caudate nucleus
  - D. Red nuclei
  - E. thalamus
97. During examination of a patient with traumatic brain injury he was found to have inability of distinguishing moving objects on the skin. Which part of the cerebral cortex was damaged?
- A. Rear central gyrus
  - B. occipital cortex
  - C. parietal cortex
  - D. The frontal part of the cortex
  - E. front central gyrus

98. As a result of the brain injury the patient lost the ability to understand the language. Which part of the brain was damaged in the patient?

- A. rear section of the first temporal sulcus
- B. Front left central gyrus
- C. Rear left central gyrus
- D. occipital cortex area
- E. subcortical nuclei

99. A patient visited neurologist having complaints of burning sensation, «pins and needles» in the right half of the body. What brain region was injured in the patient?

- A. back left central gyrus
- B. Front left central gyrus
- C. The rear section of the first temporal sulcus
- D. subcortical nuclei
- E. occipital cortex area

100. A patient during the examination revealed the absence of movement in the right half of the body. Which part of the brain was damaged in the patient?

- A. Front left central gyrus
- B. Lower division of the third frontal lobe of the left hemisphere
- C. The rear section of the first temporal sulcus
- D. subcortical nuclei
- E. occipital cortex area

101. As a result of the brain injury a patient has lost his ability to speak. Which part of the brain was injured?

- A. Lower division of the third frontal sulcus of the left hemisphere
- B. Front left central gyrus
- C. The rear section of the first temporal sulcus
- D. subcortical nuclei
- E. occipital cortex area

102. A patient was diagnosed with the tumor of cerebellum. Removal of the tumor and the cerebellum were accompanied by impairings of motor functions, but after a while the motor disturbances disappeared. Which part of the brain participated in compensation of violations?

- A. cerebral cortex
- B. diencephalon

- C. midbrain
- D. medulla oblongata
- E. Spinal cord

103. The patient was observed having difficulties in starting of movements, mask-like face, resting tremor. It was established that the symptoms were related to the weakening of substantia nigra influences to striatum. What mediator systems were these violations associated with?

- A. dopaminergic
- B. Adrenenergic
- C. Cholinenergic
- D. Peptidenergic
- E. Serotonergic

104. A woman of 64 years got violated the subtle movements of the fingers, tremor and muscle rigidity were seen. Neurologist diagnosed Parkinson's disease. What structure damage most likely led to the development of these symptoms?

- A. substantia nigra
- B. cerebellum
- C. Reticular formation
- D. red nuclei
- E. thalamus

105. A man of 48 years was found to have the selective violation of motion planning. What parts of the cerebral cortex were the most likely damaged?

- A. supplementary motor area (field 6)
- B. Primary Motor Division
- C. Temporal Zone
- D. Frontal area
- E. postcentral sulcus

106. In the sleeping boy of 18 years, by the EEG technique was detected beta rhythm and the rapid eye movements. What phase of sleep corresponds to the appearance of beta-rhythm?

- A. fast wave sleep
- B. awakening
- C. non-deep
- D. deep
- E. deep phase of slow wave sleep

107. A man of 60 years got the long-term sleep after the stroke. Damage to what struc-

tures of the central nervous system, the most likely, led to this condition?

- A. ascending part of reticular formation
- B. Cerebellum
- C. substantia nigra
- D. precentral sulcus
- E. 5-9 pairs of cranial nerves

108. A man of 60 years was diagnosed with the stroke associated with the destruction of the lateral hypothalamic nuclei. What changes of motivational behaviour were the most likely to be expected in this case?

- A. refusal of food, exhaustion
- B. thirst
- C. hunger, food-getting behaviour
- D. aggressive behaviour
- E. depression

109. During wakefulness and lack of hard mental work there mainly recorded in the EEG:

- A. beta rhythm
- B. alpha rhythm
- C. theta rhythm
- D. delta rhythm
- E. gamma rhythm

110. What kind of recording of the electrical activity reflects the movements of the limbs?

- A. electromyogram
- B. electrocardiogram
- C. electroretinogram
- D. electronystagmogram
- E. electroencephalogram

111. A patient was diagnosed with the damage of caudate nucleus. What changes in motor activity accompanied these lesions?

- A. hyperkinesia
- B. Adiadohokinesis
- C. astasia
- D. areflexia
- E. Atonia

112. The patient has lost tactile sensitivity after traumatic brain injury. Which part of the brain was damaged?

- A. postcentral gyrus
- B. occipital lobe
- C. Temporal lobe
- D. precentral gyrus

E. Cerebellum

113. After administration of strychnine to a frog it responds to the slightest irritation with generalized convulsions. This is due to the blockade in the central nervous system:

- A. inhibitory synapses
- B. excitatory synapses
- C. Renshaw Cells
- D. adrenoceptor
- E. cholinoreceptors

114. Upper limbs of a standing person at rest is in easy bending. What is the cause of the condition of the limbs?

- A. Reflex with muscle spindles tensile biceps
- B. Congenital ready to go
- C. antagonistic reflex bent open side of the lower limbs
- D. Reflex with vestibular receptors vestibular
- E. Toning influence limbic structures and the neocortex

115. The patient 36 years after the injury occurred road paralysis of the limbs on the right, loss of pain and temperature sensation on the left, a partial reduction in tactile sensitivity on both sides. To injury of what part of the brain these changes are the most common?

- A. the right half of the spinal cord
- B. the left motor cortex
- C. The left half of the spinal cord
- D. the front columns of the spinal cord
- E the posterior columns of the spinal cord

116. When pushing the rod athlete throws his head back in order to maximize the tone of the extensor muscles of the upper limbs. Where are the centers of reflexes which occur during this?

- A. in the nuclei of Deiters
- B. In motor cortex
- C. in the basal ganglia
- D. in the red nuclei
- E. In the spinal cord

117. The cat in the experiment carried out one of the irritation of motor structures of the brain, resulting in increased tone ob-

served extensor muscles by stimulation. The animal was carried irritation:

- A. Nucleus vestibularis lateralis
- B. Nucleus caudatus
- C. Nucleus ruber
- D. Nucleus reticularis medialis
- E. Nucleus intermedius lateralis

118. The cat in the experiment, an increased tone of the extensor muscles of the limbs and back (decerebrate rigidity). At what level was made overcutting of the brain?

- A. below the red nuclei
- B. between the spinal cord and medulla oblongata
- C. below the vestibular nuclei
- D. above the red nuclei
- E. Spinal Cord

119. In the vertical position the patient, closing his eyes, loses his balance. What structure of the brain is probably damaged?

- A. cerebellum.
- B. the basal ganglia.
- C. The limbic system.
- D. thalamus.
- E. the precentral gyrus of the cerebral cortex

120. A sportsman spontaneously held breath for 40 seconds, which resulted in an increase in heart rate and systemic arterial pressure. Changes of these indicators are due to activation of the following regulatory mechanisms:

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

121. After a craniocerebral injury a patient is unable to recognize objects by touch. What part of brain has been damaged?

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

122. As a result of a craniocerebral injury, a patient has a decreased skin sensitivity. What area of the cerebral cortex is likely to be damaged?

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

123. 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

124. In a cat with decerebrate rigidity the muscle tone is to be decreased. This can be achieved by

- A. Destruction of the vestibular nuclei of Deiters
- B. Stimulation of the otolithic vestibular receptors
- C. Stimulation of the vestibular nuclei of Deiters
- D. Stimulation of the vestibulocochlear nerve
- E. Stimulation of the ampullar vestibular receptors

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

126. Parkinson's disease is caused by disruption of dopamine synthesis. What brain structure synthesizes this neurotransmitter?

- A. Substantia nigra
- B. Globus pallidus
- C. Corpora quadrigemina
- D. Red nucleus
- E. Hypothalamus

## AUTONOMIC NERVOUS SYSTEM

1. Effects of stimulation of the parasympathetic system include:

- A. There is no correct answer
- B. relaxation of smooth muscles of the digestive tract and contraction of its sphincters
- C. dilating of pupils
- D. intensification of glycogen breakdown in the liver
- E. intensification of lipolysis

2. Virtually healthy man who was slowly crossing the street, noticed that round the corner the car going straight at him, at high speed. Due to the highly intensified respiration the man managed to escape the danger. The man felt a rapid heartbeating, shortness of breath. What is the leading efferent link of this reaction?

- A. sympathetic nervous system
- B. limbic system
- C. renin-angiotensin system
- D. The parasympathetic nervous system
- E. extrapyramidal system

3. The patient is often prescribed to use mustard plasters, and they act irritantly on the skin, causing increased blood flow to certain organs. Specify the reflexes which are at the heart of this phenomenon?

- A. cutaneo-visceral
- B. Somatic
- C. myotatic
- D. Viscero-visceral
- E. Viscero-cutaneous

4. During the gastric resection a patient was found to have his heart rate decreasing. Which part of the ANS, most likely, takes part in the formation of the reflex response?

- A. nuclei of the vagus nerve
- B. hypothalamic nuclei
- C. amygdala
- D. Pituitary gland
- E. Spinal cord

5. A 33 year old man was diagnosed with perforative gastric ulcer and peritonitis. One of the symptoms of the disease is muscle ten-

sion of anterior abdominal wall, «plank-like abdomen.» What type of reflex provides this symptom?

- A. Viscero-somatic
- B. Viscero-visceral
- C. Viscero-cutaneous
- D. cutaneo-visceral
- E. somatic visceral.

6. The patient revealed tachycardia as a result of increased tonus of the centres of the sympathetic division of autonomic nervous system. Through what receptors activation of sympathetic nervous system is provided the constant chronotropism on the heart?

- A. b- adrenergic
- B. a1- adrenoceptor
- C. a2- adrenoceptor
- D. M-cholinergic
- E. N-cholinergic

7. In a machine-aided manufacturing, the people of mental work have the hypokinesia (lack of physical load) developed that causes the emergency phase of adaptation. What physiological mechanism ensures the development of this phase of adaptation?

- A. activation of sympathetic nervous system
- B. Activation of parasympathetic nervous system
- C. Inhibition of sympathetic nervous system
- D. Inhibition of parasympathetic nervous system
- E. Inhibition of somatic nervous system

8. A student before exam got his blood pressure increased. Excitation of what structures was that effect caused by?

- A. alpha-adrenoceptors
- B. Beta-adrenergic receptors and M-cholinergic receptors
- C. Serotonin receptors
- D. H2-histaminic receptors
- E. M- cholinostuctures

9. Effects of stimulation of the parasympathetic system include:

- A. intensification of gastric motility
  - B. Contraction of gastrointestinal sphincters
  - C. Pupil dilation
  - D. Increased glycogen breakdown in the liver
  - E. Increased lipolysis.
10. A man of 42 years got the bronchial asthma attack. The excitation of what postsynaptic receptors led to contraction of tracheo-bronchial muscles that narrow the airways?
- A. M-cholinergic receptors
  - B. beta-1 adrenoceptors
  - C. alpha-2 adrenoceptors
  - D. beta-2-adrenoceptors
  - E. alpha-1 adrenoceptors
11. A man of 45 years was found to have gastric atony after vagotomy. Violation of activation of what receptors, most probably, led to this state?
- A. M-cholinergic receptors
  - B. a - adrenoceptors
  - C. N-cholinergic receptors
  - D. b - adrenoceptors
  - E. Glutamate receptors
12. A patient with facial trauma was delivered to hospital. Was found facial nerve trunk damage associated with changes in salivation. Fibres of what part of the nervous system were damaged?
- A. parasympathetic
  - B. Sympathetic
  - C. Somatic
  - D. metasympathetic
  - E. thoracic part of the CNS
13. Under the stress conditions, after injury, a person was found to have the dilation of the pupils. What mediator affects the muscles of the iris?
- A. Norepinephrine
  - B. Serotonin
  - C. Acetylcholine
  - D. Glycine
  - E. ATP
14. Specify the segments in which the centres of the sympathetic division of the ANS are situated:

- A. thoracic part of spinal cord
  - B. sacral part of spinal cord
  - C. cervical part of spinal cord
  - D. midbrain
  - E. medulla oblongata
15. What nerves provide constriction of the pupils in the eye exposure to light?
- A. parasympathetic
  - B. somatic afferent
  - C. Somatic efferent
  - D. sympathetic adrenergic
  - E. sympathetic cholinergic
16. Cerebral ischemia is usually associated with the pupil dilation. The inhibition of activity of what of part of the ANS or the brain causes this reaction?
- A. parasympathetic
  - B. Spinal cord
  - C. Sympathetic
  - D. medulla oblongata
  - E. Diencephalon
17. The person taking the blocking agent of membrane cytoceptors of the ANS synapses complains of dry mouth. Which of following receptors are blocked?
- A. M-cholinergic receptors
  - B. H2-receptors
  - C. beta- adrenergic receptors
  - D. N-cholinergic receptors
  - E. alpha- adrenergic
18. The man has got his pupils narrowed. This is due to:
- A. increase in tonus of parasympathetic centres
  - B. the action of noradrenaline
  - C. the action of adrenaline
  - D. Increased sympathetic nervous system activity
  - E. increased tonus of the sympathetic centres
19. A person has decreased heart rate, enhanced secretor and motor function of the stomach and intestines, narrowed pupils. This is due to activation of the following system of regulation of body functions:
- A. parasympathetic
  - B. sympathetic

- C. metasympathetic
- D. Sympathoadrenal
- E. Hypothalamic-pituitary-adrenal

20. During walking out from from light to dark areas a man has got his pupils dilated. Which of the following reflexes determines the reaction:

- A. Sympathetic unconditional
- B. Sympathetic conditional
- C. metasympathetic
- D. parasympathetic unconditional
- E. parasympathetic conditional

21. Man was poisoned with mushrooms. They contain muscarine which stimulates M- cholinergic receptors. By what symptoms is it possible to suspect the poisoning with inedible mushrooms?

- A. narrowing of the pupils
- B. dilated pupils
- C. Bronchiectasis
- D. increase in heart rate
- E. increase in blood pressure

22. A person has got increased heart rate, dilated pupils, dry mouth. This is due to activation of the following system of regulation of functions:

- A. sympathetic
- B. parasympathetic
- C. metasympathetic
- D. Vago-insular
- E. Hypothalamic-pituitary-adrenal

23. In the experimental animal the peripheral segment of the vagus nerve is being stimulated. Which of the following changes will occur at the same time?

- A. reduction in heart rate.
- B. increase in heart rate.
- C. dilating of pupils.
- D. increase in respiratory rate.
- E. Bronchiectasis

24. A person with the attack of bronchospasm needs to reduce the influence of the vagus nerve on the smooth muscles of the bronchi. What membrane cytoceptors is it appropriate to block for this?

- A. M-cholinergic receptors
- B. N-cholinergic receptors

- C. alpha-adrenergic receptors
- D. Beta-adrenergic receptors
- E. alpha- and beta-adrenoreceptors

25. During the asthma attack caused by bronchoconstriction, the patient was given an injection of adrenaline, which resulted in the dilation of bronchi and improvement of his state. With what receptors of bronchial smooth muscles did occur the interaction of adrenaline?

- A. Beta-adrenergic receptors
- B. alpha-adrenergic receptors
- C. Muscarinic
- D. nicotinic
- E. histaminic

26. After receiving of the membrane cytoceptor blocking agent a person complains of the sensation of dryness in the mouth. What cytoceptor blocking agent does the person take?

- A. M-cholinergic receptors
- B. N-cholinergic receptors
- C. alpha-adrenergic receptors
- D beta-adrenergic receptors
- E. alpha-and beta-adrenergic receptors

27. The patient has high blood pressure due to the increased vascular tone. To reduce the pressure it is appropriate to prescribe the blocking agents of:

- A. alpha-adrenoceptors
- B. beta-adrenergic receptors
- C. alpha-and beta-adrenergic receptors
- D. M-cholinergic receptors
- E. H2-receptors

28. A man of 33 years was diagnosed with perforation of the stomach, and inflammation of the peritoneum, which led to increase in the muscular tension of the anterior abdominal wall. What reflex ensures this symptom?

- A. Viscero-somatic
- B. Viscero-visceral
- C. Viscer-cutaneous
- D. Cutano-visceral
- E. somato-visceral

29. In the pre-start period, the athlete was found to have increased respiratory rate and heart rate. Explain why?

- A. activated the sympathetic-adrenal system
  - B. reduced the rate of formation of parathyroid hormone
  - C. Increased the rate of formation of calcitonin
  - D. Decreased the rate of production of sex hormones
  - E. Increased the rate of production of growth hormone
30. A patient with hypoxia was found to have a strong headache, accompanied by dilation of pupils. What is the mechanism of this phenomenon?
- A. Increased sympathetic tone
  - B. activation of the occipital areas of the cerebral cortex
  - C. Increased tone of the parasympathetic nervous system
  - D. Excitation of thalamus
  - E. Inhibition of the subcortical visual centers
31. How will the tone of the lower extremities change if a patient undergoes the double-sided transection of the sympathetic trunk at the level of lumbar segments?
- A. tonus of vessels will decrease
  - B. tonus of vessels will not change
  - C. vascular tonus will increase
  - D. First, the tonus of vessels will not change, and then will increase up
  - E. First, the tonus of vessels will rise, and then will recover back
32. In ancient India, the one who was suspected of the crime, was judged with the help the so-called «God's judgment.» He was thus asked to swallow a handful of dry rice. If he failed, his guilt was considered to be proven. Why a person who is being excited can't swallow the rice?
- A. activation of the sympathetic-adrenal system and decreased salivation
  - B. parasympathetic nervous system activation and increased salivation

- C. decrease in blood supply to the salivary glands
  - D. activation of sympathetic nervous system, and increased excretion of saliva
  - E. activation of the parasympathetic system and reduced salivation
33. In the emotional stress, in humans, is activated the sympathetic part of the ANS. The greatest essential result(s) of that is/are:
- A. Intensification of metabolism
  - B. Changes in the excitability of cells
  - C. Smooth muscle contractions
  - D. secretion from digestive glands
  - E. Skeletal muscle contractions
34. A doctor was visited by the parents of the 10 years old boy, who showed the intensification in the body hair growth, growth of facial hair (mustache, beard), deep voice. What hormone secretion increase could be suspected?
- A. Testosterone
  - B. Growth Hormone
  - C. Estrogen
  - D. Progesterone
  - E. Cortisol
35. A middle age man went to another country to have the promised job, but he didn't succeed in finding a job for a long time. Which of the endocrine glands, more likely, were being depleted?
- A. Adrenal glands
  - B. Parathyroid
  - C. Testes
  - D. Thymus
  - E. Thyroid
36. A patient complains of pain in the heart area during acute attack of gastric ulcer. What vegetative reflex can cause this painful feeling?
- A. Viscero-visceral reflex
  - B. Viscero-dermal reflex
  - C. Viscero-motor reflex
  - D. Dermatovisceral reflex
  - E. Motor-visceral reflex

## ENDOCRINE SYSTEM

1. What is the role of the renin-angiotensin-aldosterone system?
- A. increases the systemic blood pressure via kidneys, retains water and NaCl in the body
  - B. NaCl and water retention in the body, regulation of blood circulation
  - C. Suppression of blood pressure and water and salt balance in the body
  - D. support of blood pressure and the excretion of water and NaCl from the body
  - E. lowering of blood pressure, and NaCl and water retention in the body
2. A 7 year old girl has seen to have the appearance of secondary sex signs. The lack of what hormone most likely leads to premature puberty?
- A. Melatonin
  - B. Somatostatin
  - C. ACTH
  - D. Thyroliberin
  - E. thymosin
3. A man of 42 years at examination was found a distinct enlargement of facial features, wide gaps between teeth, increase in the size of the hands and feet. The increase in level of what of the following hormones most likely could have determined this condition?
- A. growth hormone (STH)
  - B. triiodothyronine
  - C. Thyroxine
  - D. corticosterone
  - E. Testosterone
4. On examination, the young man of 15 years was found to have: height is 193 cm, relatively long limbs, short torso, small proportions of the skull. The increase in the level of which of these hormones, the most likely, would lead to such a state?
- A. growth hormone (STH)
  - B. triiodothyronine
  - C. Thyroxine
  - D. corticosterone
  - E. ACTH
5. On examination, a woman of 30 years was established to have: crescent-shaped face, with cyanotic hue, disproportionate deposition of fat in the neck, trunk and extremities. The excess of what hormone, most likely, could lead to such a state?
- A. ACTH (Cushing)
  - B. ADH
  - C. Thyroxine
  - D. FSH
  - E. Testosterone
6. Male of 50 years went to the doctor complaining of dry mouth and thirst, general weakness, decreased working efficiency, itchy skin. Reduce of which of the following hormones most likely led to such a state?
- A. Insulin
  - B. Growth Hormone
  - C. Glucagon
  - D. Thyroxine
  - E. ACTH
7. It is known that the epiphysis affects the regulation of circadian rhythms. Which of the following functions do not depend on the activity of the pineal gland?
- A. participation in the regulation of blood glucose levels
  - B. Reproduction
  - C. involvement in the regulation of K<sup>+</sup> in the blood
  - D. melatonin synthesis
  - E. Synthesis of serotonin
8. In experiment were studied the metamorphosis of frog tadpoles into the adult form. By adding of what hormone into water this process could be speeded up?
- A. triiodothyronine
  - B. Adrenaline
  - C. Oxytocin
  - D. FSH
  - E. Growth Hormone
9. The normal level of calcium in the blood is always maintained at constant level because it involves the action of hormones which are produced by:

- A. Thyroid and parathyroid glands
  - B. pituitary gland and the pineal gland
  - C. pineal gland and the hypothalamus
  - D. adrenal glands and kidneys
  - E. thymus and pancreas
10. Mother of two years old toddler visited the doctor about the occurrence of periodic spasmodic contractions of the muscles of the child's limbs. The lack of what hormone could determine the violation within the CNS?
- A. parathyroid hormone
  - B. Adrenaline
  - C. Aldosterone
  - D. calcitonin
  - E. Thyroxine
11. Female of 25 years, a month after child-birth, went to the doctor complaining of decreased production (secretion) of milk. The lack of what hormone led to such a state?
- A. Prolactin
  - B. Somatostatin
  - C. ACTH
  - D. Insulin
  - E. Glucagon
12. On examination of the 10-year-old child was established: the disproportionate development of the body, reduced growth, square head, poor mental development. Lack of what hormone of the following, the most likely, could have resulted in such a state?
- A. Thyroxine
  - B. parathyroid hormone
  - C. calcitonin
  - D. ACTH
  - E. Oxytocin
13. A woman of 38 years under examination was revealed an increase in basal metabolic rate. Excessive amounts of what of the following hormones, most likely, could determine this state?
- A. triiodothyronine
  - B. calcitonin
  - C. Insulin
  - D. Aldosterone
  - E. Somatostatin
14. The young man, after initially emerged adrenal gland (adrenal cortex) hyperfunction got arterial hypertension. The increased

- production of what hormone, most likely, caused high blood pressure?
- A. Aldosterone
  - B. Angiotensin
  - C. ADH
  - D. Thyroxine
  - E. Vasopressin
15. The patient was found to have got increased sodium reabsorption in the kidneys. Increased secretion of what hormone should be investigated, at first?
- A. Aldosterone
  - B. Angiotensin
  - C. ACTH
  - D. Thyroxine
  - E. Natriuretic
16. In the study of a 7 year-old child was established: cessation of growth (height is 1 meter) while maintaining normal mental functions. The lack of which of the following hormones could cause this condition?
- A. Growth Hormone
  - B. Oxytocin
  - C. Luteinizing hormone
  - D. Vasopressin
  - E. Thyroxine
17. In experiment, the rabbit adrenal gland was removed, resulting in some decrease in blood glucose levels. Insufficient level of what hormone caused the effect?
- A. Cortisol (hydrocortisone)
  - B. Aldosterone
  - C. triiodothyronine
  - D. corticosterone
  - E. Thyroxine
18. In experiment the objectives included reducing the secretion of ACTH. With the introduction of what hormone to the area of the hypothalamus is it possible to achieve the goal?
- A. hydrocortisone
  - B. Adrenaline
  - C. Thyroxine
  - D. Growth Hormone
  - E. Luteinizing hormone
19. What gland produces a hormone that affects the exchange of calcium and phosphorus?

- A. Parathyroid gland
  - B. Pituitary (rear part)
  - C. adrenal gland (cortex)
  - D. thymus
  - E. Pancreas
20. Why once the pituitary gland been transplanted in the neck of dog there stops the secretion of several hormones?
- A. Stops the flow of liberins and statins from the hypothalamus
  - B. reduces the intensity of circulation
  - C. injuries during surgery inhibits hormone secretion
  - D. pituitary trophicity becomes disturbed
  - E. pituitary tissue destruction occurs
21. Which of the following pituitary hormones provides regulation of peripheral endocrine glands?
- A. Corticotropin, gonadotropin, thyrotropin
  - B. Thyrotropin, somatotropin
  - C. insulin, corticotropin, aldosterone
  - D. prolactin, growth hormone, glucagon
  - E. gonadotropin, thyroid-stimulating hormone, oxytocin
22. Inattentive student accidentally met the dean. The concentration of what hormone will increase the most in the blood of the student?
- A. Adrenaline
  - B. corticotropin-releasing factor
  - C. corticotropin
  - D. Cortisol
  - E. Growth Hormone
23. The major physiological effects of aldosterone include:
- A. No correct answer
  - B. lowering of blood pressure
  - C. Increase in sodium excretion from the body
  - D. decrease in circulating blood volume
  - E. decrease in blood osmotic pressure
24. Direct factor that affects the secretion of aldosterone by the glomerular layer of the adrenal cortex is:
- A. None of the given factors
  - B. Renin

- C. Angiotensinogen
  - D. Angiotensin I
  - E. plasma converting enzyme (cathepsin)
25. In a patient with hyperaldosteronism there in the kidneys occur(s):
- A. increase in sodium reabsorption and potassium secretion
  - B. decrease in sodium reabsorption and potassium excretion
  - C. increase in Na<sup>+</sup> reabsorption and decrease in secretion of K<sup>+</sup>
  - D. Increase in excretion of sodium and potassium
  - E. decrease in excretion of sodium and potassium
26. In the clinical examination a patient revealed glycosuria and hyperglycemia. What was the likely cause of that?
- A. insulin deficiency
  - B. Violation of fat metabolism
  - C. Violation of protein metabolism
  - D. Enhanced gluconeogenesis
  - E. Enhanced glycolysis
27. The main physiological effects of aldosterone include:
- A. increase in circulating blood volume
  - B. decrease in blood pressure
  - C. Increase in sodium output from the body
  - D. decrease in blood osmotic pressure
  - E. No correct answer
28. Direct factor that affects the secretion of aldosterone by the glomerular layer of the adrenal cortex is:
- A. Angiotensin II
  - B. Renin
  - C. Angiotensinogen
  - D. Angiotensin I
  - E. plasma converting enzyme (cathepsin)
29. A doctor was visited by a patient who was very tall, with long thick fingers, large lower jaw and pendulous lower lip. Increased secretion of what hormone and gland could be suspected?
- A. growth hormone of the anterior pituitary
  - B. thyroid hormones



- C. antidiuretic hormone of the posterior pituitary  
 D. gonadotropin-releasing hormone of the anterior pituitary  
 E. suprarenal hormones of the glucocorticoid group
30. A endocrinologist was visited by the parents of a 15-year-old boy, whose height was 140 cm, and no signs of normal puberty. The body proportions were not violated. The psychological state didn't reveal any deviations. The height of the parents was 162 cm and 187 cm respectively. The lack of what gland functions could the most likely take place in that case?  
 A. Pituitary  
 B. Thyroid  
 C. parathyroid  
 D. Epiphysis  
 E. Suprarenal glands
31. In a study of a 10 years old boy the doctor found signs of early sexual development. Impairment of what endocrine gland, most likely, could be suspected in this situation?  
 A. Epiphysis  
 B. adenohipophysis  
 C. thymus  
 D. Thyroid  
 E. neurohypophysis
32. In the maternity wards under the weak accouchement activity in obstetric patients there usually provided stimulation of contractions of the smooth muscles of the uterus. Which of the following hormones can use the doctor in such situation?  
 A. Oxytocin  
 B. Growth Hormone  
 C. FSH  
 D. LH  
 E. Vasopressin
33. Increased blood concentrations of what hormone would be found in man of 47 years, who worked for more than a year at the meteorological station, which is located above the Arctic Circle?  
 A. thyrotropin  
 B. Melatonin  
 C. Somatostatin

- D. Growth Hormone Releasing Factor  
 E. Parathyroid hormone
34. The patient during the examination was found to have the protein dissimilation rate increased. Which factors caused the process?  
 A. Glucocorticoids  
 B. Insulin  
 C. Growth Hormone  
 D. increase in parasympathetic effects  
 E. Decrease in sympathetic influences
35. The increase in the level of calcium in the blood is accompanied by stimulation of these hormone secretions:  
 A. calcitonin  
 B. Thyroxine  
 C. parathyroid hormone  
 D. Vasopressin  
 E. Adrenaline
36. Which of these hormones promotes the uterus growth during pregnancy and causes the hypertrophy of the uterus mucosa in the first half of the menstrual cycle?  
 A. Estrogen  
 B. Luteinising hormone  
 C. Testosterone  
 D. estrone (folliculine)  
 E. Aldosterone
37. Group of the posterior pituitary hormones includes:  
 A. Oxytocin  
 B. Corticotropin  
 C. Luteinising hormone  
 D. Prolactin  
 E. Somatostatin
38. There in the hypothalamus is formed:  
 A. Thyroliberin  
 NB. Growth Hormone  
 C. parathyrin  
 D. ACTH  
 E. Oxytocin
39. The action of glucocorticoids is implemented in:  
 A. All of the above is true  
 B. increase in blood sugar levels  
 C. decrease in blood eosinophils  
 D. anti-inflammatory effect  
 E. regulation of protein metabolism

40. Statins are produced:  
 A. in the hypothalamus  
 B. In the anterior pituitary  
 C. In the posterior lobe of the pituitary gland  
 D. In the pancreas  
 E. in the adrenal cortex
41. Female, 65 years old, went to the doctor about the secondary fracture of the forearm bones. In examination was found the osteoporosis of bones. With the decline in which hormone production what that associated?  
 A. calcitonin  
 B. Aldosterone  
 C. Melatonin  
 D. Parathyrine  
 E. Glucagon
42. Female, 40 years old, went to the doctor about excessive facial hair growth, cessation of menstruations, the appearance of edema. What gland dysfunction was the reason of that?  
 A. hyperfunction of the adrenal cortex  
 B. hyperthyroidism  
 C. hypothyroidism  
 D. hypofunction of the adrenal cortex  
 E. All of the above is not correct
43. In the examination of a 16 year old girl were revealed: the lack of pubic hair and body hair under the armpits, underdeveloped mammary glands, absence of menstruation. The result of what hormonal disorders could that be?  
 A. ovarian hormone deficiency  
 B. hyperthyroidism  
 C. hypothyroidism  
 D. hypofunction of the pancreatic islet apparatus  
 E. hyperfunction of the adrenal medulla
44. The patient visited the endocrinologist with complaints of weight loss of 10 kg in 2 months, palpitations, exophthalmia. For the hyperfunction of what endocrine gland are these complaints the most common?  
 A. Thyroid  
 B. Parathyroid  
 C. Pancreatic  
 D. Ovarian

- E. Suprarenal
45. The guy of 12 years has height of 1m 80 cm. The violation of what hormone secretion is it caused by?  
 A. growth hormone  
 B. Thyroxine  
 C. thyroid-stimulating  
 D. gonadotropin  
 E. Insulin
46. A child of 2 years got convulsions due to the low concentration of calcium ions in the blood plasma. This was due to the decrease in the function of:  
 A. Parathyroid glands  
 B. Pituitary  
 C. suprarenal cortex  
 D. pineal gland  
 E. Thymus
47. The secretion of what pituitary hormones is inhibited after taking oral contraceptives containing hormones?  
 A. gonadotropines  
 B. Vasopressin  
 C. thyroid-stimulating  
 D. growth hormone  
 E. Oxytocin
48. The doctor has been visited by the parents of a 10 years old boy who had an increase in his body hair growth, growth of beard and mustache, deep voice. An increase in the secretion of what hormone could be assumed?  
 A. Testosterone  
 B. Growth Hormone  
 C. Estrogen  
 D. Progesterone  
 E. Cortisol
49. A middle aged man went to another country to get the promised job, but he didn't succeed in that for a long time. Which of the endocrine glands, more likely, are/is being depleted in such situation?  
 A. Suprarenal glands  
 B. Parathyroid  
 C. Testes  
 D. Thymus  
 E. Thyroid

50. The patient was found to have hyperkalemia and hyponatremia. The decreased secretion of what hormone can cause such changes?

- A. Aldosterone
- B. Vasopressin
- C. cortisol
- D. parathyroid hormone
- E. natriuretic

51. Animal was intravenously injected the concentrated solution of sodium chloride, which resulted in the decrease of its reabsorption in the renal tubules. With what hormone secretion changes could it be explained?

- A. Decrease in aldosterone
- B. Increase in aldosterone
- C. Decrease in vasopressin
- D. Increase in vasopressin
- E. Decrease in natriuretic factor

52. As person has hyponatremia and hyperkalemia. This will be associated with the enhanced secretion of this hormone:

- A. Aldosterone
- B. Cortisol
- C. Vasopressin
- D. natriuretic factor
- E. parathyroid hormone

53. The patient revealed hypocalcemia. Deficiency of what hormone could cause this?

- A. Parathyroid hormone
- B. Thyrocalcitonin
- C. Aldosterone
- D. corticotropin
- E. Corticotropin Releasing Factor

54. In the kidneys of a patient the reabsorption of calcium ions is increased and reduced the reabsorption of phosphate ions. The influence of what hormone caused this change?

- A. parathyroid hormone
- B. calcitonin
- C. Hormonal forms of vitamin D3
- D. Aldosterone
- E. Vasopressin

55. A person has the blood glucose level of 15 mmol/l (threshold of reabsorption is 10 mmol/l). The result of this will appear as:

- A. glycosuria
- B. decrease in urine output
- C. reduction of glucose reabsorption
- D. decrease in the secretion of vasopressin
- E. reduction in aldosterone secretion

56. During examination, the patient revealed the overgrowth of bones and soft tissues of the face, increased proportions of the tongue, extended interdental spaces in the larger dental arch. What changes of hormone secretion are the most likely to have place?

- A. Increased secretion of growth hormone
- B. Decreased secretion of growth hormone
- C. Increased secretion of insulin
- D. Decreased secretion of thyroxine
- E. Increased secretion of vasopressin

57. In postpartum period a woman showed insufficient milk production. Hypofunction of what endocrine gland(s) could be found?

- A. adenohipophysis
- B. neurohypophysis
- C. Thyroid gland
- D. Pancreas
- E. Suprarenal glands

58. A woman of 32 years came to hospital with complaints that after the birth of child her lactation disappeared. With what hormone deficiency, most likely, can this violation be explained?

- A. Prolactin
- B. Growth Hormone
- C. Vasopressin
- D. Thyrocalcitonin
- E. Glucagon

59. According to the prescription, a man took glucocorticoid-like hormones for a long time. Secretion of which of the following hormones was suppressed as the result of this action?

- A. corticotropin
- B. growth hormone
- C. thyroid-stimulating
- D. Sexual
- E. mineralocorticoids

60. A woman of 30 years visited doctor complaining of petulance, increased body temperature, increased heart rate, weight loss.

An excess of what hormone led to such a state?

- A. Thyroliberin
- B. Cortisone
- C. Somatostatin
- D. Glucagon
- E. ACTH

61. Mother of a 8-year-old child visited the doctor complaining of the presence of lethargy in him, listlessness, drowsiness, mental retardation, reduced body temperature. Which of the following hormones is most likely to be prescribed by the doctor?

- A. triiodothyronine
- B. ADH
- C. Insulin
- D. ACTH
- E. Testosterone

62. Individual had little water during several days which caused hypovolemia (lowering the amount of water in the body). Secretion of what of the following hormones, most probably, could have increased at the same time?

- A. Vasopressin
- B. Aldosterone
- C. Somatostatin
- D. ACTH
- E. Insulin

63. A patient with chronic gastritis has got hyposecretion of gastric juice. Decrease of what hormone is most likely to be expected in this case?

- A. Gastrin
- B. secretin
- C. Insulin
- D. CCK
- E. Villikin

64. In the experiment on a rabbit was achieved the increase in wall permeability to water in the collecting tubules that led to decrease in micturition and increase in the osmotic concentration of urine. Which of the following hormones, most likely, was used by the researcher?

- A. Vasopressin
- B. Oxytocin
- C. ACTH

- D. Thyroxine
- E. Luteinizing hormone

65. The patient was found to have the increased catabolism of fats. The concentration of what hormone should be found in the blood?

- A. Testosterone
- B. thymosin
- C. calcitonin
- D. Insulin
- E. prolactin

66. In the experiment, the stimulation of the pituitary area of the hypothalamus caused the increase in ACTH release. Increased secretion of what hormones stimulates ACTH secretion?

- A. mineralocorticoid
- B. Glucagon
- C. sex hormones
- D. Thyroid hormone
- E. Insulin

67. During labour, the woman observed slight contraction of muscle cells of the uterus. The lack in what hypothalamic hormone can explain that condition?

- A. Oxytocin
- B. Folliliberin
- C. Prolactin
- D. somatoliberin
- E. Vasopressin

68. Cretinism - a disease that is accompanied by stunting of children (disproportionate dwarfs develop), mental immaturity. This is due to dysfunction of the endocrine gland in early childhood. What dysfunction is it?

- A. hypothyroidism
- B. pituitary hypofunction
- C. Hyperfunction of pituitary gland
- D. hyperthyroidism
- E. hypofunction of the parathyroid glands

69. During the examination, the patient of 60 years was found to have hand tremor, increased heart rate, tonic-like seizures. In the study was determined decrease in blood glucose levels down to less than 2 mmol/l. Increased level of what hormone, most likely, could have led to such a state?

- A. Insulin
- B. Glucagon
- C. Thyroxine
- D. ACTH
- E. Testosterone

70. A patient of 63 years with arterial hypertension was found to have posterior pituitary hyperfunction and decreased urine output. Which of the following hormones, most likely, could cause these symptoms?

- A. ADH
- B. Thyroxine
- C. Insulin
- D. Angiotensin
- E. Testosterone

71. A 52 years old male visited the doctor complaining of increased blood pressure. On examination he was diagnosed with chronic nephritis. The level of what hormone in the blood should be determined first of all?

- A. Angiotensin
- B. ACTH
- C. Thyroxine
- D. parathyroid hormone
- E. Somatostatin

72. In the experiment on a frog were achieved changings of the colour of the skin. Inhibition of action of which of the following hormones, most likely, could have caused this effect?

- A. melanocyte-stimulating hormone
- B. Prolactin
- C. Oxytocin
- D. triiodothyronine
- E. Adrenaline

73. What action does insulin produce on carbohydrate metabolism?

- A. glycogenesis, hypoglycemia, deposition of glycogen in the liver
- B. glycogenolysis, hyperglycemia, transformation of glycogen into glucose
- C. glycogenesis, hyperglycemia, transformation of glycogen into glucose
- D. glycogenolysis, hypoglycemia, transformation of glucose into glycogen
- E. gluconeogenesis, transformation of glucose into glycogen, mobilisation of hepatic glycogen

74. A man has been found to have diabetes insipidus. After the laboratory tests have been performed, he has been said to have:

- A. decrease in the formation of vasopressin
- B. decrease in formation of insulin
- C. increase in formation of glucagon
- D. increase in formation of vasopressin
- E. increase in oxytocin formation

75. The patient has a strongly expressed autoimmune reaction. What hormone(s) should be administered to the patient in attempt to decrease the concentration of autoantibodies?

- A. Glucocorticoids
- B. catecholamines
- C. mineralocorticoids
- D. Insulin
- E. Glucagon

76. What hormones are involved to the formation of the general adaptation syndrome seen under the action of stress factors?

- A. Corticotropin, glucocorticoids, epinephrine, norepinephrine
- B. cortisone, androgens, parathyroid hormone, oxytocin
- C. Corticosterone, progesterone, epinephrine, norepinephrine
- D. Corticotropin, thyroxine, norepinephrine, glucagon
- E. Somatotropin, corticotropin, adrenaline, progesterone

77. The results of studies of the steroid hormones' levels changes in the blood plasma of healthy woman with regular 28-day menstrual cycles suggest that over the past 12 hours there was observed the peak concentrations of estradiol. Progesterone concentration was negligible. The development of what situation could be expected over the next 3 days?

- A. Ovulation
- B. decrease in basal body temperature
- C. the end menstrual cycle
- D. Start of the menstrual cycle
- E. regression of the corpus luteum

78. For the purpose of suppression of autoimmune reactions following organ transplantation it is mandatory to provide the hormone therapy. What hormone(s) are used for this purpose?

- A. Glucocorticoids
- B. mineralocorticoids
- C. Sex hormones
- D. Adrenaline
- E. Growth hormone

79. In order to study the pregnancy, female urine is analysed. The appearance of what hormone in the urine probably indicates the pregnancy?

- A. Human chorionic gonadotropin
- B. estriol
- C. 17-beta-estradiol
- D. Testosterone
- E. Progesterone

80. Specify what disorders are possible under the insufficient thyroid function, if the failure occurs in early childhood?

- A. Cretinism
- B. dwarfism
- C. Gigantism
- D. Hypopituitarism
- E. Skin hyperpigmentation

81. A woman of 40 years, in the study, found to have increased basal metabolic rate. Surplus of what of these hormones caused this condition?

- A. triiodothyronine
- B. calcitonin
- C. Glucagon
- D. Aldosterone
- E. Somatostatin

82. A 15 years old girl visited the doctor complaining of rigidity and soreness of breast in the second half of the menstrual cycle. Gynecological study didn't reveal any pathology. With changes in what hormone levels can this condition be associated with?

- A. Progesterone
- B. Estradiol
- C. Testosterone
- D. Thyroxine
- E. Aldosterone

83. After removal of the thyroid gland the patient has got convulsive seizures. Which hormone is it necessary to prescribe in this case?

- A. Parathormone
- B. Growth hormone

- C. Insulin
- D. Thyroxine
- E. Glucagon

84. After a prolonged infection a patient revealed violations of certain functions of the endocrine glands and the decrease in calcium levels in the blood. Renal function is normal. The concentration of what hormone is necessary to determine in the blood, first of all?

- A. calcitonin
- B. Aldosterone
- C. Vasopressin
- D. Adrenaline
- E. Insulin

85. At the time of bleeding, in the blood increases the concentration of these agents, EXCEPT:

- A. Atrial natriuretic factor
- B. Aldosterone
- C. Angiotensin-1
- D. Angiotensin-2
- E. Adrenaline

86. Stress state reduces the immunological status of the body due to inhibition of thymosin. Which of the following hormones, which is involved in stress, affect(s) this process?

- A. Glucocorticoids
- B. melanostatin
- C. Growth Hormone Releasing Hormone
- D. Insulin
- E. Vasopressin

87. The influence of ultraviolet rays on the skin causes sunburn. Which hormone regulate(s) the intensity of the pigment metabolism?

- A. melanotropins
- B. Adrenoglomerulotropin
- C. Thyroxine
- D. Parathyroid hormone
- E. Gonadotropin Releasing Hormone

88. At the prelaunch period, the athlete has got increased respiratory rate and heart rate. Explain why?

- A. activated the sympathetic-adrenal system

- B. Increased production of growth hormone
  - C. reduced the formation of parathyroid hormone
  - D. Increased the formation of calcitonin
  - E. Decreased the production of sex hormones
89. The concentration of what hormone(s) in the blood is regulated without the direct involvement of the pituitary gland?
- A. Insulin
  - B. follitropin
  - C. Thyroxine
  - D. mineralocorticoids
  - E. Growth Hormone
90. Hormone which has an anti-inflammatory action:
- A. Hydrocortisone
  - B. Adrenaline
  - C. Aldosterone
  - D. Glucagon
  - E. Somatostatin
91. The man emerged bleeding in glomerular zone of the adrenal cortex. This caused a decrease of the hormone release:
- A. Aldosterone
  - B. Adrenaline
  - C. Progesterone
  - D. Cortisol
  - E. noradrenaline
92. The patient in the survey revealed tachycardia, exophthalmos, increased basal metabolic rate by 40%. Hyperfunction of the endocrine gland which causes these changes?
- A. Thyroid
  - B. Epiphysis
  - C. neurohypophysis
  - D. Pancreas
  - E. Parathyroid
93. In humans, daily urine output of 6 liters, the level of glucose in the blood plasma is normal. Inappropriate secretion of the hormone is the cause of this?
- A. Vasopressin
  - B. Insulin
  - C. Glucagon
  - D Cortisol
  - E. Oxytocin

94. The transfer of which pituitary hormone will be broken in the dog's neck occlusion?
- A. Cortisol
  - B. Insulin
  - C. Glucagon
  - D. PTH
  - E. calcitonin
95. A child from birth reduced thyroid function. What is the main consequence of this?
- A. Cretinism.
  - B. dwarfism
  - C. Gigantism.
  - D. hypopituitarism.
  - E. hyperpigmentation of the skin.
96. Patient 45 years old went to the doctor complaining of frequent fever, palpitations, irritability, hair loss, weight loss, hand tremor. A blood test showed high levels of hormones:
- A. Thyroid
  - B. adrenal cortex
  - C. adrenal medulla
  - D. Pancreas
  - E. Gonads
97. In humans, decreased urine output, hypernatremia, hypokalemia. Hypersecretion of what hormone may be the cause of such changes?
- A. Aldosterone
  - B. Vasopressin
  - C. Atrial natriuretic factor
  - D. Adrenaline
  - E. PTH
98. Older people are often observed bone demineralization (reduced content of calcium ions). The reason for this can be reduced secretion:
- A. calcitonin
  - B. Thyroxine
  - C. Insulin
  - D. Aldosterone
  - E. PTH
99. Growth of the child reaches 10 years, 178 cm, weight - 64 kg. The disruption of what endocrine gland is the reason?
- A. Pituitary
  - B. Thyroid
  - C. Gonads

- D. Adrenal
- E. parathyroid

100. In animal experiments were damaged neural pathways extending into the pituitary stalk, which disrupted blood flow in the following hormones:
- A. Vasopressin and oxytocin
  - B. pituitary hormones
  - C. hormones adenohipophysis
  - D. thyrotropin
  - E. Adrenocorticotrophic hormone
101. With a total patient study draws attention thickening of neck, exophthalmos, increased body temperature, heart rate 110 beats / min. The content of what hormones in the blood is useful to define?
- A. Thyroxine.
  - B. glucagon.
  - C. catecholamines.
  - D. Insulin.
  - E. Cortisol.
102. The woman in the last 6 months has masculinizing effects: increased hair growth on the face, the white line of the abdomen, legs, irregular menstrual cycle. The reason for this can be increased secretion of:
- A. androgens.
  - B. estrogens.
  - C. growth hormone.
  - D. Thyroxine.
  - E. mineralocorticoids.
103. A newborn developed spasm of the glottis, a history of susceptibility to the development of seizures. Violation of what function of the endocrine glands to think?
- A. Parathyroid.
  - B. Pancreas
  - C. Thymus.
  - D. Thyroid
  - E. Adrenal.
104. The patient declined sharply content of Ca<sup>2+</sup> in the blood. This leads to increased secretion of the hormone:
- A. PTH
  - B. Thyrocalcitonin
  - C. Aldosterone
  - D. Vasopressin
  - E. growth hormone

105. The patient long-term use of drugs potassium led to hyperkalemia. This leads to such a change in the secretion:
- A. increase in aldosterone
  - B. Decrease aldosterone
  - C. Increase Vasopressin
  - D. Decrease vasopressin
  - E. Decrease renin
106. On examination the patient identified an increase in basal metabolic rate by 50%. An increase in secretion of the hormone caused this change?
- A. Thyroxine
  - B. Insulin
  - C. PTH
  - D. growth hormone
  - E. Prolactin
107. 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. Tropic hormones
  - B. Thyroid hormones
  - C. Somatotropin
  - D. Cortisol
  - E. Thyroxin
108. Atria of an experimental animal were superdistended with blood, which resulted in decreased reabsorption of Na<sup>+</sup> and water in renal tubules. This can be explained by the influence of the following factor on kidneys:
- A. Natriuretic hormone
  - B. Aldosterone
  - C. Renin
  - D. Angiotensin
  - E. Vasopressin
109. For people adapted to high external temperatures profuse sweating is not accompanied by loss of large volumes of sodium chloride. This is caused by the effect the following hormone has on the perspiratory glands:
- A. Aldosterone
  - B. Vasopressin
  - C. Cortisol
  - D. Tgyroxin
  - E. Natriuretic

## SOMATOSENSORY ANALISER. PHYSIOLOGY OF PAIN

1. If the person has normal skin sensation of a finger, he does not feel the presence of a wedding ring on it. What is the reason for this?

- A. Adaptation of receptors.
- B. The development of fibrous tissue.
- C. Violation of epidermal structure.
- D. Impairment of blood circulation.
- E. Violation of the structure of receptors.

2. During exercises a person is less sensitive to the pain. This is due to the activation:

- A. Anti-nociceptive system.
- B. Nociceptive system.
- C. Thyroid function.
- D. Sympathetic nervous system.
- E. Function of the adrenal glands.

3. During the brain surgery it is indicated that stimulation of the certain areas of the cerebral cortex caused the patient's tactile and temperature sensations. What area was influenced by this stimulation?

- A. Postcentral gyrus.
- B. Precentral gyrus.
- C. Supralateral gyrus.
- D. Cingulate.
- E. Paragippokampoal gyrus.

4. As a result of spinal cord injury, 33 years old man, impaired pain and temperature sensitivity. Which path has caused this damage?

- A. Spinothalamic.
- B. Spinocortical
- C. Posterior cerebra-cerebellar.
- D. Lateral spinocortical.
- E. Anterior cerebellospinal.

5. The man kept flavor, but lost the overall sensitivity of the structures of the oral cavity. Which structure is ruined?

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

6. A man has bleeding to the posterior central gyrus, which caused a violation of the opposite side of this sensitivity:

- A. Cutaneous and proprioceptive.
- B. Visual.
- C. Hearing.
- D. Olfactory and gustatory.
- E. Hearing and visual.

7. The patient asked a doctor about the consultation because of the fact that he lost the ability to distinguish tastes at the root of his tongue. The doctor found that this is due to the nerve lesions. Which nerve?

- A. Glossopharyngeal.
- B. Wandering.
- C. Facial.
- D. Upper laryngeal.
- E. Trigeminal.

8. In the experiment, the animal was cut thalamocortical path. Which type of sensory deprivation survived in this experimental animal?

- A. Olfactory.
- B. Hearing.
- C. Exteroceptive.
- D. Visual
- E. Nociceptive.

9. On examining of the patient with traumatic brain injury was found that he could not distinguish moving objects on the skin. Which part of the cerebral cortex has been damaged?

- A. Posterior central gyrus, occipital lobe cortex.
- B. Share of parietal cortex.
- C. Share of the frontal cortex.
- D. Anterior central gyrus.

10. After the man has dressed, in some time, he will no longer feel the clothes that are worn. There is an adaptation of tactile receptors. These adaptive processes at the level of receptors are detected by changes in membrane permeability to ions:

- A. Reduces permeability to Na + ions.
- B. Reduces the permeability of K +.
- C. Increases in permeability to ions K +.
- D. Increases in permeability to Na + ions.
- E. Decreases permeability to Ca ++ ions.

11. During inflammation morbidity of tissues increases. Which of the following changes are likely to happen in this situation?

- A. Increase in the excitability of nociceptors.
- B. Convergence of nociceptive system.
- C. Adaptation of nociceptors.
- D. Reduced sensitivity of nociceptors.
- E. Divergence of nociceptive system.

12. Patient got to the hospital with suspected traumatic rupture of spinal cord at the level of III-V thoracic segments after the car accident, because he has completely lost all voluntary movements below the injury. Which sensitivity of the patient will be absent below area of the injury?

- A. Skin (Tangent, thermal, pain).
- B. Only temperature, only the tangent.
- C. Only pain.
- D. There will not be any sensitivity disorders.

13. Novocain is used for pain control, during tooth removing. Why is not it introduced into the gum around the tooth but in the area of a sensory nerve transmission?

- A. To block conduct of pain impulses.
- B. The formation of the potential of the actions of the pain receptors is violated. The pH of the tissue in the area of anesthesia is changed.
- C. Axonal transport is inhibited.
- D. Excitability of pain receptors is increased.

14. With the constant wearing of the ring on the finger we stop noticing it. At the same time, we felt the slightest touch clearly. Why?

- A. Adaptation of the receptors occurred.
- B. Fibrous tissue is formed under the ring.
- C. The function of ion channels of the epidermis is violated.
- D. Blood circulation in the tissues is violated.
- E. The structure of tactile receptors under the ring is disrupted.

15. It has been discovered that a patient has a complete demyelination of conducting ascending tracts. Which of the following forms of sensation will be kept in these conditions?

- A. Thermal sensation.
- B. Proprioception.
- C. Vision.
- D. Vibratory sensation.
- E. Feeling of pressure.

16. Cortical representation of the pain sensitivity is situated:

- A. In the posterior central gyrus.
- B. In the anterior central gyrus.
- C. In the frontal lobes, in the Sylvian fissure.
- D. None of the answers are correct.

17. The pain sensitivity of a 25 years old patient decreased after a strong emotional excitation. The release of which neurotransmitter can be the cause of this state of the patient?

- A. Noradrenaline.
- B. Acetylcholine.
- C. Substance P.
- D. Gamma-aminobutyric acid.
- E. Glycine.

18. Afferent fibers from the taste buds are:

- A. Spikes of trigeminal sensory cells.
- B. Axons of sympathetic nerves.
- C. Parasympathetic nerve axons.
- D. Sensory fibers ending in the surface of epithelium.
- E. Axons of gustatory sensory cells.

19. Histologically, the nociceptors - are:

- A. Free nerve endings.
- B. Pacini corpuscles.
- C. Receptors of hair follicles.
- D. Merkel disks.
- E. Meissner corpuscles.

20. In the case of a sunburn vasodilatation is accompanied by:

- A. Hyperalgesia.
- B. Lumbar anesthesia.
- C. Analgesia.
- D. Local anesthetic.
- E. Hypoalgesia.

21. Which of the following parts of the body have the highest spatial threshold of differentiation?

- A. Arm.
- B. Tip of the tongue.
- C. Tips of the fingers.
- D. Tip of the nose.
- E. Dorsum.

22. Pressure on the brachial plexus in the axilla causes a severe pain in the area innervated by that nerve during breast cancer. This symptom is an example:

- A. Spread pain along the sympathetic trunk.
- B. Of referred pain.
- C. Analgesia.
- D. Secondary pain.
- E. Projected pain.

23. Thermoesthesiometry is used to determine temperature sensitivity of the person in a laboratory experiment. In which areas this sensitivity is the highest?

- A. At the tip of the tongue and fingertips.
- B. On the palms and soles, on the muscles of the iris.
- C. On his forehead and armpits.
- D. In the rectal area and thighs.
- E. On the chest and ears.

24. A person is less sensitive to a pain during physical exercises. This is due to the activation of:

- A. Antinociceptive system.
- B. Nociceptive system.
- C. Thyroid function.
- D. Sympathetic-adrenal system.
- E. Functions of the adrenal glands.

25. The patient's left leg was amputated. However, he continued to feel pain in this extremity. What is the name of this type of pain?

- A. Phantom Pain.
- B. Reflected pain.
- C. Causalgia.
- D. Neuralgia.
- E. Projected pain.

26. Chloroethyl, that is applied to the surface of the injury to decrease pain if mus-

cles of sportsmen, are injured or if sprained. Which part of the reflex is this preparation effective for?

- A. Receptor.
- B. Effector.
- C. Endings of the efferent fiber.
- D. Nerve centers of the spinal cord.
- E. Intercalary neurons.

27. Hardening is recommended by doctors to increase body's resistance to the colds. What is the mechanism of this resistance?

- A. Decrease the excitability of the cold receptors.
- B. Increase the excitability of the cold receptors.
- C. Increase the excitability of the thermal receptors.
- D. Decrease the excitability of the thermal receptors
- E. Increase convective heat transfer.

28. The level of endorphins in 26 years old patient's blood increased significantly because of the serious injuries after a car accident. Which receptors of neurons are most likely to be connected with endorphins?

- A. Opiate.
- B. Adrenergic.
- C. Cholinergic.
- D. Glutamatergic.
- E. Dopaminergic.

29. During heart diseases reflex pain is felt:

- A. In the region of the left scapula.
- B. In the navel, in the lumbar area.
- C. In the neck.
- D. In the ear.

30. The temperature information is transmitted from the receptors to the hypothalamus by:

- A. Spinothalamic path.
- B. Gault and Burdach paths.
- C. Rubrospinal path.
- D. Gowers and Flechsig paths.
- E. Spinocerebral path.

31. Modulators of neuronal opiate antinociceptive system include:

- A. Enkephalins.
- B. Monoamines.

- C. Vasopressin.
- D. ACTH.
- E. Corticoliberin.

32. Modulators of neuronal neopiate of antinociceptive system include:

- A. Norepinephrine.
- B. Enkephalins.
- C. Endorphins.
- D. Vasopressin.
- E. Adenosine.

33. During the manipulation on the tooth of the patient that had caries there was a destruction of the pulp, which caused the dilation of the pupils. Which part of the brain participates in the pupillary reflex?

- A. Spinal Cord.
- B. Medulla oblongata.
- C. Midbrain.
- D. Diencephalon.
- E. Cerebral cortex.

34. An acute pain occurred during the manipulation on the tooth of the 40 years old person. Which irritation of receptors is this pain connected with?

- A. Free nerve endings.
- B. Tactile.
- C. Pressure receptors.
- D. Thermal receptors.
- E. Cold receptors.

35. If a man stays in a room with a bad smell for a long time, he does not feel it any more. This is based on this change in the olfactory receptors:

- A. Inactivation of sodium channels.
- B. Calcium channel inactivation.
- C. Potassium channel inactivation.
- D. Decrease in the resting membrane potential.
- E. Reduction of the threshold potential.

36. During the manipulation in the oral cavity of the 45 years old woman sudden dilation of the pupils appeared. Which factor is most likely to be a reason for this reaction?

- A. Action of the pain stimulus.
- B. Brightening of the face with using bright light.
- C. Examining close (10-15 cm) located objects.

- D. Excitation of the parasympathetic nervous system.
- E. Release of the acetylcholine in the blood.

37. During the childbirth a woman's sensitivity to pain increases as a result of the activation of this system (these systems):

- A. Anti-nociceptive.
- B. Pituitary-adrenal and antinociceptive.
- C. Sympathetic-adrenal and pituitary-adrenal.
- D. Sympathoadrenal and antinociceptive.
- E. Sympathoadrenal.

38. The child cut his finger. The pain occurred. The child cupped his finger by his palm and squeezed it hard. It felt like the pain had disappeared. This was due to the operation of the «gating mechanism» in the spinal cord. Explain why the pain has disappeared?

- A. Thick tactile afferents inhibit thin nociceptive.
- B. Thalamic neurons inhibit pain afferents.
- C. Cortical sensory neurons inhibit nociceptive afferents.
- D. Cortical motor neurons inhibit pain afferents.
- E. Reticular formation neurons inhibit pain afferents.

39. A patient complaining of pain in the left shoulder-blade region has been diagnosed with myocardial infarction. What kind of pain does the patient have?

- A. Radiating
- B. Visceral
- C. Phantom
- D. Protopathic
- E. Epicritic

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

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

## VISUAL ANALISER

- The refractive power of the optical media of the eye has increased in 10 diopters on glancing at the near located subject. This is a cause of some changes:
  - Lens
  - Corneal
  - Vitreous body
  - Moist anterior ocular chamber
  - Muscles, expanding a pupil
- It happens on grancing at the near-located subjects to for located ones:
  - Relaxang of ciliary muscle and the Zinn ligament tension
  - Contracting of ciliary muscles and relaxing of the Zinn ligament
  - Contracting of ciliary muscles and the Zinn ligament tension
  - Relaxing of ciliary muscle and relaxing of the Zinn bundles
  - State of a ciliary muscle and the Zinn ligament remains unchangeable
- Which process is unusual for light adaptation?
  - Increasing of sensitivity visual system to light
  - Reflex of pupil constriction
  - Decay of rhodopsin
  - Decay of iodopsion
  - Strengthening of lateral inhibition in the retina
- An ophthalmologist found that patient's vision has improved by using the collecting lens. What pathology does this patient have?
  - Hypermetropia
  - Astigmatism
  - Tritanopia
  - Blindness
  - Myopia
- Sclerosis is observed as a result of an eye tissues damage in the patient. What changes of acuity of vision are observed?
  - Increasing of ability of clear vision at a distance
  - Reducing of capacity of clear vision at a distance
  - Appearance of disorders of spatial perception
  - Appearance color vision disorders
  - Astigmatism
- Which of the following characteristics suffer from decreasing the function of rods not one of conus?
  - Function of muscular lutea (yellow spot)
  - Perception of colors
  - The ability to change the sensitivity to bright lightauckly
  - The level of activity in visual system in general
  - Ability to form contrast conditions
- On being watched some subjects, by a patient, their images are projected in front of the retina:
  - Myopia
  - Emmetropia
  - Amblyopia
  - Hypermetrotopia
  - Ametropia
- A patient high6 eye was covered with a soun and left one was sent a bright beam of light. What will the reaction of pupils be observed in normal condition?
  - Direct
  - Reversible
  - Consensual
  - Cross
  - Real (natural)
- Animal has completely lost sight after giving of microelectrodes in the brain structure of an intermediate. Which of the sub cortical structures were damaged?
  - Lateral geniculate body
  - Medial geniculate bode
  - Quadrigemina
  - Supraoptic nucleus of the hypothalamus
  - Suprahiazmatic nucleus of the hypothalamus
- The girl aged 17 old found an injury of eye refraction, which had been compensated accommodation for along period of time.

Which can the most probable diagnosis be made?

- Astigmatizm
  - Color-blindness
  - Spherical aberration
  - Chromatic aberration
  - There is not correct answer
- A person is observed to have dilated pupils during stress after injury. What mediator affects the muscles of the iris?
    - Noradremaline
    - Acetylcholine
    - Serotonin
    - Adenosine triphoshpate
    - Glycine
  - A doctor- radiologist has bad adaptation of the eyes in the dark. What synthesis of substance can be impaired?
    - Rhodopsin
    - Iodopsin
    - Melanin
    - Noradrenalin
    - There is not correct answer
  - A patient had been made diagnosis astigmatism eye. What is it's mechanism?
    - Not the same different refraction in the vertical and horizontal meridians of the cornea
    - Different refractions in the center and at the periphery of the lens
    - Focusing rays of light in front of the retina
    - Focusing rays of light behind the retina
    - Impairment of the lens elasticity
  - On damaging of the occipital lobe of the cerebral cortex function is impaired:
    - Vision
    - Taste
    - Hearing
    - Smelling
    - Balance
  - Which function of retinal cells may be impaired in the adaptation of the eyes has got worse in the dark?
    - Rods
    - Conus
    - Bipolar
    - Amacrine
    - Horizontal
  - On investigating fundus in a person's eye atropine is put dilate pupils. What nerves influence on it?
    - Sympathetic
    - Somatic efferent
    - Somatic afferent
    - Oculomotor
    - Parasympathic
  - The patient aged 50 went go to the doctor with complaints of clarity of vision impairment prolonged reading. What reflex may be impaired?
    - Of accommodation
    - Divirgence
    - Pupillary reflex
    - Convergence
    - Corneal reflex
  - How will vision be changed if visual way after chiasm cut on the right?
    - Come partial blindness on the right and left eyes will occurs
    - Complete blindness will occurs on the right eye
    - Will not change
    - Complete blindness will occurs on the left eye
    - Partial blindness occurs on the right eye and complete one the left eye
  - What visual functions is impared the most on damaging rods?
    - Peripheral vision
    - color vision
    - Binocular vision
    - Central vision
    - Light adaptation
  - An architect of the gothic churches often makes stained- glass windows of blue color, and shapes are in other colors, so they seem to be protected from the background. What property of the visual analyzer were they based?
    - Chromatic aberration
    - Dark adaptation
    - Accommodation
    - Light adaptation
    - Sequential images

21. The nearest point of clear vision is gradually moving away in case of aging. What is the main cause of this phenomenon?

- A. Crystalline lens loses its elasticity
- B. Changes of cornea
- C. Change in the vitreous body
- D. Impairment of blood supply of the retina
- E. Changes in the retina

22. The patient has impaired vision in the form of prolapsing right medial visual field and lateral one on the left. What part of the visual analyzer has broken?

- A. Left optic tract
- B. The optic chiasm
- C. Right optic tract
- D. Right optic nerve
- E. Left optic nerve

23. In old age, elasticity of the lens reduces. What the main symptom will be revealed?

- A. Removal near point of clear vision
- B. Astigmatism
- C. Impairment of blood supply of the retina
- D. Impairment of color vision
- E. Impaired vision of twilight

24. An ophthalmologist identified that the patient has increasing time to adapt his eye to darkness. What vitamin can be the cause of this symptom if there is deficiency of it?

- A. Vitamin A
- B. Vitamin C
- C. Vitamin K
- D. Vitamin D
- E. Vitamin E

25. A patient has lost the ability to see object in the center of visual field. As a result, a point hemorrhages in the retina. What point of the retina most likely has hemorrhage occurred?

- A. Yellow spot
- B. Ciliary part of the retina
- C. Choroid
- D. Blind spot
- E. Irritated part of the retina

26. To obtain a driver's license, a young man aged 23 has been passed examination by an ophthalmologist. It has been established that

the patient can not distinguish red and green colors. What is impaired color vision called?

- A. Protanopia and deuteranopia
- B. «Night blindness»
- C. Tritanopia
- D. Daltonism
- E. Protanopia

27. A patient was revealed anisocoria (different pupil size with the same lightning). Which neurons have been damaged, if the brain doesn't have any pathology?

- A. Retina
- B. Quadrigeminal plate
- C. Pigmentary cells of the retina
- D. Lateral geniculate body
- E. Ciliary body

28. A patient has impaired papillary reflex while maintaining visual function. What has the functional adaptation been lost?

- A. Regulation of the retina illuminance
- B. Integrity of the reflex arch
- C. Regulation of the iris tone
- D. Intensity of color perception
- E. Depth perception of space depth

29. The male aged 30 works as a radiologist. He often has to go from a darkened room into lighted one during his work. Every time he had to wait a while to get used to light. What processes take place in the visual sensory system?

- A. Switching from a system of rods to a system of coni
- B. Inchantment of impulse from the sticks
- C. Divergence of nerve impulses
- D. Regulation of nerve impulses
- E. Regulation of the pupil lumen

30. With age, people develop presbyopia (farsightedness). The reason for this is:

- A. Reduced elasticity of the lens
- B. elongation of the eyeball
- C. shortening of the eyeball
- D. lens opacities
- E. Retinal Atrophy

31. In animal experiments, the removal of part of the cortex of the cerebral hemispheres removed previously elaborated con-

ditioned reflexes to light stimulation. What portion of the cortex was removed?

- A. occipital cortex
- B. precentral gyrus
- C. postcentral gyrus
- D. limbic cortex
- E. Temporal portion

32. For better viewing the bottom of the eyeball doctor dripped into the patient's eye conjunctiva solution of atropine. This led to the expansion of the pupil through the blockade of membrane tsoretseptorov:

- A. M-cholinergic receptors
- B. N-cholinergic receptors
- C. alpha-adrenoceptor
- D. Beta-blockers
- E. H2-receptors

33. The patient has no vision, but the pupillary reflex is implemented properly. What area may be damaged?

- A. visual cortex
- B. superior colliculus
- C. Lower colliculus
- D. Somatosensory cortex
- E. the optic chiasm

34. The man who looked out the window, and began to read the book. The refractive power of the optical media increases, while due to the change state

- A. Lens
- B. Cornea
- C. vitreous
- D. pupils
- E. moisture of eye chambers

35. When looking from close on faraway objects occurs:

- A. Relaxing ciliary muscle
- B. Reduction of ciliary muscle
- C. Relaxing Zinn ligaments
- D. increase in curvature of the lens
- E. increase in the refractive power of the eye

36. For longer stays in the dark in humans increased sensitivity to light. Why?

- A. evolved adaptations receptors
- B. The number of sticks
- C. The number of cones
- D. increase in the refractive power of the cornea
- E. increase in the refractive power of the lens

37. If even in bright light has been a steady expansion of the pupil, it is a consequence of:

- A. over-activity of the sympathetic nervous system
- B. of the normal state of the mechanisms of regulation
- C. Excessive activity of the parasympathetic nervous system
- D. paralysis of the muscles, dilates the pupil
- E. ciliary muscle paralysis

38. In old age, the lens loses its elasticity. What is the main symptom detected?

- A. Presbyopia
- B. Astigmatism
- C. Myopia
- D. impairment of color vision
- E. binocular vision disorders



## AUDITORY ANALYSER, VESTIBULAR ANALYSER

1. The patient aged 60 was revealed impairment perception of high frequency sounds. What impaired state of the structures of the auditory analyzer causes these changes?
  - A. Basic membrane of the cochlea oval window
  - B. Basic cochlear membrane around helicotrema
  - C. Eustachian tube
  - D. Muscles of the middle ear
  - E. The eardrum
2. A person has damaged semicircular canals of the internal ear after an injury. What stimuli will not this person able to respond?
  - A. Change in the rate of angular acceleration
  - B. Skin irritants
  - C. Light
  - D. Sound
  - E. Change in speed of rectilinear motion
3. After an injury statolital apparatus of the internal ear has been damaged. What stimuli will not this person be able to respond?
  - A. Change of angular motion rate
  - B. Rate of change of the angular acceleration
  - C. Skin irritants
  - D. Light
  - E. Sound
4. Wax plugs have formed, a patient doesn't hear the sound of tuning fork. How can we determine the work of Corti's organ isn't impaired?
  - A. Lean a turning fork against the bones of the skull
  - B. Enhance the sound of a turning fork
  - C. Hold a turning fork to the auricle
  - D. Change tone of sounding
5. The unit of the eardrum and ossicles:
  - A. Enhance sound wave
  - B. Cause mechanical vibrations from the bone of the skull to the internal ear
  - C. Use for communication with the eardrum and the round window
  - D. Increase the energy loss during the sound transition from the ambient air to the internal ear
  - E. It is physiologically relict without special meaning
6. The muscles of the middle ear:
  - A. Have protective function
  - B. Reduce the loss of energy during the sound transition to the internal ear
  - C. Serve as the mechanical transmission of sound waves to the internal ear
  - D. Hold sound waves
  - E. Don't have a special purpose
7. Auditory passage includes the following switching nuclei:
  - A. Auditory cortex
  - B. the upper olive
  - C. Lateral geniculate body
  - D. Superior colliculus
  - E. Reticular formation
8. In the experiment on an animal that is kept in the position of back down and feet up, they watched a reflective turning of the head to restore the normal position of it in the air. What receptors of irritation are associated with this reflex?
  - A. Vestibule receptors
  - B. Inner organs
  - C. Proprioceptors of limb muscles
  - D. Tactile receptor of limbs
  - E. Vestibule receptor of semicircular canal
9. The activity of spiral neurons was increased in the animal under the action of stimulus. What was the stimulus?
  - A. Sound
  - B. Light
  - C. Rotation
  - D. Skin touch
  - E. Stretching of the muscles
10. A patient was investigated as for hearing sound by the use of a tuning fork. With its location near the external ear the patient hasn't heard the tuning fork. The sound was heard after the tuning fork was placed on

- lost the orienting reflex to sound signals. What structure was destroyed?
  - A. lower colliculus
  - B. superior colliculus
  - C. substantia nigra
  - D. nuclei of reticular formation
  - E. Red nucleus
11. A patient with audiometry has been revealed injury of the perception of high frequency sounds on the left. What is the cause of this phenomenon?
  - A. Injury of the middle part of the internal ear spire on the left
  - B. Injury of the diencephalon
  - C. Injury of the midbrain
  - D. Injury of sensory cortex
  - E. injury of the middle ear
12. Receptors of vertical acceleration sacule of the vestibule are excited:
  - A. On decelerating lift
  - B. On accelerating rotation in the horizontal plane
  - C. On accelerating rotation the vertical plane
  - D. On decelerating of acceleration in the horizontal plane
  - E. On the lift movement at the constant speed
13. A person's sound experience is formed when a tuning fork put on his head, but they disappear when it is brought to the auricle. This is due to impaired function of:
  - A. Soundconducting apparatus of the ear
  - B. External ear
  - C. Middle ear
  - D. Hearing ossicles
14. During the experimental work on animals the middle part of cochlea was destroyed. What frequency of sound waves has injured?
  - A. Low
  - B. High
  - C. High and medium
  - D. Low and medium
15. In a laboratory experiment on the dog studied the structure of the central regions of the auditory sensory system. Was destroyed one of the structures of the midbrain. Dog
  - A. Have protective function
  - B. Reduce the loss of energy during the sound transition to the internal ear
  - C. Serve as the mechanical transmission of sound waves to the internal ear
  - D. Hold sound waves
  - E. Don't have a special purpose
16. As a result of injury to the person damaged otolith apparatus of the inner ear. What stimuli will not be able to respond this man?
  - A. movement with a linear acceleration
  - B. movement with angular acceleration
  - C. Skin
  - D. Light
  - E. Sound
17. In an animal experiment recorded the electrical activity of neurons of the spiral ganglion that allows the analysis of the afferent impulses from receptors:
  - A. organ of Corti
  - B. vestibular
  - C. semicircular canals
  - D. vestibular
  - E. and the vestibular organ of Corti
18. In the study of hearing acuity of blacksmith found hearing loss by 50% in the low frequency range and almost normal hearing in the high frequency range. Violation of what structures of the auditory system has led to such a state?
  - A. organ of Corti - closer to helicotrema
  - B. the organ of Corti - closer to the oval window
  - C. Central part of the organ of Corti
  - D. The muscles of the middle ear
  - E. Eardrum
19. 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 middle ear
  - B. Right middle ear
  - C. Left inner ear
  - D. Right inner ear
  - E. Right external ear
20. A laboratory experiment on a dog was used to study central parts of auditory sys-

tem. One of the mesencephalon structures was destroyed. The dog has lost the orienting response to auditory signals. What structure was destroyed?

- A. Inferior colliculi of corpora quadrigemina
- B. Superior colliculi of corpora quadrigemina
- C. Substantia nigra
- D. Reticular formation nuclei
- E. Red nucleus

21. A soldier with explosion-caused trauma was delivered to a hospital. Examination revealed his tympanic membrane to be intact. What defense reflex prevented the tympanic membrane from rupturing?

- A. Contraction of *m. tensor tympani*
- B. Relaxation of *m. tensor tympani*
- C. Contraction of *m. auricularis anterior*
- D. Relaxation of *m. auricularis anterior*
- E. Relaxation of *m. stapedius*

## METABOLISM, THERMOREGULATION, NUTRITION

1. The patient 28 years old has respiratory coefficient (RC) greater than 1. What condition is most likely caused a magnitude RC?

- A. Performance of heavy muscle loads
- B. eating a lot of proteins
- C. excess of fatty foods
- D. The amount of protein in food is not enough
- E. Eating a lot of carbohydrates

2. The patient 58 years old after the stroke has thermoregulation disturbance (fever, chills). What structures of the brain were irritated?

- A. hypothalamus
- B. Cerebellum
- C. Pons
- D. red nucleus
- E. Thalamus

3. A child aged less than one year underwent a sudden cooling. What processes, first of all, ensure constant temperature of the child?

- A. Oxidation of brown fat
- B. Reduction of skeletal muscles
- C. Tremor thermogenesis
- D. Expansion vessels in the skin
- E. Gain hepatic metabolism

4. At the examination of man 45 years old, a long time being on vegetable-dairy diet, revealed a negative nitrogen balance. Which factor most likely led to this patient's condition?

- A. Insufficient dietary protein
- B. Insufficient amount of carbohydrate in the diet
- C. Excess fluid intake
- D. excess amount of fatty foods
- E. Reduction in the intensity of metabolic processes in the body

5. Energy spendings of 40 years man, working as a miner, are more than 5000 calories / day. Which component in the diet is need to increase for the compensation for this flow of energy?

- A. Fat
- B. Liquid

- C. Protein
- D. Carbohydrates
- E. Vitamins

6. What are the seasonal changes in basal metabolic rate, above all, must be considered in determining the latter?

- A. In winter - increases, in summer - is reduced
- B. In spring - decreases, in autumn - increases
- C. In autumn - increases, in the winter - reduced
- D. In summer - increases, in winter - reduced
- E. In spring - decreases, in summer - increases

7. At the physical activity changing the several physiological systems. Which of the following will influence the temperature transfer of the patient?

- A. Reduction of skeletal muscles
- B. increase in blood pressure
- C. Increase in the number of erythrocytes
- D. Increase of heart rate
- E. Increase in respiratory rate

8. Woman 40 years old went to the doctor complaining of stool retention, difficulty of defecation. What changes in the diet is necessary to?

- A. Increase the number of products containing fiber
- B. Increase the amount of fat
- C. Reduce the amount of carbohydrates
- D. Increase the amount of proteins
- E. Reduce the amount of vegetable fats

9. At the rapid obesity, such as fattening geese, the value in the respiratory quotient (RQ) increased to 1.5-1.7. Which factor is most likely caused a magnitude DC?

- A. Intaking of large amounts of carbohydrates
- B. Intaking of large amounts of protein
- C. Excessive amounts of fatty foods
- D. Intaking of large amounts of fluid
- E. Not enough carbohydrates in the diet

10. At the prophylactic examination of young healthy women was revealed a positive nitrogen balance. Which factor most likely led to this patient's condition?

- A. Pregnancy
- B. deficiency of necessary amino acids for protein synthesis
- C. Decrease in intensity of metabolic processes in the body
- D. Irregular eating
- E. Excessive amounts of fatty foods

11. In humans during exercise value of the respiratory quotient increased from 0.85 to 1.0. What is the reason for this change?

- A. increased oxidation of carbohydrates
- B. Increased protein breakdown
- C. increased fat oxidation
- D. Reduction in protein oxidation
- E. Reduction in fat oxidation

12. At the hyperventilation increases the respiratory quotient (RQ). What is the cause of increasing RQ in this case?

- A. Increase in carbon dioxide emissions
- B. Increase in allocation of water vapor
- C. Decrease in oxygen consumption
- D. Reduce carbon dioxide emissions
- E. increase in oxygen consumption

13. The patient has an increase in the assimilation of fats. What might be the reason for this phenomenon?

- A. Increase in insulin secretion
- B. Increase in secretion of adrenaline
- C. Increase in secretion of corticoids
- D. Increase in secretion of thyroxine
- E. Increase in secretion of sex hormones

14. The man intaked water below normal in a few days led to dehydration. What mechanism can be activated to conserve water in the body?

- A. increase in somatostatin secretion
- B. increase in vasopressin secretion
- C. Increase in secretion of thyroxine
- D. Decrease in calcitonin secretion
- E. Decrease in aldosterone secretion

15. It is known that one way to protect against hypothermia in children is shivering thermogenesis. What nerves stimulate shivering thermogenesis?

- A. sympathetic adrenergic
- B. parasympathetic
- C. Somatic efferent
- D. sympathetic cholinergic
- E. Somatic afferent

16. The patient has increased protein dissimilation. Which factors cause this process?

- A. Glucocorticoids
- B. Growth Hormone
- C. Insulin
- D. Increase in parasympathetic influences
- E. Decrease in sympathetic influences

17. At the experiment was investigated excitability of the centers of thermoregulation on the dog. How will change their activity by the action of cold on the body of the dog?

- A. Increase in the center of heat
- B. Increase in the center of the heat transfer
- C. Decrease in the center of heat
- D. Decrease in centers contractile thermogenesis
- E. Decrease in centers shivering thermogenesis

18. Depot of which substances used in the initial period of fasting and how this varies with the respiratory quotient (RQ)?

- A. carbohydrates, RQ approaches 1.0
- B. Protein, RQ approaches 1.0
- C. Fat, RQ approaching 0.85
- D. Protein, RQ approaching 0.7
- E. Fat, RQ approaching 0.72

19. What contr-insulin hormone is acting on carbohydrate metabolism?

- A. Adrenaline
- B. Aldosterone
- C. Natriuretic
- D. Calcitonin
- E. Vasopressin

20. What is one of the reasons of the increase in dissimilation of carbohydrates?

- A. Increased secretion of glucagon
- B. Decrease secretion of growth hormone
- C. Decrease in calcitonin secretion
- D. Increase in insulin secretion
- E. Reduced secretion of vasopressin

21. The patient has an increase in the assimilation of proteins. What factors can stimulate this assimilation?

- A. Increase excitation of the parasympathetic nerves
- B. Reduced insulin secretion
- C. Increased arousal of the sympathetic nerves
- D. Increased secretion of thyroxine
- E. Increased secretion of adrenaline

22. In which case the human body has a positive protein balance (nitrogen)?

- A. during the growth of the organism
- B. In old age
- C. Fasting
- D. With a significant decrease in the content of protein and increasing the carbohydrate content of food
- E. In case of prolonged and intense physical exertion

23. A young woman at admission with food 120 grams of protein per day with urine out 16 g of nitrogen. In what state is the woman?

- A. Pregnancy
- B. Acute infectious diseases
- C. Leukemia
- D. Ovulation
- E. Menstruation

24. The adapted to heat man in hot weather enhanced sweating, so that he loses a lot of water, and the extracellular environment becomes more concentrated. Excitation of receptors which provides high activity of ADH?

- A. hypothalamic osmoreceptors
- B. Volyumoretseptors of vena cava and atrial
- C. Liver osmoreceptors
- D. Volyumoretseptors of hypothalamus
- E. Baroreceptors of the aortic arch

25. A man is standing in a room in light clothing, air temperature 14 C. Windows and doors closed. Which way he gives the greatest amount of heat?

- A. Heatradiation
- B. Heatholding
- C. Convection
- D. Evaporation
- E. Perspiration

26. A person with a mass of 80 kg after prolonged physical exertion has blood volume

5.4 L, hematocrit 5, total blood protein-80g /l. Such indicators have the consequence of blood, primarily?

- A. Water loss through sweat
- B. Increase in the number of erythrocytes
- C. Increase in protein content in the plasma
- D. Increase in circulating blood volume
- E. Increased diuresis

27. During emotional stress in humans is activating the sympathetic division of the autonomic nervous system. The most significant is then?

- A. Increase Metabolism
- B. Change cell excitability
- C. Reduction of smooth muscle
- D. Secretion of digestive glands
- E. Decrease in skeletal muscle

28. If the temperature is 38 degrees Celsius, relative humidity 80, wind speed 0 m / s , the heat will pass through ?

- A. Evaporation of sweat
- B. Radiation
- C. Convection
- D. Reduction of blood supply to the skin
- E. No answer is not correct

29. A man 45 years doing not heavy physical, has determining of energy costs by the method of biokalorimetry. What index is considered at it?

- A. Heat release
- B. Composition of diet
- C. Volume of oxygen absorbed
- D. Total CO<sub>2</sub> emissions
- E. Respiratory factor

30. During physical stress changes occur in many body systems. Which of the following processes that most affect the heat?

- A. Reduction of skeletal muscle
- B. Increase in heart rate
- C. Increased blood pressure
- D. increase in respiratory rate
- E. Increase in circulating blood volume

31. Under normal conditions in humans after the physical load airflows that extracts heat from the skin surface are the cause of loss of heat by:

- A. Convection
  - B. Radiation
  - C. Sweating
  - D. Conduction
  - E. Filtration
32. At the examining was found that the patient has a violation of chemical thermoregulation. In what way?
- A. change in the intensity of metabolic processes
  - B. Change in convection path regulation
  - C. Infrared radiation
  - D. Change in thermal conductivity
  - E. Change sweating
33. If the temperature is 18 C, relative humidity of 10, wind speed 0 m / s, will pass through?
- A. Radiation
  - B. Perspiration
  - C. Convection
  - D. Reduction of blood supply to the skin
  - E. No answer is not correct
34. Long stay in the heat caused the human thirst. Signaling from receptors which primarily led to its development?
- A. Hypothalamic osmoreceptors
  - B. Sodium receptors of the hypothalamus
  - C. Baroreceptors of the aortic arch
  - D. Glucoreceptors of hypothalamus
  - E. Osmoreceptors of liver
35. At full (with water) alimentary starvation developed generalized edema. Which of the pathogenic factors in this case, are the leading?
- A. Reduced plasma oncotic pressure
  - B. Increase oncotic pressure of tissue fluid
  - C. Decrease in interstitial fluid hydrostatic pressure
  - D. Reduction of the osmotic pressure of blood plasma
  - E. increase in osmotic pressure of the intercellular fluid
36. Individuals wishing to lose weight, is recommended to include in the diet more lean beef. What are the properties of proteins is the reason?
- A. Having the largest specific-dynamic action

- B. Low calorie
  - C. poor absorption
  - D. long delay in the stomach
  - E. fast satiation
37. At the examination of woman 40 yrs old was found an increased basal metabolic rate. Excess what hormone may lead to this?
- A. Triiodothyronine
  - B. calcitonin
  - C. Glucagon
  - D. Aldosterone
  - E. Somatostatin
38. The energy costs of young man increased from 500 to 2000 kJ per hour. What can lead to this?
- A. Exercise
  - B. Increased ambient temperature
  - C. Intellectual labor
  - D. Eating
  - E. Transition from sleep to cheerfulness
39. Person is in an environment with a temperature of 38 degrees, relative humidity 5. What ways are responsible for maintaining a constant heat temperarury core body under these conditions?
- A. Evaporation
  - B. Radiation
  - C. Heatholding
  - D. Convection
  - E. Convection and heatholding
40. A man is standing in a room in light clothing, air temperature 14 C. Windows and doors closed. Which way he gives the greatest amount of heat?
- A. Heatradiation
  - B. Heatholding
  - C. Convection
  - D. Evaporation
  - E. Perspiration
41. In the operating room air temperature is 36 C, relative humidity - 8. How does the human body give off heat in these conditions?
- A. Evaporation of sweat
  - B. Heatholding
  - C. Radiation
  - D. Convection
  - E. All answers are correct

42. The patient, strictly implement the recommendations of the compliance of specific diet for 10 days, was investigated the respiratory quotient values. (Result RQ = 1.0). What diet did adhere to the patient?
- A. With mostly carbohydrate
  - B. With mostly protein and fat
  - C. With mostly fat and carbohydrates
  - D. Mixed
  - E. With mostly protein and carbohydrates
43. What is the effective way to return the body heat of the greenhouse farm workers at the air temperature + 36C, relative humidity of it - 70?
- A. Evaporation of sweat
  - B. Convection and teploprovedenie
  - C. Radiation
  - D. Convection
  - E. Holding
44. Cooling the human body in water is much faster than in the air, because water is much more efficient heat loss by?
- A. Heatholding
  - B. Convection
  - C. Radiant of heat
  - D. Evaporation of sweat
  - E. Radiation
45. In the experiment on a dog was investigated the role of the adrenal gland in the processes of thermoregulation. What hormone of this gland narrows blood vessels, thereby reducing the heat transfer?
- A. Adrenaline
  - B. Corticosterone
  - C. Cortisone
  - D. Androgens
  - E. Estrogens
46. The energy value was identified in a man. In what state was a man if his energy were lower than the basal metabolic rate?
- A. Dream
  - B. Rest
  - C. Easy operation
  - D. Nervous tension
  - E. Rest
47. At the determining the basal metabolism found that its value exceeds the proper value

- by 8. This means that energy metabolism processes?
- A. Proceeds normally
  - B. Relatively increased
  - C. Relatively depressed
  - D. Significantly depressed
  - E. Significantly increased
48. At the determining the basal metabolism found that its value exceeds the proper value by 8. This means that energy metabolism processes?
- A. Proceeds normally
  - B. Relative increased
  - C. Relatively depressed
  - D. Significantly depressed
  - E. Significantly increased
49. The man measured the energy losses on an empty stomach, lying in terms of physical and mental rest, at a temperature of comfort. At what time will the lowest energy loss?
- A. 3-4 am
  - B. 7-8 am
  - C. 10-12 am
  - D. 14-16 pm
  - E. 17-18 pm
50. The measured the energy losses on an empty stomach, lying in terms of physical and mental rest, at a temperature of comfort. At what time would be the greatest energy losses?
- A. 17-18 pm
  - B. 7-8 am
  - C. 10-12 am
  - D. 14-16 pm
  - E. 3-4 am
51. After 3 hours after ingestion a man has increased power losses by 3. What kind of food did eat the man?
- A. Protein
  - B. The carbohydrate
  - C. Fat
  - D. Protein-carbohydrate
  - E. Carbohydrate and fat
52. At the determining of the energy costs of a human body indirect calorimetry was determined that one minute of oxygen consumed 1000 ml and 800 ml of carbon dioxide released gas. What respiratory coefficient has this person?

- A. 0.8
  - B. 1.25
  - C. 0.9
  - D. 0.84
  - E. 1
53. At the determining of the energy costs of the organism was found that the respiratory coefficient is 1.0. It means that in the cells of the patient is more oxidized?
- A. Carbohydrate
  - B. Protein
  - C. Fat
  - D. Proteins and carbohydrates
  - E. Carbohydrate and Fat
54. At the determining of the energy of the organism was found that the respiratory coefficient is 0.7. It means that in the cells of the test is more oxidized ?
- A. Fat
  - B. Protein
  - C. Fat
  - D. Proteins and carbohydrates
  - E. Carbohydrate and Fat
55. Studying process of heat transfer from naked man at room temperature. Is defined that at these conditions the greatest amount of heat is given by:
- A. Heat radiation
  - B. Heat transfer
  - C. Convection
  - D. Fumes
  - E. No right answer
56. A man came out of the conditioned space to the street where the air temperature is 40°C (Humidity - 6). Heat loss from the body in the street will be due?
- A. Evaporation of sweat
  - B. Convection
  - C. Radiation
  - D. Locations
  - E. No right answer
57. At the thermometry was found that the temperature of exposed skin at 1-1.5 degrees below the temperature of the near plots covered with clothes made of natural fabrics. The reason for this is primarily that wear reduces the heat irradiation by:
- A. Convection

- B. Radiation
  - C. Locations
  - D. Fumes
  - E. No right answer
58. In cold wind weather, people freeze faster than in the absence of wind. The reason of it is that the wind increases the heat transfer by?
- A. Convection
  - B. Radiation
  - C. Locations
  - D. Fumes
  - E. No right answer
59. Workers of hot metallurgical shops lose a significant amount of water with sweat. To compensate it should be consumed?
- A. Salted water
  - B. Aerating water
  - C. Milk
  - D. Juices
  - E. kvass
60. By the indirect calorimetry was established that 30 years man has decrease in basal metabolism by 3. Reduction in the concentration of what hormones in the blood plasma could be causing this?
- A. Triiodothyronine, tetraiodothyronine
  - B. Thyrocalcitonin, parathyroid hormone
  - C. Glucocorticoids
  - D. Catecholamines
  - E. Somatoliberin, somatostatin
61. The inhabitants of the territories for the cold climate have in the blood increased content of a hormone that has an adaptive thermoregulatory function. What the hormone is it?
- A. Thyroxine
  - B. Insulin
  - C. Glucagon
  - D. Growth Hormone
  - E. Cortisone
62. Sweating of adapted to high temperature people is not accompanied by the loss of a large number of sweat sodium chloride. What hormone action leads to this result?
- A. Aldosterone
  - B. Vasopressin
  - C. Cortisol
  - D. Thyroxine
  - E. natriuretic

63. The patient has persistent vomiting which led to dehydration. Increased secretion of what hormone under these conditions, primarily provides water retention in the body?
- A. Vasopressin
  - B. Aldosterone
  - C. Natriuretic
  - D. Adrenaline
  - E. Calcitonin
64. A woman of 35 years, which is within 3 months limited number of foods in the diet has decreased body weight, physical deterioration and mental activity, swelling of the face. Which nutrient deficiency could lead to such changes?
- A. Protein
  - B. Vitamins
  - C. Fat
  - D. Carbohydrates
  - E. Trace
65. During exercise with sweating in the blood vessels of the skin increased levels of bradykinin, which provides?
- A. Increase in heat transfer by radiation
  - B. Increase in convective heat transfer
  - C. Increase in heat conducting
  - D. Reduction in heat transfer by radiation
  - E. Reduction in heat
66. In teenager, during exercise the minute oxygen consumption and carbon dioxide emission are both equal to 1000 ml. What substrates are oxidized in the cells of his body?
- A. Carbohydrates
  - B. Proteins
  - C. Fats
  - D. Carbohydrates and Fats
  - E. Carbohydrates and proteins
67. By indirect calorimetry was revealed that the basal metabolism of a person was by 40% lower than it had been predicted. Impairment of what endocrine gland was the reason of that?
- A. Thyroid
  - B. Thymus
  - C. Pancreas
  - D. epiphysis
  - E. Adrenal Glands
68. A patient, 35 years, shows an increase in body weight, reduction in body temperature,

- dry skin, inhibition of central nervous system functions, bradycardia. Malfunction of what gland(s) should be supposed?
- A. Thyroid
  - B. Parathyroid
  - C. Pancreatic
  - D. adrenal medulla
  - E. gonads
69. Man fell into the icy water and quickly died as a result of sharp hypothermia. This took place because in this case the body loses heat mostly by:
- A. Conduction
  - B. Radiation
  - C. Convection
  - D. Conduction and radiation
  - E. No correct answer
70. In a young man during exercise, the minute oxygen uptake and carbon dioxide emission equalled to 1000 ml. What substrates are oxidized in the cells of his body?
- A. Carbohydrates
  - B. Proteins
  - C. Fats
  - D. Carbohydrates and fats
  - E. Carbohydrates and proteins
71. The processes of heat transfer in a naked person at room temperature have been studied. It was revealed that under these conditions the greatest amount of heat is transferred by:
- A. Heat radiation
  - B. Heat conduction
  - C. Convection
  - D. Evaporation
  - E. —
72. When measuring power inputs of a person by the method of indirect calorimetry the following results were obtained: oxygen consumption is 1000 ml and carbon dioxide production is 800 ml per minute. The person under examination has the following respiratory coefficient:
- A. 0,8
  - B. 1,25
  - C. 0,9
  - D. 0,84
  - E. 1,0

## RESPIRATORY SYSTEM

1. As a result of a gunshot wound a man 30 years old has a full gap in the upper spinal cord - thoracic region. How will change the nature of breath?

- diaphragmatic will save, thoracic will disappear
- Will stop
- will become a rare and severe
- No change
- thoracic will save, diaphragmatic will disappear

2. In certain situations people use anti-gas masks. How does breathing change?

- become deep due to increased volume of airways
- will become frequent
- Will become superficial
- Will become arrhythmic
- No change

3. When person breathes in a gas mask the breathing become deeper. This is necessary because of increased:

- volume of airways
- residual volume
- Total volume of lungs
- inspiratory reserve volume
- expiratory reserve volume

4. In experiments on dogs was determined ventilation - perfusion rest coefficient (alveolar ventilation / pulmonary blood flow). Whichever of the following is correct?

- 0.8
- 0.1
- 0.0.3
- 1.5
- 0.015

5. The end useful result of the first phase (external) respiration is the maintaining constancy of?

- Gas composition of the alveolar air
- coefficient of the alveolar ventilation
- VC
- the total lung capacity
- functional residual capacity

6. Thoracic surgeons after removal of part or the whole of lung use breathing through the

tube of the same diameter, but the increasing length for the development of functional possibilities. Changes of what parameters of external respiratory is the basis of the method?

- FDS (functionally dead space)
- MVL MLV (maximal lungs ventilation)
- Rr (respiratory reserve)
- RV (residual volume)
- VLC (vital lungs capacity)

7. Patient with asthma is at the attack condition. Which of the drugs must be entered to expand the bronchial tubes?

- Adrenaline
- Heparin
- Acetylcholine 0
- Gastrin
- Histamine

8. Destruction of pneumotoxic center in the experiment led to a change of?

- duration of inspiration.
- clearance of the bronchi.
- duration of expiration.
- long pauses between breaths.

9. The volume of air that a person inhales and exhales during quiet breathing is called?

- respiratory volume.
- total lung capacity.
- vital lung capacity.
- expiratory reserve volume.
- inspiratory reserve volume.

10. The act of inspirating is replaced by an act of expiration. What is the trigger in the implementation of Hering - Breuer reflex?

- irritation of mechanoreceptors in the lungs during inhalation.
- irritation pneumotoxic center.
- oxygen deficiency in the blood.
- increased volume in the thorax.
- irritation of reflex zones of the aorta.

11. The greatest amount of air which person can exhale after maximum, taking a deep breath it?

- vital lung capacity.
- respiratory volume.
- Total lung capacity.

- expiratory reserve volume.
- Functional residual capacity.

12. In the room is high content of carbon dioxide. How will change (depth and frequency) of a person who came into this room?

- the depth and the rate of breathing will increase.
- the depth and frequency of breathing will decrease
- the depth and frequency of breathing will decrease.
- the depth and reduced respiratory rate will increase.
- will remain unchanged.

13. The man 58 years old consulted to the doctor with complaints of shortness of breath and expectoration of sputum in the morning. What is the functional examination of the respiratory system must be performed for the diagnosis?

- Spirograph, spirometry.
- cycle ergometer.
- heart rate monitor.
- dynamometer.
- ECG.

14. The patient, who is often sick, found low levels of lung surfactant. This is the reason?

- tobacco-
- of adrenal hormones
- Excitation of the vagus nerve
- eat foods rich in arachidonic acid
- The periodical deep breaths.

15. If the tidal volume  $t_v = 350$  ml and RR = respiratory rate 18/min. The alveolar ventilation is equal to AB?

- 3600 ml
- 3100 ml
- 4.000 ml
- 4500 ml
- 5000 ml

16. The kid asked you to inflate the balloon as much as possible in a single breath. How does the volume of air you use?

- vital capacity
- inspiratory capacity
- functional residual capacity
- inspiratory reserve volume
- of the total lung capacity

17. A person at rest increased inspiratory muscle work. What could be causing this?

- Airway narrowing
- of Breath
- rare breath
- negative pressure within the pleural
- decrease in minute volume

18. In the hyperbaric chamber reduced the pressure to 400 mmHg How to change the external breathing person in this chamber?

- the depth and rate of respiration will decrease
- the depth and rate of respiration will increase
- the depth will decrease and respiratory rate will increase
- the depth will increase and respiratory rate will decrease
- No change

19. The patient has a sharp decrease in the activity of lung surfactant. What happens as a consequence of this?

- addiction of the alveoli to collapse
- reduction of airway resistance
- reduction of the work of respiratory muscles
- increase of pulmonary ventilation
- hyperoxaemia

20. At the request of the doctor patient made a maximum deep breath. Which of the following muscles work in such an exhalation?

- Abdomen
- Diaphragma
- Stair muscles
- Sternoclavicularmastoid
- Trapezoid

21. An early born baby has a respiratory distress syndrome. It manifested with fall of the alveoli areas due to increased elastic recoil. This force can be reduced by?

- surfactant preparations
- inhalations of pure oxygen
- mechanical ventilation
- suctioning respiratory
- glucose injection

22. Patients with pulmonary insufficiency are often advised to live in the highlands. What could be the reason for the improvement of their health?

- A. The body's reaction to hypoxia
  - B. low temperature
  - C. Clean Air
  - D. reduction of nervous tension
  - E. Reduction of body exercise
23. After abdominal surgery the patient is at rest in a horizontal position. In this position, the inspiration of the lungs by 80 due to the reduction?
- A. Diaphragma
  - B. external intercostal muscles
  - C. Internal intercostal muscles
  - D. Pectoralis major and minor
  - E. of the abdominal muscles
24. The man has a hyperventilation of lungs due to heavy physical exertion. What indications of the external respiration increased, compared to the state of rest?
- A. tidal volume
  - B. vital capacity
  - C. inspiratory reserve volume
  - D. expiratory reserve volume
  - E. total lung capacity
25. At the request of the doctor patient after normal breathing made a maximum deep breath. Which of the following muscles work in this exhalation?
- A. abdomen
  - B. external intercostal
  - C. diaphragma
  - D. trapezius
  - E. internal intercostal
26. The patient who is suffering with bronchitis need to perform spirometry. Which of lung volume can not be determined by this method?
- A. residual volume
  - B. tidal volume
  - C. inspiratory reserve volume
  - D. expiratory reserve volume
  - E. vital capacity
27. The doctor wrote in a history of the disease that the patient has superficial breathing (reduced depth of breathing). It means that will decrease the index of?
- A. tidal volume
  - B. vital capacity
  - C. functional residual capacity

- D. inspiratory capacity
  - E. minute respiratory volume
28. A person made a maximum deep breath. What the name of the air volume in his lungs?
- A. functional residual capacity
  - B. residual volume
  - C. expiratory reserve volume
  - D. tidal volume
  - E. vital capacity
29. A man is measured intrapleural pressure. In what phase of the man held his breath when the pressure is equal to -7.5 sm.vod.st.?
- A. Calm breath in
  - B. Calm breath out
  - C. Forced breath in
  - D. forced breath out
  - E. All answers are correct
30. The newborn didn't do the first breath. The autopsy established that with the free airways the lungs didn't deal. Which of the above could be causing this?
- A. no surfactant
  - B. bronchoconstriction
  - C. gap bronchi
  - D. thickening of the pleura
  - E. All answers are correct
31. As a result of trauma the person has damaged chest with the development of an open pneumothorax. As a result of this how will change the pressure in the pleural cavity?
- A. will be equal to atmospheric
  - B. No change
  - C. It will become superatmospheric
  - D. will be below atmospheric
  - E. will be equal the alveolar
32. A person with bronchospasm attack is necessary to reduce the influence of the vagus nerve on the smooth muscles of the bronchi. What membrane receptors appropriate are need block for this?
- A. M-cholinergic receptors
  - B. N-cholinergic receptors
  - C. alpha-adrenergic
  - D. beta-adrenergic receptors
  - E. alpha-and beta-adrenergic receptors
33. The sufferer has damaged chest with symptoms of open pneumothorax on the left.

- How will change the pressure in the pleural cavity of the left in this case?
- A. became equal to the atmospheric
  - B. became negative
  - C. Unchanged
  - D. became higher than the atmospheric
  - E. At the inspiration will decrease and will increases at the expiratory
34. In the accident occurred obturation of the lung trachea. What function of the lungs will become broken first?
- A. ventilation
  - B. gas exchange in the lungs
  - C. transport of oxygen
  - D. gas exchange in tissues
  - E. tissue respiration
35. During inspiration, the pressure in the pleural cavity becomes?
- A. more negative
  - B. Equal to zero
  - C. equal to the pressure in the alveoli
  - D. equal to the atmospheric pressure
  - E. more positive
36. During the exertion at the forced breathing person involuntarily transferred to breathing through the mouth, because it leads to?
- A. reduction of aerodynamic drag
  - B. increase of aerodynamic drag
  - C. Reduction of elastic resistance
  - D. reduction of surface tension
  - E. Reduction of gravity
37. Useful result of the first phase of external respiration is the maintenance constancy of?
- A. Gas composition of the alveolar air
  - B. VC
  - C. Ratio of alveolar ventilation
  - D. the total lung capacity
  - E. functional residual capacity
38. At the spirogram analysis has established reduction in the rate and depth of breathing. It will reduce?
- A. respiratory minute volume
  - B. vital capacity
  - C. inspiratory reserve volume
  - D. expiratory reserve volume
  - E. residual volume

39. In a patient with severe symptoms of hypoxia was found violation of hemoglobin ability to transport the oxygen. Hyperbaric oxygen therapy has improved the condition of the patient. What is the mechanism of action?
- A. Increase in dissolved oxygen in the plasma
  - B. Increase in oxyhemoglobin dissociation
  - C. Increase in formation of oxyhemoglobin
  - D. Decrease in blood oxygen capacity
  - E. Increase in hemoglobin-oxygen affinity
40. The carbonic acid forms from carbon dioxide in the body. Where does it happen?
- A. in erythrocytes
  - B. In cells of tissues
  - C. In leukocytes
  - D. In the blood plasma
  - E. In platelets
41. Carbon dioxide is transported in the body mainly in the form of?
- A. Salts of carbonic acid
  - B. Methemoglobin
  - C. Reduced hemoglobin
  - D. Oxyhemoglobin
  - E. Carboxyhemoglobin
42. Champions of diving dive to a depth of 100 meters without scuba gear and return to the surface for 4-5 minutes. Why do they have't decompression sickness?
- A. Diver is not breathing, blood gas dissolution occurs.
  - B. Increase in the partial pressure of carbon dioxide.
  - C. Rapid release of gases from the blood rise.
  - D. Rapid release of gases from the blood during the dive.
  - E. Reduced oxygen partial pressure.
43. As a result of the accident has occurred tracheal obturation of the lung. What lung function has broken first?
- A. Ventilation
  - B. Tissue respiration.
  - C. The gas exchange in the tissues.
  - D. The gas exchange in the lungs.
  - E. Transport of oxygen.
44. The part of oxygen in arterial blood, which is absorbed by the tissues is called?

- A. Coefficient of oxygen utilization.
  - B. Respiratory minute volume.
  - C. Oxygen capacity of the blood.
  - D. Partial pressure of the gas.
45. The displacement of oxyhemoglobin dissociation curve to the right is observed under the influence of?
- A. Hyperthermia.
  - B. alkalosis.
  - C. hypocapnia.
  - D. No answer is correct.
  - E. decrease in the concentration of 2,3-diphosphoglycerate in erythrocytes
46. Carbon dioxide is transported in the body in the form of?
- A. Salts of carbonic acid
  - B. Oxyhemoglobin
  - C. Carboxyhemoglobin
  - D. Recovery of Hb.
  - E. Methemoglobin
47. At hyperventilation increases the respiratory quotient (RQ). What is the cause of increasing of RQ in this case?
- A. Increase in carbon dioxide emissions
  - B. Increase in allocation of water vapor
  - C. Reduce of carbon dioxide emissions.
  - D. Increase in oxygen uptake
  - E. Decrease in oxygen uptake
48. At carbon monoxide poisoning patient felt weakness, fatigue. How thus will change the oxygen capacity of the blood?
- A. Decrease in blood oxygen capacity
  - B. Increase in blood oxygen capacity
  - C. At first increase the oxygen capacity of the blood, and then declines
  - D. No change
  - E. All wrong.
49. During the patient's stay in the conditions of the mountain resort, he had rose parameters of pulmonary ventilation and hemodynamics. What was the main cause of this phenomenon?
- A. reaction of the organism to hypoxia
  - B. Increase in physical activity
  - C. Decrease in ambient temperature
  - D. Reduction of nervous tension
  - E. Clean Air

50. Oxyhemoglobin dissociation curve \_ to the right is observed under the influence of?
- A. No answer is not correct
  - B. decrease in concentration of 2,3 - diphosphoglycerate in erythrocytes
  - C. alkalosis
  - D. hypocapnia
  - E. Hypothermia
51. How is called hemoglobin associated with CO?
- A. carboxyhemoglobin
  - B. No answer is correct.
  - C. Methemoglobin
  - D. Oxyhemoglobin
  - E. Carbohemoglobin
52. The patient has a sharp decrease in activity of lung surfactant. What is the consequence of this?
- F. Propensity of the alveoli to collapse
  - A. Reduction in airway resistance
  - B. Reduce of respiratory muscles
  - C. Increase in ventilation
  - D. Hyperoxaemia
53. After a long stay of the person in the mountains at a height of 3000 m above sea level, he has increased the oxygen capacity of the blood. The immediate reason for this is the increased formation in the body of?
- A. Erythropoietin
  - B. Leucopoetins
  - C. Carbohemoglobin
  - D. Catecholamines
  - E. 2.3 Diphosphoglycerate
54. What environmental factors improve parameters of pulmonary ventilation in high mountains?
- A. Decrease in the partial pressure of oxygen
  - B. Reduction of nervous tension
  - C. Increase in physical stress
  - D. Temperature
  - E. Clean Air
55. The upper portions of the lungs are more often amazed by tuberculosis because of?
- A. Preponderance of ventilation perfusion
  - B. Preponderance of ventilation perfusion
  - C. High blood pressure in the capillaries
  - D. High oncotic pressure
  - E. Severe of arteriovenous shunts

56. The man after the pathological process has increased thickness of the alveocapilar membrane. Because of this will be the reduction of?
- A. Lung diffusion capacity
  - B. Oxygen capacity
  - C. Respiratory minute volume
  - D. Alveolar ventilation
  - E. Expiratory reserve volume
57. Emergency Physician stated in the the victim villager unconsciousness, respiratory failure and other manifestations of carbon monoxide poisoning. What connection was the cause of respiratory disorders?
- A. carboxyhemoglobin
  - B. Carbohemoglobin
  - C. Methemoglobin
  - D. Deoxyhemoglobin
  - E. Oxyhemoglobin
58. After a long delay in the patient breathing arterial O<sub>2</sub> tension decreased to 60 mm.rt.st. (8.0 kPa). How does the respiratory system react to such a change in homeostasis?
- A. Hyperventilation
  - B. Hypoventilation
  - C. Hyperoxygenation tissues
  - D. Hyperoxia
  - E. Hypercapnia
59. Due to physical exercise oxygen capacity of the blood in man has increased from 180 to 200 ml / l. The main reason of it is that during exercise increases:
- A. Hemoglobin content per unit volume of blood
  - B. Diffuse lung capacity
  - C. Oxygen content in the alveoli
  - D. Oxygen affinity of hemoglobin
  - E. The minute volume of respiration
60. Due to an accident a person has been poisoned by CO, which caused a headache, shortness of breath, dizziness. Reducing the content of what compound in the blood resulting to it ?
- A. Oxyhemoglobin
  - B. Carboxyhemoglobin
  - C. Carbohemoglobin
  - D. Methemoglobin
  - E. Deoxyhemoglobin
61. The infant , has respiratory distress syndrome prematurely. It appeared by reduction in portion of the alveoli due to the increased elastic recoil. This force can be reduced by:
- A. Surfactant preparations
  - B. Pure oxygen inhalation
  - C. Mechanical ventilation
  - D. Suctioning respiratory
  - E. Glucose injection
62. In investigated person was determined tidal volume (500 ml), respiratory rate (over 15 minutes), the volume of the dead space (100 mL). How much air will pass from the patient through the alveoli per minute?
- A. 6000 mL
  - B. 7500 ml
  - C. 1500 ml
  - D. 9000 ml
  - E. 7400 ml
63. The patient has a normal value of diffuse lung capacity, but has reduced the diffusion of gases in the lungs. Reduce of what of these factors causes it?
- A. Gradient of pressure in the alveoli and blood
  - B. Surface area through which diffusion occurs
  - C. The thickness of the alveolar-capillary membrane
  - D. Diffusion coefficient
  - E. Rate of blood flow in the capillaries
64. Due to physical exercise oxygen capacity of human blood increased from 180 to 200 ml / l. The main reason of it is that during exercise increases?
- A. Hemoglobin content per unit volume of blood
  - B. Diffusion capacity of the lungs
  - C. Oxygen content in the alveoli
  - D. Oxygen affinity of hemoglobin
  - E. The minute volume of respiration
65. In the investigation of human in upright posture was found that in lung alveoli tops partial pressure of oxygen is 140 mmHg The cause of this is that in these regions of the lungs?
- A. Ventilation dominantes the perfusion
  - B. Perfusion dominates ventilation
  - C. Ventilation and perfusion are balanced
  - D. No ventilation
  - E. No perfusion



66. The man has increased arterial oxygen tension to 104 mm Hg, and the carbon dioxide is reduced to 36mm Hg. Art. It can result from?

- A. Arbitrary hyperventilation
- B. Delays breathing
- C. Intensity of exercise
- D. Moderate exercise
- E. Stay in the mountains

67. What form of hemoglobin carries the largest amount of CO<sub>2</sub>?

- A. Carbohemoglobin
- B. Carboxyhemoglobin
- C. Oxyhemoglobin
- D. Methemoglobin
- E. No answer is not correct

68. Which of the factors of the environment improves indices of pulmonary ventilation at high altitude?

- A. Reduction of the partial pressure of O<sub>2</sub>
- B. Reduction of nervous tension
- C. Increase in physical stress
- D. Temperature
- E. Clean Air

69. Boy 14 years old plunged into the lake and his head stumbled on a snag. As a result of the displacement of the upper cervical vertebrae spinal cord is completely severed. How will change the character of respiration?

- A. Will stop
- B. Will be rare
- C. Will be rapid
- D. Will be superficial and frequent
- E. No change

70. As a result of trauma a man 42 years old has damaged both vagus nerve. How will change the nature of respiration?

- A. Will be deep and rare
- B. Will stop
- C. will be rapid
- D. will be rapid and surface
- E. No change

71. In the state of asthmatic attack to expand the bronchi should enter the following material:

- A. Blocker of atsetilholin
- B. Blockers of vasopressin
- C. Alfa - adrenoblocker

- D. of oxytocin blockers
- E. Adrenoblocker

72. Bronchoconstriction in patients with asthma is caused by increased tone of centers:

- A. Of parasympathetic vagal
- B. Of the sympathetic nerves
- C. Of the facial nerve
- D. Of parasympathetic glossopharyngeal nerve
- E. Of the phrenic nerve

73. A patient with traumatic brain injury has respiratory arrest. Damage of what part of the brain is most probably?

- A. Medulla oblongata
- B. Spinal Cord
- C. Midbrain
- D. Diencephalon
- E. Cerebellum

74. Change of pH of cerebrospinal fluid in the experiment in dogs causes a change in of respiration due to excitation of:

- F. Central chemoreceptors of the medulla oblongata
- A. Irritant receptors
- B. Receptors of pleura
- C. Lung receptors
- D. Receptors of the hypothalamus

75. Central hemoreceptors perceiving pH of cerebrospinal fluid are located:

- A. In the medulla oblongata
- B. In the spinal cord
- C. In the midbrain
- D. In the thalamus
- E. In the hypothalamus,

76. During the experiment the dog was cut the brain stem between the medulla oblongata and pons. How will change respiration in this case?

- A. Inhale will lengthen and exhale will find difficulty
- B. Stopped
- C. No change
- D. Exhale will lengthen and inhale will find difficulty
- E. Will be rapid

77. During the experiment the dog was cut on the neck two vagus nerve and after it

was broke Hering-Breuer reflex. How will change the \_ breathing?

- A. Lengthened inhale and exhale
- B. Stopped on inhaling
- C. Stay at the maximum exhale
- D. Will rapid
- E. No change

78. During the experiment on a dog after transection of the brain stem between the pons and medulla and cut two vagus nerve in the neck. How will change the respiration after it?

- A. Will stop
- B. No change
- C. Will rapid
- D. Will slowing
- E. Will be deepen

79. In an experiment on dogs limited depth of inhalation by flow of pulses from:

- A. Lung mechanoreceptors
- B. Chemoreceptors of carotid zone
- C. Central chemoreceptors
- D. Receptors of airways
- E. Yukstakapillary receptors

80. During the experiment on the cat after transection of the spinal cord at the level C<sub>2</sub> stopped breathing. What is the reason?

- A. Disrupted communication of the respiratory center of the medulla oblongata with the motor neurons of the spinal cord
- B. Disrupted communication of red nucleus with the spinal cord
- C. Disrupted communication of the nuclei of Deiters with motor neurons of the spinal cord
- D. Reduction in excitability of spinal cord
- E. Spinal shock

81. Due to the road accident in a patient was diagnosed a transverse rupture of the spinal cord below the thoracic segment VI. How will change the respiration?

- A. Will not change.
- B. Will stop.
- C. Will become more rare.
- D. Will be profound.
- E. Will become more rapid.

82. Patients with congestive vessels in the pulmonary circulation was revealed dyspnea.

Activation of what receptors will causes this condition?

- A. Yukstakapillary
- B. lung receptors
- C. Na<sup>+</sup> - receptors of central chemoreceptors
- D. lung irritant receptors
- E. Oxygen peripheral receptors of the carotid sinus
- F. of mechanoreceptors in the lungs.

83. The function of expiratory neurons is:

- A. inhibition of inspiratory neurons in the dorsal and ventral nucleus
- B. In the excitation of the respiratory muscles
- C. In excitation pneumotoxic center
- D. reduction in ventilation
- E. No answer is correct

84. Reflex Hering-Breuer is realized by irritation:

- A. Receptors of breathing apparatus (bronchi, lungs, pleura)
- B. Receptors of joints, tendons, ligaments.
- C. Chemoreceptors of aortic arch
- D. Chemoreceptors of carotid sinus
- E. No answer is correct

85. After inhalation of dust appeared cough, which is caused by the excitation:

- A. Irritant receptors
- B. Yukstakapillary receptors
- C. Hamoretseptors of lung
- D. Thermoreceptors of lung
- E. Pain receptors

86. The patient has spasm of bronchial smooth muscle. Physiological rationale is to use the activator of ..... to remove attack:

- A. Beta-adrenoceptor
- B. Alfa-adrenoceptor
- C. alpha and beta-adrenoceptor
- D. N-cholinergic receptors
- E. M-cholinergic receptors

87. At smoking people is often have a cough. Which receptors irritation starts this reflex

- A. Irritant
- B. Chemoreceptors of aortic arch
- C. Chemoreceptors of carotid sinus
- D. Lung mechanoreceptors
- E. Central chemoreceptors

88. The patient after a craniocerebral trauma rare and profound breathing. Where is the damage?

- A. Hindbrain
- B. Hypothalamus
- C. Medulla oblongata
- D. Cerebral cortex
- E. Cerebellum

89. At the patient appeared spasm of bronchial smooth muscle. Physiological explanation will be used for removal of activators:

- A. Beta-blockers
- B. Alpha-adrenoceptor
- C. Alpha-and beta-adrenoceptors
- D. N-cholinergic receptors
- E. M-cholinergic receptors

90. The animal was removed carotid corpuscles on both sides. Which of the factors indicated he will not have developing of hyperventilation?

- A. Hypoxemia
- B. Exercise
- C. Hypercapnia
- D. Acidosis
- E. Increase in body core temperature of body nucleus

91. A person with an attack of bronchospasm is necessary to reduce the influence of the vagus nerve on bronchial smooth muscle. What membrane citoreceptors is need to block for this?

- A. M-cholinergic receptors
- B. N-cholinergic receptors
- C. Alpha-and beta-adrenoceptors
- D. Alpha-adrenergic receptors
- E. Beta-adrenergic receptors

92. As a result of injury a man 35 years old has complete rupture of the spinal cord at the level of the first cervical vertebra. How will change the nature of respiration:

- A. Will stop
- B. No change
- C. Save diaphragmatic, disappear breast
- D. Thoracic will disappear diaphragmatic will disappear
- E. Will become rare and deep

93. What receptors is need to block in humans with an attack of bronchospasm to

reduce the influence of the vagus inequality on smooth muscles of the bronchi?

- A. M-cholinergic receptors
- B. N-cholinergic receptors
- C. alpha-adrenergic receptors
- D. Beta-adrenergic receptors
- E. Alpha and beta-adrenoceptors

94. Hyperpnoea after a long delay of breathing is caused by?

- A. Increase in blood CO<sub>2</sub> tension
- B. Increase in blood O<sub>2</sub> tension
- C. Reduction in blood O<sub>2</sub> tension
- D. Reduction in blood CO<sub>2</sub> tension
- E. No right answer

95. At an exercise stress during forced respiration people involuntarily passes to breathing through the mouth, because it leads to?

- A. Reduction in aerodynamic resistance
- B. Increase in aerodynamic resistance
- C. Reduction in elastic resistance
- D. Reduction in surface tension
- E. Reduction of gravitational forces

96. In an experiment on a dog have caused reflex of Hering-Breer. It has been observed that stimulation of certain receptors inhibits breath. What kind of receptors is it?

- A. Pulmonary stretch receptors
- B. Irritant
- C. Pleural
- D. Muscle spindles
- E. Juxtglomerular

97. Before diving into the water pearl divers do a few deep breaths. What provides these movements?

- A. Maximum possible removal of CO<sub>2</sub> from the body
- B. Provision body oxygen supply
- C. Adaptation to the temporary cessation of breathing
- D. Increased blood flow in the pulmonary circulation
- E. Increase in lung diffusion capacity

98. During the experiment on the dog irritated central chemoreceptors. How varied breath thus?

- A. Amplifies the inhalation and exhalation
- B. Attenuated inhalation and exhalation
- C. Attenuated breath, exhale amplified

D. Amplified breath, exhale attenuated  
E. No changes noted

99. To the person with an attack of bronchospasm is necessary to reduce the influence of the vagus nerve on bronchial smooth muscle. What membrane citoreceptors is necessary to block for it?

- A. M-cholinoceptors
- B. N-cholinoceptors
- C. Alpha-adrenoceptors
- D. Beta-adrenoceptors
- E. Alpha-and beta-adrenoceptors

100. In an animal was removed karotic corpuscles on both sides. Which of these factors it will not develop hyperventilation?

- A. Hypoxia
- B. Exercise
- C. Hypercapnia
- D. Acidosis
- E. Increase in temperature of body nucleus

101. At functional load on a stationary bike at the test athlete has increased respiration rate. What is the main cause in change of the respiratory center in this case?

- A. Increase in the voltage of CO<sub>2</sub> in the blood
- B. Reduction in blood CO<sub>2</sub> tension
- C. Increase in the quantity of adrenaline
- D. Increase in the voltage of O<sub>2</sub> in the blood
- E. Reduction in blood O<sub>2</sub> tension

102. After a random delay of breathing in humans increased depth and rate of the respiration. The main factor stimulating these changes is?

- A. Increase in blood CO<sub>2</sub> tension
- B. Increase in blood O<sub>2</sub> tension
- C. Reduction in blood O<sub>2</sub> tension
- D. Reduction in blood CO<sub>2</sub> tension
- E. Reduction in blood concentration of H<sup>+</sup>

103. In an experiment on a dog produced transection of the vagus nerves on both sides. How thus will change the nature of respiration?

- A. Will be deep and rare
- B. Will become superficial and frequent

C. Will be deep and frequent  
D. Will become superficial and rare  
E. Breathing will not change

104. In the young woman who came into the production hall with a pungent smell of paint products, appeared bronchospasm. Which receptors irritation caused this reflex?

- A. Irritant
- B. Juxtglomerular
- C. Receptors of pleura
- D. Central chemoreceptors
- E. Peripheral chemoreceptors

105. After hyperventilation the athlete has a momentary stop of breathing. What changes in the blood are

- A. predetermine it?
- B. Reduce CO<sub>2</sub> tension
- C. Reduction pH
- D. Increasing the voltage CO<sub>2</sub>
- E. Increasing the voltage of CO<sub>2</sub> and O<sub>2</sub>
- F. Decreasing the voltage O<sub>2</sub>

106. A diver after lifting from depth has signs of decompression sickness. What measures must be done?

- A. Perform compression in the chamber, followed by decompression
- B. Produces an intense hyperventilation
- C. Hold the breath
- D. Compression and perform in a pressure chamber with an excess amount of O<sub>2</sub>
- E. Compression and perform in a pressure chamber with an excessive amount of CO<sub>2</sub>

107. Bronchoconstriction in patients with asthma is caused by increased tone centers?

- A. Of parasympathetic vagal
- B. Of the sympathetic nerves
- C. Of parasympathetic glossopharyngeal nerve
- D. Of the phrenic nerve
- E. Of the facial nerve

108. Forced deep breathing requires the inclusion of additional chest muscles. Which of the following brain structures provide their work?

- A. Ventral nucleus of the medulla oblongata
- B. Deiters nuclei

- C. Tooth nucleus of cerebellum
  - D. The lateral geniculate body
  - E. Front colliculus
109. During respiration under water at elevated pressure arise complications. How can we change the to avoid the complications?
- A. Replace nitrogen helium
  - B. Decrease CO<sub>2</sub> partial pressure
  - C. Increase O<sub>2</sub> partial pressure
  - D. Increase CO<sub>2</sub> partial pressure
  - E. Decrease O<sub>2</sub> partial pressure
110. After a quick rise from the depths of the 70 meters in the diver appeared aeremia with fatal end. What process caused incompatible with life violations?
- A. Air embolism of vital organs
  - B. Lung injury
  - C. Heart Failure
  - D. Gap differential pressure vessels
  - E. Breach of blood flow in the veins
111. A group of tourists who climbed to an altitude of 4000 m, had mountain sickness, which was accompanied by shortness of breath, dizziness. Which process could lead to this state?
- A. Cerebral vasospasm as a result of hypocapnia
  - B. Increase in blood pressure
  - C. Decrease in venous blood flow to the heart
  - D. Hypercapnia hypoventilation
112. By inhalation of mixture of air and low O<sub>2</sub> content in the test subject appeared increase the depth and rapity of breathing. What are the receptors which the most respond by increasing the activity of hypoxemia?
- A. Chemoreceptors carotid bodies
  - B. Chemoreceptors of the aortic arch
  - C. Chemoreceptors of the medulla oblongata
  - D. Receptors of lung tissue
  - E. Lung airway receptors
113. After a long delay of breathing the patient has O<sub>2</sub> tension in arterial blood decreased to 60 mm Hg. Art. (8.0 kPa). How does react the respiratory system to such a change in homeostasis?
- A. Hyperventilation

- B. Hypoventilation
  - C. Hyperoxygenation tissues
  - D. Hyperoxia
  - E. Hypercapnia
114. The patient received a spinal cord injury above 5 cervical segment. How it will change the nature of respiration?
- A. Will stop
  - B. Will become superficial and a rare
  - C. Will be deep and rapid
  - D. Will become superficial and rapid
  - E. Will be deep and rare
115. Why do people who are indoors for a long time, where burning fireplace, has shortness of breath?
- A. reduction in the number of O<sub>2</sub> in the air
  - B. Increased humidity
  - C. Increase in amount of CO<sub>2</sub> in the air
  - D. Reduction of CO<sub>2</sub> in air
  - E. Decrease humidity
116. The diver who breathes underwater ambient air, with the rapid rise affected decompression (caisson) disease. It is caused by?
- A. forming of nitrogen bubbles in tissues
  - B. CO<sub>2</sub> bubble formation in tissues
  - C. narcotic effects of nitrogen
  - D. sharp fall of the partial pressure
  - E. hypoxia
117. During exercise reduced O<sub>2</sub> level and blood pH. The most effective stimulus of the carotid sinus, which increases ventilation is?
- A. Low O<sub>2</sub> in blood
  - B. Low CO<sub>2</sub> levels in the blood
  - C. Increase O<sub>2</sub> in blood pressure
  - D. Accumulation of glucose in the blood
  - E. Increased blood pH
118. In the animal was destroyed one of the structures of the respiratory center. It had no effect on breathing animal. What structure was broken?
- A. Ventral respiratory nucleus
  - B. Dorsal respiratory nucleus
  - C. Pneumotoxic center
  - D. Spinal motoneurons
  - E. Ventral and dorsal respiratory nucleus
119. Large group of people for a long time was in the small room. It led to the develop-

- ment of hyperventilation due to the following changes in the air?
- A. Increase in the concentration of CO<sub>2</sub>
  - B. Reduction of O<sub>2</sub>
  - C. Increase in moisture content
  - D. Increase in temperature
  - E. Decrease in temperature
120. After several arbitrary intensive respiratory movements (hyperventilation) athlete «doesn't want to» breathe for some time. What is the cause of this condition?
- A. Reduces the excitability of the respiratory center
  - B. Increases the excitability of the respiratory center
  - C. Increase in the partial pressure of CO<sub>2</sub>
  - D. Reduces the partial pressure of O<sub>2</sub>
  - E. Increased blood pH
121. In the subject were determined the tidal volume (500 ml), respiratory rate (15 per minute), the volume of the dead space (100 mL). How much air will pass through the alveoli per minute in this person?
- A. 6000 mL
  - B. 7500 ml
  - C. 1500 ml
  - D. 9000 ml
  - E. 7400 ml
123. During the examination of a human is needed to determine the proportion of the alveolar air which is refreshed with every inspiration. Which one of the indicators is to be used for this?
- A. coefficient of lung (pulmonary) ventilation
  - B. minute volume of respiration
  - C. minute alveolar ventilation
  - D. vital capacity
  - E. functional residual capacity of the lungs
124. The man is being measured the intrapleural pressure. In what phase has the man got held his breath, if the pressure is equal to 3 cm Aq?
- A. forced expiration
  - B. calm expiration
  - C. Forced inspiration
  - D. Calm inspiration
  - E. This can't be (no correct answer)

125. The pressure in the alveoli of the lungs of a healthy person is being measured. This pressure is equal to 0 cm Aq during:
- A. pause between inhalation and exhalation
  - B. Quiet inspiration
  - C. Quiet expiration
  - D. forced inspiration
  - E. forced expiration
126. In the study of the external respiration a doctor asked the patient to make the deepest expiration after the deepest inspiration as it was needed to determine:
- A. vital capacity
  - B. total lung capacity
  - C. functional residual capacity
  - D. expiratory reserve volume
  - E. blood oxygen capacity
127. Which of the hemoglobin derivatives is formed in residents of the building if we prematurely close the chimney?
- A. carboxyhemoglobin
  - B. Carbhemoglobin
  - C. deoxyhemoglobin
  - D. Methemoglobin
  - E. Oxyhemoglobin
128. In prelaunch state a runner must increase the amount of O<sub>2</sub> in the muscles. How can this be done?
- A. Breathe in the mode of hyperventilation
  - B. Breathe in the mode of hypoventilation
  - C. Do a quick inspiration and slow expiration
  - D. Breathe 'superficially'
  - E. Breathe at low frequency
129. In a person, hemoglobin level in blood is 100g/L. What is the oxygen capacity of the blood in this person?
- A. 134 ml/L
  - B. 100 ml/L
  - C. 150 ml/L
  - D. 168 ml/L
  - E. 180 ml/L
130. Oxygen capacity of fetal blood is higher than the mother's due to the higher content of:
- A. HbF
  - B. HbA
  - C. HbH

- D. HbS  
E. HbP
131. Because of the long staying of the person in the mountains at an altitude of 3000 m above sea level the person has got increased the oxygen capacity of the blood. The immediate reason for this was the increased formation of:
- Erythropoietin
  - Lekopoietins
  - Carbhemoglobin
  - catecholamines
  - 2,3- diphosphoglycerate
132. The patient, after a traumatic brain injury, showed rare and profound breathing. Where is the damage localised?
- hindbrain
  - hypothalamus
  - medulla oblongata
  - cerebral cortex
  - Cerebellum
133. The patient was found to have spasm of bronchial smooth muscles. To remove the attack, physiologically proper would be prescribing the activators of:
- Beta -adrenoceptors
  - Alpha -adrenoceptors
  - Alpha-and beta- adrenoceptors
  - N - cholinergic receptors
  - M- cholinergic receptors
134. After inhalation of dust a person got a cough that was caused by the excitation of:
- irritant receptors
  - juxtacapillary receptors
  - pulmonary chemoreceptors
  - pulmonary thermoreceptors
135. The man who went out of the warm room into the cold air often gets a cough. Which receptors irritation starts the coughing reflex?
- irritant
  - Central chemoreceptors
  - Chemoreceptors of aortic arch
  - Chemoreceptors of carotid sinus
  - pulmonary mechanoreceptors

136. It is being conducted a registration of electrical activity of neurons. They are excited before inhalation and in its beginning. Where are these neurons situated?
- medulla oblongata
  - diencephalon
  - midbrain
  - Spinal cord
  - cerebral cortex
137. A patient has increased thickness of alveolar-capillary membrane caused by a pathologic process. The direct consequence will be reduction of the following value:
- Diffusing lung capacity
  - Oxygen capacity of blood
  - Respiratory minute volume
  - Alveolar ventilation of lungs
  - Expiratory reserve volume
138. 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?
- Irritant receptors
  - Juxtacapillary (J) receptors
  - Stretch receptors of lungs
  - Proprioceptors of respiratory muscles
  - Thermoreceptors
139. A doctor asked a patient to make a deep exhalation after a normal inhalation. What muscles contract during such exhalation?
- Abdominal muscles
  - External intercostal muscles
  - Diaphragm
  - Trapezius muscles
  - Pectoral muscles
140. Electrical activity of neurons is being measured. They fire prior to and at the beginning of inhalation. Where are these neurons situated?
- Medulla oblongata
  - Diencephalon
  - Mesencephalon
  - Spinal cord
  - Cerebral cortex

## DIGESTIVE SYSTEM

1. The doctor recommended to the patient with gastric hypersecretion to exclude from diet broths and vegetable broths, because they stimulate gastric secretion through the activation of:
- Production of gastrin
  - Tastebuds
  - Oral mechanoreceptors
  - Gastric mechanoreceptors
  - Secretin
2. In the acute experiment, the animal was performed electrical stimulation of chorda tympani, resulting the secreting from the flow of the parotid gland of:
- Lots of liquid saliva
  - Not liquid saliva
  - Do not salivate
  - Not viscous saliva
  - Many viscous saliva
3. In a patient with a disorder of cerebral blood flow disturbed swallowinghe can choke when he will taking liquid food. Which part of the brain was damaged?
- Medulla oblongata
  - Midbrain
  - Diencephalon
  - Cerebellum
  - Cervical part of spinal cord
4. During the exam the students have «dry mouth.» Mechanism that leads to the development of this condition is the increased implementation of such reflections:
- Conditional sympathetic
  - Unconditional parasympathetic
  - Conditional parasympathetic
  - Certainly sympathetic
  - Unconditional peripheral
5. At the oral examination of the 59 years old patient was necessary to investigate the movement of the mandible. Which method is used for this purpose?
- Face-bow
  - Electromyography
  - Electric pulp test
  - Myography
  - Gnathodynamometer
6. In the experiment, the nerve is irritated by electrical impulses. In the experiment and it leads to the release of a large amount of liquid saliva of parotid gland. What nerve is stimulated?
- N. glossopharyngeus
  - N. facialis
  - N. sympathicus
  - N. trigeminus
  - N. vagus
7. Patient 35 years old has an increased acidity of gastric juice. Blockade of what receptor blockade can cause this decline?
- Histamine
  - Alpha-1 adrenoceptor
  - Of alpha-2-adrenoceptor
  - 1 Beta-adrenoceptor
  - Beta-2-adrenoceptor
8. Little children have infectious gastrointestinal diseases very often, it is related to lack of production in the gastrointestinal tract:
- HCl
  - Pepsin
  - Trypsin
  - Lipases
  - Alkali component
9. A man 70 years after subtotal removal of the stomach has anemia. Generation of what substance was broken in the stomach?
- Gastromukoprotein (factor of Kastl)
  - Gastrin
  - Pepsin
  - HCl
  - Lipase
10. The gastric motilityof 30 yaeas old patien was registered by balloon method after meal Abnormalities were not detected. How did change condition of the stomach at the eating?
- Relaxing
  - Unchanged
  - Increases the tone
  - Motility slightly enhanced
  - Motility increases sharply
11. A patient 37 years after dental prosthetics has decreased amount of enzymes in saliva. Hydrolysis of what substances is broken?

- A. Carbohydrate
- B. Fat
- C. Protein
- D. Triglycerides
- E. Nucleic acid

12. Patients suffering from gastric ulcer, has delay of gastric emptying in duodenum. Excess of what the substance in the stomach causes this phenomenon?

- A. HCl
- B. Gastriksina
- C. Lipase
- D. Pepsin
- E. Alkali component

13. The man has susceptibility to the development of caries. The reason of it could be the lack of content in the saliva of the following components:

- A. Lysozyme
- B. Alpha-amylase
- C. Maltose
- D. Slime
- E. Sodium Chloride

14. After opening its mouth comes a reflex closing. Blockade of what receptors begins on specified reflex?

- A. Proprioceptors of muscles that raise the lower jaw
- B. Proprioceptors of dipped lower jaw muscles
- C. Taste receptors
- D. periodontal receptors
- E. Mechanoreceptors of oral mucosa

15. What is the main inorganic component of gastric juice?

- A. Hydrochloric acid
- B. Carbonic acid
- C. Lactic Acid
- D. Acid phosphatase
- E. pepsin

16. To the experimental dog through the probe into the gastric cavity was introduced 150 ml. broth. The content of what substances will increase rapidly in the blood of an animal?

- A. Gastrin
- B. Somatostatin
- C. Insulin

- D. Neurotensin
- E. Vazointestinalny polypeptide

17. The patient has chronic neuritis of the trigeminal nerve. Which of the digestive processes will be affected the most?

- A. Chewing
- B. Salivation
- C. Saliva secretion
- D. Swallowing
- E. Gastric acid secretion

18. In experiments on rats intersection of efferent branches of vagus, which innervate the gastrointestinal tract most displayed on:

- A. Gastric acid secretion
- B. Masticating
- C. Salivation
- D. Secretion of intestinal juice
- E. Laxation

19. With increasing vagal tone after meal muscle tone of the cardial part of gastric reduced, broken esophageal peristalsis and stomach contents can be thrown into the esophagus. This causes an unpleasant sensation following:

- A. Heartburn
- B. Belching
- C. Aerophagy
- D. Vomiting
- E. Nausea

20. During the examination of, men 50 years old was revealed a violation of the evacuation of the chyme from the stomach into the duodenum. What is a hormone that is produced in the small intestinal mucosa, and could speed up this process?

- A. Motilin
- B. Cholecystokinin
- C. Secretin
- D. neurotensin
- E. Enterogastrin

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- B. Cholecystokinin
- C. Secretin
- D. neurotensin
- E. Enterogastrin

26. The examination revealed a decrease in male motor-evacuation function of the stomach. On the deficit of what factors in this case?

- A. Gastrin
- B. Secretin
- C. Adenosine
- D. Somatostatin
- E. Gastrointestinal inhibitory peptide

27. Tip of the tongue was wetted with local anesthetic. It will lead to a lack of perception of flavor:

- A. Sweet
- B. Salt
- C. Sour
- D. Bitter
- E. sour and salty

28. Which of these processes will be activated first of all in a hungry man who sees the delicious food?

- A. Gastric acid secretion
- B. Intestinal juice secretion
- C. Colon Motility
- D. Reduction of the sphincter of Oddi
- E. Small bowel motility

29. The patient has no conductivity on the glossopharyngeal nerve. What feeling will disappear in a patient?

- A. Bitter
- B. Sour
- C. Sweet
- D. Salt
- E. sour and salty

30. The patient had resection of part of the pancreas. What products are necessary to limit in the diet?

- A. Fatty meats, strong broths
- B. Boiled vegetables
- C. Dairy products
- D. vegetables rich in proteins (beans, soy)
- E. Fruit

31. The patient has removed duodenum. It will reduce the secretion of:

- A. Cholecystokinin and secretin
- B. Gastrin
- C. Histamine
- D. Gastrin and histamine
- E. Neurotensin

32. Through the tube in 12 duodenal ulcer entered a weak solution of hydrochloric acid to the test dog. It will lead to increased secretion of:

- A. Secretin
- B. Gastrin
- C. Histamine
- D. Cholecystokinin
- E. Neurotensin

33. A man 60 years has a weakening of intestinal peristalsis. Which of the following foods will stimulate the motility of the most?

- A. Rye bread
- B. White bread
- C. Meat
- D. Fat
- E. Tea

34. After receiving a large amount of protein foods a patient has increase in proteolytic enzymes of pancreatic juice. What of the following enzymes will be increased?

- A. Trypsin
- B. Pepsin
- C. Enterokinase
- D. Gastriksina
- E. Rennin

35. In a woman 55 years old was revealed a sluggish gallbladder contraction after the injection of 30 ml of olive oil in duodenum. Failure, what hormone most possible?

- A. Cholecystokinin
- B. Secretin
- C. Motilin
- D. Gastrin
- E. Gastro-intestinal peptide

36. In the patient 30 years old was found inadequate secretion of enterokinase. Violation of what digestive function will have the patient?

- A. Proteolysis
- B. Digestion and absorption of fats
- C. Digestion and absorption of carbohydrates
- D. Water absorption
- E. Absorption of mineral salts

37. Excretion of chymotrypsinogen by acinar cells of the pancreas:

- A. Goes down after vagotomy
- B. Decline after the addition of trypsin inhibitor of food
- C. Glucose stimulated food
- D. Decrease at the loss of pancreatic ducts in the colon
- E. Increases only in the intestinal phase of digestion

38. Through the tube into the duodenum entered a weak solution of hydrochloric acid

to the animal. Content of what hormone will increase?

- A. Secretin
- B. Cholecystokinin-pancreozymin
- C. Gastrin
- D. Glucagon
- E. Neurotensin

39. What does play the dominant role in the regulation of the secretory function of the small intestine:

- A. Local reflexes
- B. Conditioned stimuli
- C. Unconditioned stimulus
- D. Secretin, CCK-PZ
- E. Motilin, somatostatin

40. In the regulation of intestinal secretion are important:

- A. Local mechanisms
- B. Sympathetic excitatory
- C. Sympathetic brake
- D. Parasympathetic excitatory
- E. Parasympathetic brake

41. Excretion of what of the hormones suppressed by low pH cavity of gastrointestinal channel:

- A. Gastrin
- B. Secretin
- C. Gastrointestinal peptide
- D. Somatostatin
- E. Cholecystokinin

42. To the surgical ward was admitted 52 years old patient with a of biliary colic attack. The examination found a stone in the common bile duct, which prevents the flow of bile into the intestine. Violation of what of the digestion process will be there?

- A. Digestion of fats
- B. Digestion of proteins
- C. Absorption of vitamin
- D. Carbohydrate digestion
- E. Mineral absorption

43. Patient 60 years complains of pain in the lower abdomen, frequent stools. At scatological investigation was revealed an increase in the amount of neutral fat in the feces. what enzyme deficiency was the cause of incomplete digestion of fats?

- A. Pancreatic lipase

- B. Enterokinase
- C. Maltose
- D. Aminopeptidase
- E. Pepsinogen

44. Chronic pancreatitis was revealed at the patient. What hormone in the blood is determined in order to confirm the diagnosis?

- A. Cholecystokinin-pancreozymin
- B. Somatostatin
- C. Motilin
- D. Bombesin
- E. Enkephalin

45. In the test tube, which contains pancreatic juice of newborn, added minced meat. it is not digesting because a newborn pancreatic juice does not contain:

- A. Trypsin
- B. Amylase
- C. Lipase
- D. Nuclease
- E. Lactate dehydrogenase

46. It is known that secretin is synthesized in S-mucosal cells of the duodenum. What kind of influence of this hormone on the secretion of gastric juice?

- A. Inhibits the release of HCl and stimulates the secretion of pepsinogen
- B. Stimulates the secretion of HCl and inhibits the release of pepsinogen
- C. Stimulates the secretion of pepsinogen and HCl
- D. Stimulates the secretion of HCl and mucus and inhibits the release of pepsinogen
- E. Inhibits the release of pepsinogen and HCl

47. Proteolytic enzymes of pancreatic juice move into the lumen 12 duodenal ulcer in an inactive state. Specify the substance which is an activator of hemotripsinogena?

- A. Trypsin
- B. Enterokinase
- C. Karboksipolipeptidaza
- D. Carbonic anhydrase
- E. Bile acids

48. Acidic contents of the stomach enter into the small intestine. Hydrochloric acid from the stomach is neutralized in the duodenum by:

- A. Bicarbonate of pancreatic juice
- B. Enzymes of pancreatic juice
- C. Hormones
- D. Enzyme small intestine
- E. Vitamins

49. In the patient 30 years with impaired function of the pancreas was found a decrease of bicarbonate in the duodenum. What gastrointestinal hormone increases the amount of bicarbonates the most in the secret of pancreas?

- A. Secretin
- B. Pancreozymin
- C. Gastrin
- D. Motilin
- E. Vazointestinal peptide

50. The patient after removal of duodenum has decreased secretory function of the pancreas. What could be causing this phenomenon?

- A. Lack of secretin and cholecystokinin production-pankreazimin
- B. Lack of production of gastrin
- C. Lack of production of histamine
- D. Lack of secretion of HCl
- E. Lack of the selection of bombesin

51. In experimental animal should be excluded secretion of digestive juices. What types of regulation should be eliminated?

- A. Nervous regulation, humoral regulation
- B. Reflex regulation
- C. Related regulation and unconditioned
- D. Central nervous regulation
- E. regulation occurs at the level of local mechanisms

52. Deficiency of what enzyme is the most often result in incomplete digestion of fats in the gastro-intestinal tract and increase the amount of neutral fat in feces?

- A. Of pancreatic lipase
- B. Of gastric lipase
- C. Hepatic Lipase
- D. Intestinal lipase
- E. Enterokinase

53. At scatological examination was found that feces is discolored, there were found drops of neutral fat in it. The most probable cause is a violation of:

- A. flow of bile into the intestine

- B. of gastric acidity
  - C. secretion of pancreatic juice
  - D. secretion of intestinal juice
  - E. absorption process in the intestines
54. In the process of human aging observed a decrease of synthesis and secretion of pancreatic juice, it decreases in the trypsin. It leads to disturbance of digestion of:
- A. Protein
  - B. phospholipids
  - C. Polysaccharides
  - D. Nucleic acids
  - E. lipids
55. To the experimental dog through the tube in duodenal ulcer was entered a weak solution of hydrochloric acid. It will lead to increased secretion of:
- A. Secretin
  - B. Gastrin
  - C. Histamine
  - D. Cholecystokinin
  - E. Neurotensin
56. In humans, which due to chronic liver disease significantly impaired its function of protein synthesis. It will led to the reduce of:
- A. Blood plasma oncotic pressure
  - B. Osmolality
  - C. pH
  - D. Density of blood
  - E. Hematocrit index
57. Liver diseases that are accompanied by insufficient intake of bile into the intestine, and with it observed the deteriorating of hemocoagulation. How can we explain this phenomenon?
- A. Vitamin K deficiency
  - B. Iron deficiency
  - C. Thrombocytopenia
  - D. Eritropeniya
  - E. Leukopenia
58. At the toxic damage of the liver cells with dysfunction of the patient appeared edema. What changes in the composition of blood plasma are the leading cause of edema?
- A. Reduction of albumin
  - B. Increase in the content of globulins
  - C. Reduction of fibrinogen

- D. Increase in the concentration of albumin
  - E. Reduction of globulins
59. During the examination, was\_ found insufficient secretion of the enzyme enterokinase in a woman 45 years old. Infringement of what digestive function can cause this process?
- A. Hydrolysis of proteins
  - B. Hydrolysis of carbohydrates
  - C. Fat hydrolysis
  - D. Absorption of vitamins
  - E. Fat absorption
60. By experimental way was managed to increase the hydrostatic pressure in the intestines of an animal. How will change the absorption in the intestines, and by what mechanism?
- A. Will accelerated by filtering
  - B. Will slow down by active transport
  - C. No change
  - D. Will accelerated by active transport
  - E. Will slow down by diffusion
61. A patient 56 years old with chronic enteritis at scatological study was found violations of digestion and absorption of proteins. What is the main mechanism of absorption of amino acids in the small intestine?
- A. Secondary active transport
  - B. Simple diffusion
  - C. Facilitated diffusion
  - D. Osmosis
  - E. Primary active transport
62. At dinner man ate salt herring and potatoes with pickles. After some time, he had a thirst. Impulses from what receptors led to this feeling?
- A. hypothalamic osmoreceptors
  - B. Volumoreceptors of vena cava and atrial
  - C. osmoreceptors of liver
  - D. Volumoreceptors of hypothalamus
  - E. baroreceptors of the aortic arch
63. The man had removing surgically damaged by pathological process distal quarter of the small intestine. How it will affect on absorption of nutrients in the normal diet?
- A. Suction will not change

- B. Will reduce the absorption of carbohydrates
  - C. Will reduce the absorption of proteins
  - D. Will reduce the absorption of fat
  - E. Will reduce the absorption of water
64. The man has disturbed absorption of fat hydrolysis products. Cause of this may be deficient in the cavity of the small intestine:
- A. of bile acids
  - B. of bile pigments
  - C. of lipolytic enzymes
  - D. Of sodium ions
  - E. of fat-soluble vitamins
65. In the experiment, the animals were made electrical stimulation of brain neurons, resulting it in the animal originated hypophagia (rejection of the meal). In what part of the brain were introduced electrodes?
- A. in the ventromedial nucleus of the hypothalamus
  - B. in the lateral nucleus of the hypothalamus
  - C. In the neurohypophysis
  - D. In adenohypophysis
  - E. in the red nucleus
66. The experiment was performed electrical stimulation of the brain structures, resulting it in an animal evolved polyphagia (excessive desire for food). In what part of the brain were introduced electrodes?
- A. in the lateral nucleus of the hypothalamus
  - B. in the ventromedial nucleus of the hypothalamus
  - C. In the supraoptic nucleus of the hypothalamus
  - D. In adenohypophysis
  - E. in the red nucleus
67. By experimental way was able to increase the hydrostatic pressure in the intestines of animals. Will this process affect on the absorption in the gut and by what mechanism?
- A. Will accelerated by filtering
  - B. Will slow down by active transport
  - C. No change
  - D. Will accelerated by active transport
  - E. Will slow down by diffusion
68. Energy malnutrition leads to malabsorption in the digestive tract of simple sugars.

- Which of the following transport mechanisms is broken?
- A. recycled-active transport
  - B. of primary-active transport
  - C. Simple diffusion
  - D. Facilitated diffusion
  - E. pinocytosis
69. The man had removing the affected pathological process distal quarter of the small intestine. How it will affect the absorption of nutrients in the normal diet?
- A. Suction will not change
  - B. Will reduce the absorption of carbohydrates
  - C. Will reduce the absorption of proteins
  - D. Will reduce the absorption of fat
  - E. Will reduce the absorption of water
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- A. of bile acids
  - B. of bile pigments
  - C. of lipolytic enzymes
  - D. Of sodium ions
  - E. of fat-soluble vitamins
71. The patient has normally colored feces, which is composed of a large amount of free fatty acids. The reason for this is a violation of:
- A. Absorption of fat
  - B. Fat hydrolysis
  - C. Biliary excretion
  - D. Bile
  - E. Lipase secretion
72. The patient has surgically removed third colon affected by the pathological process. As this will change the absorption water at normal water regime?
- A. will not change significantly
  - B. Will significantly reduce
  - C. Will increase substantially
  - D. Will increase slightly
  - E. Will decreased slightly
73. Patient 57 years old, who have long been treated with antibiotics, complained of a violation of bowel function. What led to this state?
- A. Inhibition of intestinal microflora

- B. Infringement of in the gut secretion
  - C. Malabsorption
  - D. Increased intestinal motility
  - E. Infringement of of biliary excretion
74. Due to biliary obturation in a patient has decreased flow of bile in the duodenum , leading to perturbing the absorption of:
- A. Fats
  - B. Protein
  - C. Carbohydrates
  - D. Proteins and carbohydrates
  - E. Mineral salts
75. The man has significantly impaired digestion of proteins, fats and carbohydrates. Reduced secretion of what digestive juice most likely was the cause of this?
- A. pancreatic
  - B. Saliva
  - C. Gastric
  - D. Bile
  - E. Intestinal
76. Baby first year of life doctor prescribed vitamin D. What ions are strongly absorbed in the digestive canal while taking this vitamin?
- A. of calcium and phosphate
  - B. Calcium
  - C. phosphates
  - D. Kalia
  - E. Sodium and chloride
77. The man has decreased absorption of sodium ions from the intestinal lumen into the blood. of the above the absorption of what substances will remain unchanged?
- A. Fat
  - B. Carbohydrates
  - C. Protein
  - D. Water
  - E. Chloride
78. A patient with gastric hypersecretion has been recommended by the doctor to eliminate from the diet:
- A. beef broths
  - B. Milk
  - C. Sweets
  - D. Salt
  - E. White bread

79. Patient with gastric hyperacidity has been recommended by the doctor to have boiled dishes, but not grilled meat, as the grilled contains substances that stimulate the release of:
- A. Gastrin
  - B. secretin
  - C. Somatostatin
  - D. pancreozymin
  - E. neurotensin
80. In Ancient India, a suspect in the crime was often offered to swallow a handful of dry rice. Criminals could not swallow the rice for the reduced salivation due to:
- A. activation of the sympathoadrenal system
  - B. activation of the parasympathetic nucleus of the facial nerve
  - C. reduction of blood supply to the salivary glands
  - D. activation of the parasympathetic nucleus of the glossopharyngeal nerve
  - E. inhibition of the sympathetic nervous system
90. In experimental animal was stimulated a peripheral part of the sympathetic fibers that innervate the sublingual salivary gland. As a result, from the fistula duct there excreted:
- A. A little of viscous saliva
  - B. A little of liquid saliva
  - C. Saliva did not excrete
  - D. A lot of liquid saliva
  - E. A lot of viscous saliva
91. Male, 35 years old, with peptic ulcer has undergone the resection of the gastric antrum. What gastrointestinal hormone secretion would become violated will the most of all?
- A. gastrin
  - B. Histamine
  - C. Secretin
  - D. Cholecystokinin
  - E. neurotensin
92. Vomiting reflex often impedes the gastric probing. How can it be prevented?
- A. Lubricate parts of the palate and of the tongue with local anesthetic agents
  - B. grease the probe with saline

- C. grease the probe with vegetable oil
- D. enter the probe under general anesthesia
- E. Enter the probe in «standing» position

93. Patient has been prescribed a diet containing an increased amount of wholemeal bread and vegetables. For what purpose has this been done?
- A. Intensification of motility
  - B. Inhibition of gastric acid secretion
  - C. activation of trypsinogen
  - D. excretion of high amounts of saliva
  - E. neutralization of HCl
94. A man has little viscous saliva excretion, and there is reduced its enzymatic activity and increased the mucus content. The most probable cause of that is a violation of functions of:
- A. parotid gland
  - B. Own mucosal glands
  - C. sublingual glands
  - D. submandibular gland
  - E. all salivary glands
95. Patient with gastric hypersecretion has been recommended by the doctor to eliminate from the diet rich broths and vegetable broths, as they stimulate the release of:
- A. Gastrin
  - B. secretin
  - C. Cholecystokinin
  - D. Somatostatin
  - E. neurotensin
96. The patient held a removal of a part of the pancreas. What products is it now necessary to limit in his diet?
- A. fatty and fried meat
  - B. lean boiled meat
  - C. Dairy products
  - D. Vegetables
  - E. fruits
97. In the animal was blocked the activity of the submucosal plexus of the small intestine. Which of these processes would be the most negatively affected?
- A. secretion of intestinal juice
  - B. membrane digestion
  - C. rhythmic segmentation
  - D. 'pendular' movements
  - E. Absorption

98. In case of ingestion of 100 ml of 25% (saturated) solution of magnesium sulfate there appears a lot of liquid feces. Why?
- A. increases the osmotic pressure in the gut
  - B. secretion of gastric juice is being stimulated
  - C. activity of intestines is being inhibited
  - D. release of duodenal hormones is stimulated
  - E. decreases the osmotic pressure
99. A man, 45 years old, 3 years after the removal of the stomach has the level of red blood cells of  $2.0 \cdot 10^{12} / L$ , Hb - 85 g / L, color index - 1.27. Malabsorption of what vitamin did cause changes in erythropoiesis?
- A. B12
  - B. C
  - C. A
  - D. P
  - E. B6
100. A man, 60 years old, diagnosed with a stroke in the lateral hypothalamic nuclei. What changes in his behaviour should be expected in this case?
- A. Refuse to eat
  - B. Aggressiveness
  - C. Depression
  - D. Thirst
  - E. insatiability
101. 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
102. A 35-year-old man with peptic ulcer disease has undergone antrectomy. After the surgery secretion of the following gastrointestinal hormone will be disrupted the most:
- A. Gastrin
  - B. Histamine
  - C. Secretin
  - D. Cholecystokinin
  - E. Neurotensin



## SYSTEM OF EXCRETION

1. In the test person after exercise pressure in renal arteries increased to 180 mm. mmHg. What changes in glomerular filtration happened?

- A. GFR has not changed
- B. GFR decreased sharply
- C. GFR increased sharply
- D. GFR increased slightly
- E. GFR decreased slightly

2. A woman of 50 years after suffering of inflammation of the kidneys (pyelonephritis) in the urine amino acids, glucose. What is the mechanism of reabsorption likely disrupted due to illness?

- A. Secondary active transport
- B. Diffusion
- C. Primary active transport
- D. Pinocytosis
- E. Osmosis

3. A man 45 years old has polyuria (increased urine output). Blood Glucose - 5.5 mmol / l. Urinalysis - glycosuria. Which department of kidney nephrons, is most likely damaged?

- A. proximal convoluted tubules
- B. Loop of Henle
- C. Distal convoluted tubules
- D. Glomeruli
- E. Collecting tubules

4. A man 25 years old has an acute polyuria - per day allocates up to 30 liters of urine specific gravity of 1.001, and also a decrease in blood pressure. Lack of secretion of what hormone causes such phenomena, most likely?

- A. Vasopressin
- B. Glucocorticoids
- C. Aldosterone
- D. Oxytocin
- E. Natriuretic hormone

5. The content of sodium ions in a woman 37 years old is reduced compared to the norm. Lack of what hormone secretion, is most likely causes this phenomenon?

- A. Aldosterone
- B. PTH
- C. Natriuretic peptide

- D. Antidiuretic hormone
- E. Prostaglandins

6. In the patient women with heart disease by ultrasound of the heart revealed a prominent increase of the right atrium. The patient complained of excessive urination. Which of hormones, is most likely stimulates diuresis?

- A. natriuretic peptide
- B. Vasopressin
- C. Angiotensin
- D. Aldosterone
- E. Oxytocin

7. The man 25 years old has high blood pressure - 220/110 mm Hg. In the study of renal vessels - a sharp narrowing of the renal arteries. Which of the following compounds are most likely participates in the increase in blood pressure?

- A. Renin
- B. Aldosterone
- C. Acetylcholine
- D. Cortisone
- E. Glucagon

8. In the experiment was investigated the structure of glomerular filtrate. Which of the substances mentioned below is present in the highest concentration in filtrate?

- A. Glucose
- B. Globulins
- C. gammaglobulin
- D. Albumin
- E. Fibrinogen

9. In the urine of women 60 years old were found traces of glucose. Above what level increased blood glucose?

- A. 10 mmol / l
- B. 50 mg / l
- C. 100 mmol / l
- D. 5 mg / l
- E. 1 mmol / l

10. At what of the following substances is zero clearance?

- A. Glucose
- B. Uric Acid

- C. Urea
- D. Creatinine
- E. Potassium

11. Which of the the following substances practically is not reabsorbed?

- A. Inulin
- B. Glucose
- C. Sodium
- D. Amino Acids
- E. Calcium

12. Which of the components of blood plasma is not filtered in the glomeruli of the kidneys?

- A. high molecular weight proteins
- B. low molecular proteins
- C. All proteins
- D. Protein and glucose
- E. Protein and creatinine

13. Normally bringing arterioles of nephron glomerular significantly wider than putting up. Why uropoiesis decrease if bringing arterioles become narrower than putting up with?

- A. filtration pressure will decrease
- B. There will be a sclerosis renal tissue
- C. Filtration pressure will increase
- D. Will disrupt sodium reabsorption
- E. Will disrupt the secretion of urea

14. In experiments with isolated rabbit kidney in the perfusion solution was added 40 ml of. glucose. The amount of urine increased because glucose is:

- A. threshold substances
- B. substance suitable for disabled
- C. Filtrometric substance
- D. A substance that is secreted
- E. No right answer

15. Boy 10 years at once drank the 1.5 liters of water. Change in secretion of what hormones lead to the restoration of circulating blood volume?

- A. Vasopressin
- B. Sodium uretichesky factor
- C. Aldosterone
- D. Kortikotropin
- E. Renin

16. Which of the following hormones will be released in increased amounts in response to the consumption of large quantities of salt?

- A. ADH
- B. Aldosterone
- C. ACTH
- D. Oxytocin
- E. Angiotensin

17. The patient has decreased synthesis of vasopressin leading to polyuria and, as a consequence, to the expressed dehydration. What is the mechanism of polyuria?

- A. Decrease of water reabsorption in the tubules
- B. Reduction reabsorption of sodium ions in the tubules
- C. Increase of sodium reabsorption in the tubules
- D. Reduction in Protein tubule reabsorption
- E. Reduction in glucose reabsorption

18. In the kidney increased reabsorption of calcium and phosphate ions is reduced. Influence of what hormone led to these changes?

- A. PTH
- B. Thyrocalcitonin
- C. Hormone form of vitamin D3
- D. Aldosterone
- E. Vasopressin

19. The man has blood glucose 15 mmol / l (threshold reabsorption - 10 mmol / l). The consequence of this would be:

- A. Glycosuria
- B. Decrease in urine output
- C. Decrease in glucose reabsorption
- D. Decrease in vazopresina
- E. Decrease in aldosterone secretion

20. In an adult male per day allocated 20 liters of urine with low relative density. The most probable cause is a deficiency in the body:

- A. Antidiuretic hormone
- B. Aldosterone
- C. Sodium- urretich factor
- D. Renin
- E. PTH

21. The woman has restriction of blood flow in the kidney, high blood pressure. What hormone hypersecretion has caused high blood pressure?

- A. Renin
- B. Adrenaline
- C. Noradrenalmna
- D. Erythropoietin
- E. Vasopressin

22. The people who live in the highlands, has increased red blood cells, which may be due to increased production in the kidney:

- A. Erythropoietin
- B. Renin
- C. Urokinase
- D. Prostaglandins
- E. Vitamin D3

23. In a patient 18 years at the laboratory examination revealed the presence of glucose in urine when its normal concentration in blood plasma. The reason for this is the violation:

- A. Tubular reabsorption
- B. Glomerular filtration
- C. Tubular secretion
- D. Insulin secretion
- E. Secretion of glucocorticoids

24. To the dog, which was under anesthesia introduced vasopressin, and the resulting is decreased amount of urine, as vasopressin is:

- A. Enhances reabsorption of water
- B. Enhances reabsorption of sodium
- C. Decreased reabsorption of water
- D. Reduces calcium reabsorption
- E. Increases calcium reabsorption

25. After donating a student felt thirst. Increased secretion of what biologically active substance promotes this?

- A. Angiotensin
- B. Aldosterone
- C. erythropoietin
- D. Adrenaline
- E. Norepinephrine

26. In case of injury man lost 500 ml of blood, which led to a decrease in urine output. Influence of what hormone on the kidneys has adaptive response?

- A. Vasopressin
- B. Natriuretic Factors
- C. Aldosterone
- D. Cortisol
- E. Renin

27. A person with chronic kidney disease, has impaired their renal function The venous blood pH is 7.33. What the solution is need to correct acid-base status of the patient?

- A. Sodium bicarbonate
- B. Sodium Chloride
- C. Glucose
- D. Potassium chloride
- E. Calcium Chloride

28. The animal in 2 weeks after experimental constriction of the renal artery has increased blood pressure. With action on the vessels of what factor humoral regulation is that?

- A. Angiotensin II
- B. Cortisol
- C. Aldosterone
- D. Vasopressin

29. A person with kidney disease revealed anemia The most likely cause of anemia is a disorder of:

- A. Erythropoietin
- B. Renin
- C. Aldosterone
- D. Sodium- uretic hormone
- E. ADH

30. Narrowing of bringing arterioles caused a decrease in renal corpuscles diuresis. The reason is to reduce:

- A. effective filtration pressure
- B. water reabsorption
- C. glucose reabsorption
- D. reabsorption
- E. urea secretion

31. In the experiments with isolated rabbit kidney to the perfusion solution was added 40 % glucose solution. The amount of urine increased because:

- A. Not all of glucose reabsorbed
- B. increased the osmotic pressure of the perfusate
- C. increased the osmotic pressure of the primary urine

D. Increased the hydrostatic pressure of the perfusate

E. increased the permeability of the renal filter

32. A man, 25 years old, with fractured skull, shows large amount of urine with low relative density. The cause of changes in urine formation is a violation of the synthesis and secretion of:

- A. Vasopressin
- B. thyrotropin
- C. ACTH
- D. Oxytocin
- E. STH

33. By reducing the concentration of Na + in the blood plasma, in the kidney is enhanced its reabsorption. What is the main regulatory mechanism that stimulates this process?

- A. Aldosterone
- B. sympathetic reflexes
- C. parasympathetic reflexes
- D. natriuretic hormone
- E. PTH

34. A child, 10 years, has undergone removal of the posterior lobe of the pituitary gland because of a tumor. This has lead to:

- A. increase in diuresis
- B. Decrease in urine output
- C. stunting
- D. Mental Retardation
- E. hyperglycemia

35. In a person has decreased urine output due to enhanced secretion of vasopressin. Vasopressin secretion is stimulated by the increase in:

- A. osmotic pressure of the plasma
- B. concentration of sodium
- C. CBV (Circulating Blood Volume)
- D. plasma oncotic pressure
- E. Potassium concentration

36. Water reabsorption in the kidneys is impaired in a patient. Violation of what hormone secretion does it directly relate to?

- A. Vasopressin
- B. Aldosterone
- C. natriuretic hormone
- D. PTH
- E. Thyrocalcitonin

37. The dog's 0.5 liter of blood loss was compensated by introducing a balanced saline solution containing glucose. This was accompanied by an increase in glomerular filtration rate (GFR). The most likely reason for the increase in GFR in animal was:

- A. Decrease in oncotic pressure of the blood plasma
- B. increase in systemic arterial pressure
- C. Reduction in the ultrafiltrate hydrostatic pressure in the capsule
- D. increase in the permeability of the renal filter
- E. increase in the effective renal blood flow

38. In the experiment on a dog was increased the blood flow to the atria, causing an increase in the urine production. The underlying mechanism of the increased formation of urine includes the increased secretion of:

- A. Natriuretic peptide
- B. Vasopressin
- C. Aldosterone
- D. Renin
- E. Adrenaline

39. Urine analysis has shown high levels of protein and erythrocytes in urine. This can be caused by the following:

- A. Renal filter permeability
- B. Effective filter pressure
- C. Hydrostatic blood pressure in glomerular capillaries
- D. Hydrostatic primary urine pressure in capsule
- E. Oncotic pressure of blood plasma

## CARDIOVASCULAR SYSTEM, HAEMODYNAMICS

1. Minute volume of a woman (30 years old) at rest is 5 l/minute. What does the volume that flows through her lung vessels in one minute equal to?

- A. 5 l
- B. 3,75 l
- C. 2,5 l
- D. 2,0 l
- E. 1,5 l

2. While preparing the patient for the operation pressure measurement of compartments of heart has been arranged. During cardiac cycle the pressure has been changing from 0 to 120 millimeter of mercury in one of them. Indicate the compartment of heart:

- A. Left ventricle
- B. Right ventricle
- C. Right atrium
- D. Left atrium
- E. None of the answers is correct

3. Increased tonus of arteriolar of the patient is observed while cardiac function is normal. How will that influence arterial tension?

- A. Predominantly diastolic pressure will increase
- B. Predominantly systolic pressure will increase
- C. Blood pressure will not change
- D. Predominantly diastolic pressure will decrease
- E. Predominantly systolic pressure will decrease

4. At the result of blood loss the volume of circulating blood has decreased. How will that influence the arterial tension?

- A. Systolic and diastolic pressure will decrease
- B. Only systolic pressure will decrease
- C. Only diastolic pressure will decrease
- D. Systolic pressure will decrease while diastolic rises
- E. Diastolic pressure will decrease while systolic rises

5. A woman (36 years old) has been injected concentrated solution of albumin after surgical interference. That would lead to intensified water motion in the following direction:

- A. From intercellular fluid to capillary tubes
- B. From intercellular fluid to cells
- C. From the cells to intercellular fluid
- D. From capillary tubes to intercellular fluid
- E. None of the answers is correct

6. Pulse wave velocity of 70 year-old man is significantly higher than of 25 year-old man. The reason of this phenomenon is the decrease of:

- A. Elasticity of arterial walls
- B. Arterial tension
- C. Cardiac output
- D. Frequency of heart contractions
- E. Blood velocity

7. While preparing the patient for the operation pressure measurement of compartments of heart has been arranged. In one of them during cardiac cycle the pressure has been changing from 0 to 120 millimeter of mercury. Indicate the compartment of heart:

- A. Left ventricle
- B. Right ventricle
- C. Right atrium
- D. Left atrium
- E. None of the answers is correct

8. During moderate physical activity minute volume of the patient has been 10 l/minute. What has the volume that flew through his lung vessels in one minute been equal to?

- A. 10 l/minute
- B. 5 l/minute
- C. 4 l/minute
- D. 6 l/minute
- E. 7 l/minute

9. During physical exercise frequency of heart contractions of an untrained man has increased from 80 (at rest) to 180 beats per minute. How will arterial tension change?

- A. Diastolic pressure will increase while systolic decreases
- B. Systolic pressure will increase while diastolic decreases
- C. Pulse pressure will increase
- D. Pulse pressure will not change
- E. Arterial tension will not change

10. Systemic arterial tension of a grown-up man has decreased from 120/70 to 90/50 millimeter of mercury that caused reflectory vessel constriction. In which of the mentioned organs vessel constriction will be minimal?

- A. Heart
- B. Skin
- C. Intestinal tract
- D. Skeletal muscles
- E. Liver

11. The patient has been transfused 500 ml of blood intravenously. At the result the volume of blood that was flowing to the heart increased. What reactions of blood circulatory system can be observed?

- A. Increase of force of heart contractions
- B. Bradycardia
- C. Peripheral vasoconstriction
- D. Peripheral vessel distention
- E. Decrease of force of heart contractions

12. Defect of filtration process of microvasculature that appeared as water outflow from blood to telae. Indicate a possible reason of filtration defect.

- A. Increase of hydrostatic pressure in capillary tubes
- B. Increase of oncotic pressure of plasma
- C. Increase of osmotic pressure of plasma
- D. Decrease of blood pressure in veinlets
- E. Increase of oncotic pressure in telae

13. The patient felt faintness after changing body position quickly from lying to standing. What is the reason of this phenomenon?

- A. Decrease of vascular supply of brain
- B. Increase of tonus of arterial vessels
- C. Increase of systemic arterial pressure
- D. Increase of vein tonus
- E. Increase of frequency of blood contractions

14. Systolic output of a man, who changes quickly his body position from lying to standing, decreases. Why is that happening?

- A. Detention of blood in veins takes place and blood flow to the heart increases
- B. The tone of limb veins increases
- C. The tone of arterial vessels increases
- D. Tachycardia appears
- E. Blood storage takes place

15. Edemas are observed on the lower limbs at the result of water flow from blood to telae. In which vessels is water flow defected?

- A. In capillary tubes
- B. In aorta
- C. In resistance vessels
- D. In great vessels
- E. In veins

16. At the result of peripheral resistance patient's arterial tension has increased abruptly. Which vessels provide resistance most of all?

- A. Arteriolar
- B. Large arteries
- C. Capillary tubes
- D. Aorta
- E. Veins

17. The patient has been detected defect of integumental emission of heat. In what vessels does integumental heat emission mostly take place?

- A. Capillary tubes
- B. Large arteries
- C. Arteriolar
- D. Veins
- E. Shunt vessels

18. One of the factors that provide blood flow through vessels is low pressure in cavae. In which way can blood pressure of the patient be decreased to lighten cardiac function of the patient?

- A. By increasing respiration depth
- B. By increasing frequency of heart contractions with the help of medication
- C. By increasing the tone of arterial vessels with the help of pharmaceutical
- D. By excluding physical stress
- E. By holding the breath briefly

19. Bed rest has been administered to the patient (60 years old) with cardiac disease in order to lighten heart strain. It has been also recommended to raise his legs on the roller above the corpus. Why is heart strain lightened in this position?

- A. Blood flow to the heart is lightened
- B. Repletion of arterial pulse increases
- C. Amplitude of venous pulse increases
- D. The volume of blood flow to the heart increases
- E. The functioning of vein valves improves

20. The patient with arterial hypertension is administered medications that increase diuresis which leads to pressure lowering. Why is that happening?

- A. The volume of blood circulation decreases
- B. Blood velocity increases
- C. The force of heart contractions increases
- D. Vessel tone increases
- E. No correct answer

21. While examining the mechanisms of blood flow to the heart at the experiment on animal it was found out that skeletal muscle activity pushes the blood to the heart by constricting the vessels. What provides that direction of blood flow during muscle activity?

- A. Vein valves
- B. Difference in pressure at the beginning and at the end of the vessel
- C. Elastance of arterial vessels
- D. Elastance of vein vessels
- E. Change of tone of arterial vessels

22. Arterial tension has increased after physical exercise. Why has that happened?

- A. Minute volume of blood circulation has increased
- B. The number of functioning capillary tubes has increased
- C. The amount of hemoglobin has increased
- D. Containing of potassium ions in plasm has increased
- E. Containing of water in plasm has increased

23. Light physical exercise of a healthy man causes gradual increase of systolic and a slight decrease of diastolic pressure. What is the reason of this phenomenon?

- A. Increase of cardiac function, decrease of vessel tone in muscles
- B. Increase of cardiac function, increase of vessel tone in muscles
- C. Increase of cardiac function, decrease of vessel elastance
- D. Decrease of cardiac function, decrease of vessel tone in muscles
- E. Decrease of cardiac function, increase of vessel tone in muscles

24. If vessel radius becomes twice as little, according to Poiseuille formula, peripheral resistance will:

- A. Be 16 times as much
- B. Be twice as little
- C. Be 9 times as much
- D. Be 27 times as little
- E. Not change

25. Arteriolae have the biggest influence on arterial tension, because:

- A. They create the biggest resistance
- B. They have the biggest surface area
- C. They have the biggest sectional area
- D. They have the biggest speed of blood flow
- E. They have the minimal speed of blood flow

26. During slight physical exercise all circulatory dimensions increase except:

- A. Peripheral resistance
- B. Minute volume of the heart
- C. Frequency of heart contractions
- D. Systolic volume
- E. Pulse pressure

27. Which of the following compensatory processes takes place when the position of the body changes from horizontal into vertical?

- A. Increase of vessel tone
- B. Decrease of frequency of heart contractions
- C. Decrease of peripheral resistance
- D. Decrease of systolic volume
- E. Increase of PQ interval

28. While examining phases of cardiac cycle the dog had been injected a probe to measure ventricular pressure. In which phase of cardiac cycle would the pressure be minimal?

- A. In rapid filling phase
- B. In rapid ejection phase
- C. In slow ejection phase
- D. In postsphygmic period
- E. In asynchronous contraction phase

29. The patient (60 years old) got drop infusion of normal salt solution in order to measure his arterial tension. It did not change significantly. What property of nonstriated muscles of vessels is the most probable in preventing increase of arterial tension?

- A. Compliance
- B. Contractility
- C. Automatism
- D. Excitation
- E. Conduction

30. Denervation of nonstriated muscles of the vessel has been arranged during the experiment on the white rat. Which physiological property of nonstriated muscles determines existence of this activity?

- A. Automatism
- B. Conductivity
- C. Excitation
- D. Contractility
- E. Compliance

31. Normally, being in blood flow the blood is present in liquid state. It is provided by:

- A. Smooth surface of vascular endothelium
- B. Thin layer of fibrin on vascular walls
- C. Fusion of prostacyclin by endotheliocyte
- D. The same charge of vascular wall and blood cells
- E. All mentioned factors

32. An adolescent (16 years old) has fainted at the result of change of body position from horizontal into vertical. Which of the following factors could cause fainting?

- A. Decrease of venous return to the heart
- B. Increase of venous return to the heart
- C. Increase of venous pressure
- D. Decrease of oncotic pressure of plasm
- E. Increase of arterial tension

33. In the experiment, in the study of the processes of excitation in cardiomyocytes was found that during the rapid depolarization phase  $\text{Na}^+$  ions could move also through:

- A.  $\text{Ca}^{++}$  - channels
- B.  $\text{K}^+$  - channels.
- C.  $\text{Cl}^{-}$  - channels
- D.  $\text{Mg}^{++}$  - channels.
- E.  $\text{Li}^+$  - channels

34. In animal experiment the cardiac cycle is being studied. There are closed all the valves of the heart. What phase does this correspond to?

- A. isometric contraction
- B. Asynchronous contraction
- C. protodiastolic period.
- D. fast filling.
- E. Slow filling.

35. During climbing stairs up to the 5th floor, there in a person increased the blood pressure. The reason was the increase in:

- A. minute volume of blood
- B. Number of functioning capillaries
- C. blood viscosity
- D. ion content in the blood plasma
- E. circulating blood volume

36. In a person weighing 80 kg after a prolonged physical exertion decreased the circulating blood volume, hematocrit - 50%, total blood protein - 80 g/L. Such indices of the blood is the result, primarily, of:

- A. water loss through sweating
- B. increase in the number of erythrocytes
- C. increase in the protein content in the plasma
- D. increase in the plasma oncotic pressure
- E. increase in diuresis

37. In a healthy person physical exercises caused a moderate decrease in diastolic pressure. What was the cause of this phenomenon?

- A. Reduction of vascular tone in the muscles.
- B. Increase in the heart activity
- C. Reduction of vascular elasticity.
- D. Decrease in the circulating blood volume
- E. Increase in vascular resistance

38. In the experiment was measured the linear velocity of the blood flow: it was the lowest in capillaries. The reason was in that the capillaries have:

- A. the greatest total cross-sectional area
- B. small length
- C. Small diameter
- D. Low Hydrostatic Pressure
- E. the thinnest walls

39. 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

40. During ventricular systole the cardiac muscle does not respond to additional stimulation because it is in the phase of:

- A. Absolute refractoriness
- B. Relational refractoriness
- C. Hyperexcitability
- D. Subnormal excitability
- E. There is no correct answer

41. An animal experiment is aimed at studying the cardiac cycle. All the heart valves are closed. What phase of the cycle is characterized by this status?

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

## REGULATION OF CARDIAC ACTIVITY, REGULATION OF HAEMODYNAMICS

1. During physical exercise distribution of blood flow of the student (18 years old) has been registered with the help of rheography. In what vessels has the blood flow increased predominantly?

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

2. Osmotic pressure of plasma of the patient was 350 mOsm/l (the norm is 300 mOsm/l). That would lead to increased secretion of the following hormone:

- A. Vasopressin
- B. Aldosterone
- C. Cortisol
- D. Adrenocorticotropin
- E. Natriuretic hormone

3. Diuresis of the man who had lost 1, 5 l of blood decreased quickly. Intensified secretion of which hormone led to change of diuresis?

- A. Vasopressin
- B. Corticotropin
- C. Natriuretic hormone
- D. Cortisol
- E. Parathormone

4. Blood circulatory system responds to the shift of body position from horizontal into vertical in the way of development of reflexory pressor reaction. Which of the following is its irreplaceable element?

- A. Constriction of venous capacitance vessels
- B. Distention of arterial resistance vessels
- C. Decrease of volume of circulating blood
- D. Decrease of frequency of heart contractions
- E. Decrease of pumping function

5. Arterial pressure of the animal has decreased abruptly at the result of injection of a large dose of histamine because of:

- A. Distention of resistance vessels
- B. Constriction of resistance vessels
- C. Increase of frequency of heart contractions
- D. Decrease of frequency of heart contractions
- E. Decrease of frequency and force of heart contractions

6. Systemic arterial tension of a grown-up man has decreased from 120/70 to 90/50 millimeter of mercury, which caused reflexory vascular constriction. In which of the following organs vascular constriction will be maximal?

- A. Intestinal tract
- B. Heart
- C. Brain
- D. Kidneys
- E. Epinephros

7. A pharmaceutical that normalized arterial tension had been injected to the patient with decreased arterial tension. Choose the most probable function mechanism of this medication:

- A. It caused peripheral vessel constriction
- B. It caused peripheral vessel distention
- C. It decreased peripheral vascular resistance
- D. It caused bradycardia
- E. It stimulated blood deposition

8. A pharmaceutical that normalized arterial tension had been injected to the patient with decreased arterial tension. Choose the most probable function mechanism of this medication:

- A. It caused peripheral vessel distention
- B. It caused vessel constriction
- C. It caused tachycardia
- D. It caused distention of peripheral vessels
- E. It stimulated blood flow from blood pool

9. Increased rennin secretion is observed in the kidneys of the patient. Indicate possible consequences of this phenomenon for blood circulatory system:

- A. Increase of systemic arterial tension
- B. Decrease of the tone of peripheral vessels
- C. Decrease of systemic arterial tension
- D. Decrease of epinephrine production
- E. Tachycardia

10. The patient has been detected increased vasopressin secretion. Indicate possible consequences of this phenomenon for blood circulatory system:

- A. Increase of systemic arterial tension
- B. Decrease of the tone of vessels
- C. Decrease of systemic arterial tension
- D. Distention of peripheral vessels
- E. Tachycardia

11. The amount of epinephrine in the blood increases during emotional tension (stress). Indicate possible consequences of this phenomenon for blood circulatory system:

- A. Increase of systemic arterial tension
- B. Decrease of the force of heart contractions
- C. Decrease of systemic arterial tension
- D. Decrease of myocardium excitation
- E. Bradycardia

12. Increase of arterial pressure of the patient caused by continual blastoma excitation of anatomic pressor neurovascular center has been detected. Where is the center located?

- A. In medulla oblongata
- B. In midbrain
- C. In thalamus
- D. In hindbrain
- E. In pallidum

13. Decrease of arterial pressure of the patient caused by continual blastoma excitation of anatomic depressor neurovascular center has been detected. Where is the center located?

- A. In medulla oblongata
- B. In midbrain
- C. In little brain
- D. In thalamus
- E. In red nucleus

14. Electric stimulation of depressor neurovascular center and arterial tension are arranged and registered at the experiment on

the animal. The stimulation causes decrease of arterial tension. What is the mechanism of arterial tension decrease at this experiment?

- A. Decrease of tone of peripheral vessels
- B. Tachycardia
- C. Increase of frequency of heart contractions
- D. Increase of cardiac output
- E. Increase of peripheral vascular tone

15. Electric stimulation of pressor neurovascular center and arterial tension are arranged and registered at the experiment on the animal. The stimulation causes increase of arterial tension. What is the mechanism of arterial tension increase at this experiment?

- A. Increase of peripheral vascular tone
- B. Decrease of vascular tone
- C. Bradycardia
- D. Decrease of frequency of heart contractions
- E. Decrease of cardiac output

16. Venous return to the heart of the person, who quickly changes his body position from horizontal into vertical, decreases. Which mechanism activates to normalize venous return?

- A. Reflexes of aortic arch and carotid bulb
- B. Anrep effect
- C. Increase of tone of cavae
- D. Frank-Starling law of the heart
- E. Intracardiac reflexes

17. Behavior-reflectory increase of frequency of heart contractions and arterial tension of the patient are observed at prelaunch phase. Which brain division provides this behavior reflex?

- A. Neocortex
- B. Paleocortex
- C. Archicortex
- D. Hypothalamus
- E. Spinal cord

18. At the result of change of body position from horizontal into vertical the frequency of heart contractions of the man (23 years old) has increased by 15 contractions per minute, systolic pressure has not changed, diastolic pressure has increased by 10 millimeter of mercury. Which regulation mech-

anisms provide the changes of measurements of blood circulatory system predominantly?

- A. Inborn sympatic reflexes
- B. Behavior sympatic reflexes
- C. Sympatic reflexes
- D. Catecholamines
- E. Sympatic reflexes and Catecholamines

19. It was found out at the experiment that vascular tone is regulated by metabolic factors. Which factor predetermines decrease vascular tone predominantly?

- A. Decrease of pressure of O<sub>2</sub> in the blood
- B. Increase of pressure of O<sub>2</sub> in the blood
- C. Increase of concentration of lactic acid E in the blood
- D. Increase of amount of prostaglandin
- E. Decrease of concentration of adenosine in the blood

20. The task of the experimenter is to increase the lumen of the vessels. What substance can help solve the task?

- A. Acetylcholine
- B. Vasopressin
- C. Epinephrine
- D. Serotonin
- E. Atropine

21. The soldier faints at watch rather in hot weather than in chilly weather. What is the explanation to this phenomenon?

- A. Vasodepressor reflectory reactions prevail
- B. Pressor reflectory reactions prevail
- C. Renin secretion decreases
- D. Vasopressin secretion decreases
- E. Thyroxin secretion increases

22. Activity of nerves of carotid bulb during decrease of blood volume is 20% in comparison to the norm:

- A. Decreases
- B. Increases by 20%
- C. Increases by 10%
- D. Does not change
- E. Increases twice

23. Which of the following factors provides distention of systemic arterioles in the organism most efficiently?

- A. Histamine
- B. Endothelin

- C. Vasopressin
- D. Noradrenaline
- E. None of them

24. In the experiment on the isolated heart was registered an increase in the frequency and force of heart contractions after adding certain salts to the perfusate. Which salt was added?

- A. Calcium Chloride
- B. Potassium Chloride
- C. Sodium Chloride
- D. Sodium bicarbonate
- E. Magnesium sulphate

25. In humans, as a result of voluntary breath hold for 40 seconds there increased heart rate and systemic arterial pressure. Implementation of what regulatory mechanisms did cause changes in the indices?

- A. Unconditional sympathetic reflexes
- B. Unconditional parasympathetic reflexes
- C. conditional sympathetic reflexes
- D. conditional parasympathetic reflexes
- E. metasympathetic reflexes

26. In prelaunch period the athlete increased frequency and strength of heart contractions. Implementation of any reflections caused these changes?

- A. Sympathetic conditional
- B. Sympathetic unconditional
- C. parasympathetic conditional
- D. parasympathetic unconditional
- E. Peripheral

27. In the experiment an isolated dog's heart was being perfused with a solution that had excess in calcium chloride concentration. What changes in cardiac activity were observed in this?

- A. increase in the frequency and force of contractions
- B. Reduction in the force of contractions
- C. Increase in the frequency of contractions .
- D. Reduction in heart rate
- E. Reduction in the frequency and force of contractions

28. Patients with cardiac defects often have elevated level of hormone in the blood that

reduces the reabsorption of sodium and water, and is produced in the heart. Which one of the hormones has the described action?

- A. natriuretic hormone
- B. Renin
- C. Aldosterone
- D. Vasopressin
- E. Adrenaline

29. During abdominal surgery the reflex cardiac arrest occurred. Where is the center of the reflex localised?

- A. medulla oblongata
- B. Spinal cord
- C. midbrain
- D. diencephalon
- E. cerebral cortex

30. Which of the following mechanisms of regulation CAN'T be take place in the isolated mammalian heart?

- A. Central reflexes
- B. Local reflexes
- C. Law of the heart (Frank-Starling's law)
- D. Effect of Anrep
- E. Bowditch staircase phenomenon

31. In the experiment was found that under the stimulation of the Pavlov amplificating nerve occurred an increase in the strength of heart contractions. The action of what mediator does this result link to?

- A. norepinephrine
- B. Acetylcholine
- C. Serotonin
- D. dopamine
- E. GABA

33. In the animal, 2 weeks after the experimental narrowing of the renal artery the blood pressure increased. To the action of what factor of humoral regulation on the blood vessels is that related?

- A. Angiotensin II
- B. Cortisol
- C. Aldosterone
- D. Vasopressin
- E. dopamine

34. A person, 40 years, during the emotional arousal got an increase in the blood pressure. Specify the possible cause of this effect:

- A. Increased sympathetic tonus
- B. dilation of arterioles
- C. Decrease in heart rate
- D. Hyperpolarization of cardiomyocytes
- E. Increased tonus of parasympathetic nervous system

35. In the prelaunch period, the athlete's got increased frequency and force of heart contractions. Implementation of what reflexes did cause these changes?

- A. Sympathetic conditional
- B. Sympathetic unconditional
- C. parasympathetic conditional
- D. parasympathetic unconditional
- E. Peripheral

36. In an athlete, at the start point of the race an increase in blood pressure and heart rate took place. The influence of what parts of the CNS could these changes be explained with?

- A. cerebral cortex
- B. medulla oblongata
- C. midbrain
- D. diencephalon
- E. Hypothalamus

37. While getting from the prone position to the standing one, in a healthy person are getting activated the following compensatory mechanisms:

- A. Increase in heart rate
- B. Decrease in heart rate
- C. decrease in diastolic blood pressure
- D. Decrease in vascular tone
- E. Decrease in total peripheral vascular resistance

38. In the experiment on a dog, the carotid sinus baroreceptor electrostimulation led to:

- A. vasodilation
- B. vasoconstriction
- C. increase in heart rate
- D. increase in minute volume of blood
- E. increase in systolic volume

39. In the animal, electrical pulses are being used to stimulate the sympathetic nerve that innervate the skin vessels. What will be the vessels' reaction like?

- A. narrowing the arteries and veins

- B. should be no reaction
- C. arteries should dilate
- D. Arteries and veins should dilate
- E. Veins should dilate

40. In the athlete after an intense workout took place a significant reduction of vascular tone of the working muscles. What led to this effect?

- A. Metabolites
- B. renin -angiotensin
- C. Histamine
- D. natriuretic hormone
- E. Serotonin

41. he patient has lost a lot of fluid, and there decreased the circulating blood volume. It directly led to the increase in secretion of:

- A. Vasopressin
- B. Aldosterone
- C. natriuretic hormone
- D. PTH
- E. thyrocalcitonin

42. In the experiment, to the rabbit were intravenously introduced 300 ml of isotonic NaCl solution, which led to a significant increase in circulating blood volume. What factor concentration should increase in the blood under these conditions?

- A. natriuretic hormone
- B. Renin
- C. Aldosterone
- D. Angiotensin II
- E. Epinephrine

43. A person with renal disease shows an increase in blood pressure, especially diastolic. Concentration of what biologically active substance is increased in the patient's blood?

- A. Renin
- B. Adrenaline
- C. noradrenaline
- D. Vasopressin
- E. catecholamines

44. A 16-year-old female patient has fainted after quickly changing her body position from horizontal to vertical one. Which process from the ones listed below has caused the loss of consciousness in the first place?

- A. Decreasing venous return
- B. Increasing venous return
- C. Increasing central venous pressure
- D. Decreasing oncotic pressure of blood plasma
- E. Increasing arterial pressure

45. 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

46. A patient with hypertensive crisis has increased content of angiotensin II in blood. Angiotensin pressor effect is based on:

- A. Contraction of arteriole muscles
- B. Activation of biogenic amine synthesis
- C. Prostaglandin hyperproduction
- D. Vasopressin production stimulation
- E. Activation of kinin-kallikrein system

47. A patient has insufficient blood supply to the kidneys, which has caused the development of pressor effect due to constriction of arterial resistance vessels. This condition results from the vessels being strongly affected by the following substance:

- A. Angiotensin II
- B. Angiotensinogen
- C. Renin
- D. Catecholamines
- E. Norepinephrine

48. Experimental stimulation of the sympathetic nerve branches that innervate the heart caused an increase in the force of heart contractions because the membrane of typical cardiomyocytes permitted an increase in:

- A. Calcium ion entry
- B. Calcium ion exit
- C. Potassium ion exit
- D. Potassium ion entry
- E. Calcium and potassium ion exit

## TECHNIQUES OF CARDIAC ACTIVITY INVESTIGATION

1. While analyzing electrocardiogram it is necessary to define where cardiac pacemaker is. That can be done on the basis of:

- A. Duration of R-R interval
- B. Deflection amplitude
- C. Direction of deflections
- D. Duration of QRST complex
- E. Duration of QRS complex

2. At the result of electrocardiogram it was found out that T waves are positive in the second standard lead from extremitas. It would be correct to say that the following process that takes place in ventricles is functioning normally:

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

3. Decrease of speed of patient's conduction of excitement through auricular-ventricular node is taking place. Considering this fact the increase of speed of the following activity will be registered on electrocardiogram:

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

4. Increase of frequency of heart contractions has been recorded at the result of electrocardiogram registration of the patient with hyperactivity of thyroid body. Shortening of which element of electrocardiogram indicates that?

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

5. Increase of duration of T wave has been detected on the electrocardiogram of the pa-

tient. This is the result of decrease of speed of ... in ventricles.

- A. Repolarization
- B. Depolarization and Repolarization
- C. Depolarization
- D. Contractions
- E. Relaxation

6. The processes of repolarization of ventricular myocardium of the patient are deflected. This will lead to defect of amplitude, configuration and duration of ... wave.

- A. T
- B. Q
- C. R
- D. S
- E. P

7. Before the exam the student had tachycardia. What changes of electrocardiogram will indicate it?

- A. Decrease of R-R interval
- B. Increase of R-R interval
- C. QRS complex widening
- D. Elongation of P-Q interval
- E. Elongation of Q-T segment

8. The duration of P-Q interval of electrocardiogram of the patient exceeds the norm while duration of P wave is standard. The reason of this phenomenon is speed decrease of conduction of excitement by:

- A. Auricular-ventricular node
- B. Sino-atrial node
- C. His band
- D. His bundle branch
- E. Purkinje's fibers

9. At the result of electrocardiogram it was found out that T waves are positive in the second standard lead from extremitas, their amplitude and duration are normal. It would be correct to say that the following process that takes place in ventricles is functioning normally:

- A. Repolarization
- B. Depolarization

- C. Excitation
- D. Contraction
- E. Relaxation

10. The patient has an off-speed conduction of excitement through auricular-ventricular node. What changes of electrocardiogram will take place?

- A. Increase of duration of P-Q interval
- B. Increase of duration of Q-S interval
- C. Negative T wave
- D. S-T segment displacement
- E. Increase of Q-T interval

11. At the result of electrocardiogram of the patient it was found out that the position of cardiac electrical axis is normal (intermediate). By how many degrees can the mean vector of heart be deflected from the axis of the first lead?

- A. 30-69 degrees
- B. 0-29 degrees
- C. 70-90 degrees
- D. 0-15 degrees
- E. 70-80 degrees

12. At the result of patient's electrocardiogram analyze it was found out that the mean vector of heart is deflected from the axis of the first lead by 10 degrees. What is the position of cardiac electrical axis of the patient?

- A. Horizontal
- B. Vertical
- C. None of the answers is correct
- D. Intermediate
- E. Dextrogram

13. At the result of patient's electrocardiogram analyze it was found out that the position of cardiac electrical axis is horizontal. By how many degrees can the vector of the heart be deflected from the axis of the first lead?

- A. 0-29 degrees
- B. 45-50 degrees
- C. 70-90 degrees
- D. 30-69 degrees
- E. 80-90 degrees

14. Deflection of the amplitude of P wave has been detected on electrocardiogram of the patient. What can this change indicate?

- A. Defect of excitation in atria
- B. Defect of depolarization of ventricles
- C. Defect of excitation of His bundle branches
- D. Defect of excitation of Purkinje's fibers
- E. Defect of excitation of His bundle branches

15. At the result of the analyze of patient's electrocardiogram the change of duration and amplitude of Q wave has been detected. In which compartment of heart is the defect of conduction of excitement observed?

- A. In interventricular septum
- B. In the right atrium
- C. In the left atrium
- D. On the apex of heart
- E. In sino-atrial node

16. Defect of the normal tone of the first heart sound of the patient has been diagnosed. Indicate one of the leading mechanisms of defect of tones.

- A. Defect of closing of auricular-ventricular valves
- B. Defect of valve closing of pulmonary artery
- C. Defect of valve closing of aorta
- D. Defect of blood movement from atria to ventricles
- E. Defect of the process of filling ventricles with blood

17. Defect of the tone of the second heart sound of brisket in the second intercostal space of the patient has been detected. Indicate one of the leading mechanisms of possible defects of tones.

- A. Defect of valve closing of pulmonary artery
- B. Defect of auricular-ventricular valve closing
- C. Increase of ventricular flutter
- D. Defect of opening of auricular-ventricular valves
- E. Defect of aorta valve closing

18. The amplitude of R wave of all deflections is decreased on electrocardiogram of the patient. In which compartment of the heart is the process of excitation deflected?

- A. In ventricular muscle



- B. In auricular-ventricular node
  - C. In His band
  - D. In atria
  - E. In sino-atrial node
19. The condition of which quality of cardiac muscle cannot be estimated entirely on the basis of electrocardiogram analyze?
- A. Inotropy
  - B. Excitability
  - C. Ductance
  - D. Automatism
  - E. Refractivity
20. At the result of analyze of patient's electrocardiogram the increase of duration of cardiac cycle has been detected. What changes in cardiac functioning can be observed in this case?
- A. Decrease of frequency of heart contractions
  - B. Increase of frequency of heart contractions
  - C. Increase of heart force
  - D. Decrease of heart force
  - E. Increase of frequency of heart contractions and heart force
21. At the result of patient's electrocardiogram analyze the decrease of duration of cardiac cycle has been detected. What changes in cardiac functioning can be observed in this case.
- A. Increase of frequency of heart contractions
  - B. Increase of heart force
  - C. Decrease of heart force
  - D. Decrease of frequency of heart contractions and heart force
  - E. Decrease of frequency of heart contractions
22. At the result of electrocardiogram analyze it was detected that R-R interval = 0,8 seconds. What is the frequency of heart contractions in this case?
- A. 75 contractions/minute
  - B. 60 contractions/minute
  - C. 100 contractions/minute
  - D. 80 contractions/minute
  - E. 90 contractions/minute

23. At the result of analyze of electrocardiogram it was found out that the position of cardiac electrical axis is horizontal. What kind of correlation of R waves in three standard deflections is observed in this case?
- A. ( I ) > R (II) > R (III)
  - B. ( I ) < R (II)
  - C. (III) > R (II)
  - D. (III) > R (I)
  - E. ( I ) = R (II)
24. P wave of electrocardiogram indicates depolarization of:
- A. Both atria
  - B. The right atrium only
  - C. The left atrium only
  - D. Keith-Flack's node
  - E. His bundle
25. It was detected on electrocardiogram of the patient that R-R interval = 1,5 seconds. In which compartment of conductive system of the heart is the pacemaker located?
- A. Atrio-ventricular node
  - B. Sinus node
  - C. His bund
  - D. Left branch of His bund
  - E. Right branch of His bund
26. Which physiological qualities of myocardium do waves, segments and intervals of electrocardiogram indicate?
- A. Excitation, conductivity, automatism
  - B. Excitation, automatism, inotropy
  - C. Excitation, inotropy, refractivity
  - D. Inotropy, automatism, conductivity
  - E. Inotropy, refractivity, automatism
27. Normal sequence of waves on electrocardiogram has been defected at the result of arrhythmogenic influence of stress reaction on the heart. Indicate correct sequence of electrocardiogram waves.
- A. PQRST
  - B. QPRST
  - C. RSTPQ
  - D. PQSRT
  - E. RSTQP
28. In order to estimate contractile qualities of the heart the patient was recommended to undergo medical testing that is based on reg-

- istration of light displacements of the body which are called heart contractions. What is the name of this medical testing?
- A. Ballistocardiography
  - B. Electrocardiography
  - C. Echo-cardiography
  - D. Roentgenocardiography
  - E. Phonocardiography
29. At the result of analyze of electrocardiogram it was detected that the patient had intermediate position of cardiac electrical axis. What kind of correlation of R waves in three standard deflections is observed in this case?
- A. ( II ) > R ( I ) > R ( III )
  - B. ( I ) = R ( II )
  - C. ( I ) > R ( II )
  - D. ( III ) > R ( II )
  - E. ( I ) = R ( III )
30. During AD change of the patient it was detected that systolic pressure = 120 millimeter of mercury and diastolic pressure = 80 millimeter of mercury. What is the pulse pressure of the patient?
- A. 40 millimeter of mercury
  - B. 30 millimeter of mercury
  - C. 35 millimeter of mercury
  - D. 60 millimeter of mercury
  - E. 20 millimeter of mercury
31. It was defined that CO of the heart of the healthy person = 70 ml and frequency of heart contractions = 70 contractions/minute. What is the minute volume of the heart of this person?
- A. 4,0 l
  - B. 8,0 l
  - C. 7,0 l
  - D. 6,0 l
  - E. 5,0 l
32. The speed of the paper flow during electrocardiogram recording is 50 mm/sec. R-R interval is 40 mm. Count the duration of cardiac cycle.
- A. 0,8 sec
  - B. 0,85 sec
  - C. 0,9 sec
  - D. 0,75 sec
  - E. 0,7 sec

33. What is an approximate pressure of the left ventricle during diastole?
- A. 0 millimeter of mercury
  - B. 120 millimeter of mercury
  - C. 100 millimeter of mercury
  - D. 80 millimeter of mercury
  - E. 40 millimeter of mercury
34. Notable decrease of dicrotic wave has been detected at the result of registration of sphygmogram of the patient (60 years old). On which factor does the appearance of this wave depend?
- A. Valve closing of Aorta
  - B. Valve opening of Aorta
  - C. Closing of bicuspid valve
  - D. Opening of bicuspid valve
  - E. Opening of valves of pulmonary artery
35. P wave splitting was detected while testing electrocardiogram of the patient. With the defect of which functions is the notified change on electrocardiogram connected?
- A. Conduction of excitation through ventricles
  - B. Conduction of excitation through AB node
  - C. Conduction of excitation through atria
  - D. Atrial repolarization
  - E. No defect is notified
36. Cardiac enlargement of the patient (12 years old) is detected on the roentgenogram. Which method is the most probable to estimate the size of cardiac cavities?
- A. Echo-cardiography
  - B. Phonocardiography
  - C. Sphygmography
  - D. Electrocardiography
  - E. Rheography
37. What causes appearance of T-P interval?
- A. Electric diastole of the heart
  - B. Conduction of excitation through atria
  - C. Conduction of excitation through atria and ventricles
  - D. Conduction of excitation through ventricles
  - E. electric systole of the heart

38. Patient's ECG shows the prolongation of the QT interval. This can be due to decrease in ventricular rate of:

- A. depolarization and repolarization
- B. depolarization
- C. repolarization
- D. contraction
- E. Relaxation

39. In a person, it is necessary to estimate the elasticity of large arteries. Which of the instrumental techniques should be used for this?

- A. sphygmography
- B. Electrocardiography
- C. Phonocardiography
- D. phlebography
- E. vectorcardiography

40. In a person, it is necessary to assess the state of the heart valves. Which of the instrumental techniques is it advisable to use for this?

- A. Phonocardiography
- B. Electrocardiography

- C. sphygmography
- D. phlebography
- E. Probing of vessels

41. Electrocardiogram analysis demonstrates that cardiac cycle of a human equals 1 second. It means that heart rate per minute equals:

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

42. In an elderly person the change in heart force and vessels physical properties were detected; they can be clearly observed on graphic recording of carotid pulse waves. What method was applied?

- A. Sphygmography
- B. Plethysmography
- C. Rheography
- D. Myography
- E. Phlebography

## SYSTEM OF BLOOD

1. Normally pH of blood can change only for a short period of time and this deviance is insignificant. How will pH of blood change if the dog is injected 1, 5 l of glucose solution intravenously?

- A. It will not change
- B. It will increase
- C. It will decrease
- D. It will be neutral
- E. It will fluctuate

2. Blood values indicate appearance of large amount of bilirubin. What does it indicate?

- A. Massive erythrocyte lysis
- B. Erythrocytosis
- C. Leukopenia
- D. Leukocytosis
- E. Globular value change

3. At the result of prophylactic medical examination of the student (20 years old) it was found out that red blood cell count =  $8 \cdot 10^{12}/l$ , blood viscosity = 5, 0, platelet count =  $400 \cdot 10^9/l$ , white blood cell count =  $8 \cdot 10^9/l$ , packed cell volume = 45%. Which of these values is not normal?

- A. Red blood cell count
- B. Blood viscosity
- C. Platelet count
- D. White blood cell count
- E. Packed cell volume

4. The man lives high in the mountains. What change of his blood volume can be detected?

- A. Increase of red blood cell count
- B. Decrease of measurement of hemoglobin contents
- C. Appearance of erythroblasts
- D. Decrease of reticulocyte count
- E. No change in the blood takes place

5. A child has arrived to Eupatorian health resort from radiation zone. High amount of red blood cells has been detected in lymphatic fluid. What is the reason of this phenomenon?

- A. Capillary permeability has increased
- B. Red blood cell count has increased

- C. Oncotic pressure has increased
- D. Osmotic pressure has increased
- E. Lymph flow has changed

6. Two weeks after artery stricture in the experiment on the rabbit increase of red cell blood count and hemoglobin in the blood has been detected. At the result of stimulation of erythropoiesis caused by erythropoietins. Stimulation of erythropoietin formation is caused by emergence of:

- A. Hypoxemia
- B. Hypercapnia
- C. Arterial hypertension
- D. Hyposmia
- E. Hyperxemia

7. What is the mechanism of blood sedimentation rate of a pregnant woman?

- A. Increase of fibrinogen concentration
- B. Increase of red blood cell count
- C. Increase of blood volume
- D. Increase of albumin concentration
- E. Increase of bone marrow function

8. Patient's serum has been sent to the lab for analyze. Which of the following components can be detected in it?

- A. Albumins, globulins, calcium
- B. Albumins, fibrinogens, ferrum
- C. Fibrin monomers soluble complexes of fibrin breakdown products
- D. Fibrin-stabilizing factor, albumins, sodium
- E. Globulins, ferrum

9. Red blood cell count of a healthy patient is  $5,65 \cdot 10^{12}/l$ . What can be deduced from this result?

- A. The patient lives in the mountains
- B. The patient is a miner
- C. The patient is a grown-up man
- D. The patient is a pregnant woman
- E. The patient is a grown-up woman

10. Reticulocyte count of the patient has increased three days after an insignificant hemorrhage. In which organ are they formed?

- A. In bone marrow
- B. In the spleen

- C. In lymph glands
  - D. In lymphatic tissue of intestinal tract
  - E. In liver
11. Systemic red blood cell count of the patient has decreased to  $1,5 \cdot 10^{12}/l$  in 5 l of blood. This phenomenon is accompanied by shortbreathing, faintness, entotic sound, seeing spots. What is the reason of this phenomenon?
- A. The amount hemoglobin has decreased
  - B. Oxygen capacity of blood is insufficient
  - C. Hypoxia
  - D. Defect of respiratory function of blood
  - E. All the answers are correct
12. A woman (38 years old) with uterine hemorrhage has been administered to department of diagnostics. What changes of blood would most probably take place?
- A. Decrease of packed cell volume
  - B. Increase of packed cell volume
  - C. Leukopenia
  - D. Leukocytosis
  - E. Erythrocytosis
13. At the result of the accident a man was poisoned by CO. That caused headache, shortbreathing, faintness. Decrease of concentration of what compound led to this effect?
- A. Oxyhemoglobin
  - B. Carboxyhemoglobin
  - C. Carboxyhemoglobin
  - D. Methemoglobin
  - E. Deoxygenated hemoglobin
14. Blood examination indicated increase of blood sedimentation rate, which is defined by:
- A. Inflammatory process
  - B. Intensive physical activity
  - C. Loss of blood
  - D. Acute situational reaction
  - E. Food acceptance
15. The correlation between albumins and globulins in plasm has decreased at the result of long-term starvation. Which of the following effects would be the result of this change?
- A. Increase of blood sedimentation rate

- B. Decrease of blood sedimentation rate
  - C. Increase of packed cell volume
  - D. Decease of packed cell volume
  - E. Hypercoagulability
16. A man with kidney disease has been detected anaemia. The most probable reason of anemia is the defect of ... secretion.
- A. Erythropoietin
  - B. Rennin
  - C. Aldosterone
  - D. Natriuretic hormone
  - E. Antidiuretic hormone
17. After long-lasting physical activity the volume of blood circulation of a man with the weight of 80 kl has decreased to 5, 4 l, packed cell volume – 50%, total protein – 80 g/l. These blood values are the result of:
- A. Water loss with sudor
  - B. Increase of red blood cell count
  - C. Increase of protein content in plasm
  - D. Increase of oncotic pressure of plasm
  - E. Increase of diuresis
18. A man with exsomatized kidney has been detected symptoms of anemia. What influenced appearance of these symptoms?
- A. Decrease of erythropoietin fusion
  - B. Increased erythrocytosis
  - C. Lack of ferrum
  - D. Lack of anti-pernicious anemia factor
  - E. Lack of folic acid
19. Hemoglobin count of the patient is 150 g/l. What is the amount of oxygen capacity?
- A. 20ml/100 ml of blood
  - B. 12/100 ml of blood
  - C. 10/100 ml of blood
  - D. 25/100 ml of blood
  - E. 15/100 ml of blood
20. A man got poisoned by carbon monoxide during the fire. What changes took place in the blood?
- A. Carboxyhemoglobin formation
  - B. Methemoglobin formation
  - C. Carbaminohemoglobin formation
  - D. Reduced hemoglobin formation
  - E. Acidosis progression
21. While analyzing the blood sample drawn from the corpse cyanides poisoning has been

- detected by forensic doctor. What was the reason of death?
- A. Methemoglobin formation
  - B. Carboxyhemoglobin formation
  - C. Carbaminohemoglobin formation
  - D. Reduced hemoglobin formation
  - E. Blood pH Change
22. A young man (20 years old) who had started practicing track and field athletics regularly was stated: red blood cell count –  $5, 5 \cdot 10^{12}/l$ , reticulocyte count – 12% from systemic red blood cell count, hemoglobin – 160 g/l, globular value – 1, 03. These blood values indicate erythropogenesis stimulation at the result of ... formation in the course of training.
- A. Hypoxemia
  - B. Hypercapnia
  - E. Exercise load
  - D. Hyperventilation
  - E. Hyperglycosemia
23. 1 l of sodium chloride solution with the concentration of 150 millimole/l has been injected to the patient who had had loss of blood. What would decrease first of all?
- A. Oncotic pressure of blood
  - B. Oncotic pressure of intercellular fluid
  - C. Osmotic pressure of blood
  - D. Osmotic pressure of intercellular fluid
  - E. Osmotic intracellular pressure
24. While analyzing blood sample of the sportsman the following values have been detected: red blood cell count –  $5, 5 \cdot 10^{12}/l$ , hemoglobin count – 180 g/l, white blood cell count –  $7 \cdot 10^9/l$ , neutrocyte count – 64%, basophil count – 0, 5%, monocyte count – 8%, lymphocyte count – 27%. These values indicate first of all stimulation of:
- A. Erythropogenesis
  - B. Leucopoiesis
  - C. Lymphopoiesis
  - D. Granulocytopenia
  - E. Immunogenesis
25. Red blood cell count of a healthy man is  $5, 65 \cdot 10^{12}/l$ . The reason of this value is the fact that this man:
- A. Lives in high mountain region

- B. Works as a miner
  - C. Is a pregnant woman
  - D. Is an adult man
  - E. Is a preschooler
26. During medical examination of a pregnant woman twice the amount of fibrinogen content in plasm has been detected. What is the woman's blood sedimentation rate?
- A. 40-50 mm/h
  - B. 10-15 mm/h
  - C. 2-12 mm/h
  - D. 5-10 mm/h
  - E. 0 – 5 mm/h
27. The worker has been working intensively while the temperature was +35 C. What changes of blood value will be observed?
- A. Increase of packed cell volume
  - B. Decrease of packed cell volume
  - C. Increase globular value
  - D. Decrease of blood sedimentation rate
  - E. Increase of blood sedimentation rate
28. Before the trauma blood sedimentation rate of the man was 40%. What will it be one day after the loss of 750 ml of blood?
- A. 30%
  - B. 40%
  - C. 55%
  - D. 45%
  - E. 50%
29. Blood viscosity of the patient used to be 70. Which factor was the most probable in changing the value of blood viscosity?
- A. Water deprivation
  - B. Athletic overexertion
  - C. Excessive fluid intake
  - D. Food acceptance
  - E. Hypodynamia
30. The patient (44 years old) who had been administered to intensive care unit has been stated packed cell volume decrease to 0,3. Which of the following processes could lead to this condition?
- A. Internal hemorrhage
  - B. Derangement of digestion
  - C. Excessive fluid intake
  - D. Stricture of vessels of internals
  - E. Renal disorder

31. According to blood sample analyze patient's blood contains  $4,8 \cdot 10^{12}/l$  of red blood cells some of which comprise nuclei. What is the meaning of this phenomenon?

- A. Tension in erythropoiesis system
- B. Erythropenia
- C. Erythrocytosis
- D. Packed cell volume change
- E. Change of blood pH

32. Blood examination of the patient who had been administered to the hospital indicated increase of blood sedimentation rate. What is the reason of this change?

- A. Inflammatory process
- B. Acute situational reaction
- C. Food consumption
- D. Intense physical activity
- E. Loss of blood

33. A significant decrease of blood volume of the patient has been observed at the result of hemorrhage. Which homeostatic value would be restored by the organism in the first place?

- A. Volume of blood circulation
- B. Osmotic pressure
- C. Oncotic pressure
- D. Sodium ion content in the blood
- E. Factor IV content in the blood

34. Red blood cell count of a grown up man had been  $4,8 \cdot 10^{12}/l$  for several years. After his family and he emigrated to a different region his red blood cell count has risen to  $7,0 \cdot 10^{12}/l$ . In what region has the man emigrated?

- A. To high mountain region
- B. To the sea
- C. To the valley
- D. To the country side
- E. To the woodland

35. 3 hours after long-lasting and acute hemorrhage patient's Volume of blood circulation restored with the help of 0,9% of NaCl. What would globular value be?

- A. 1.0
- B. 1.3
- C. 0.7
- D. 0.6

E. 0.5

36. Oxygen capacity of the fetus is higher than of the mother because of the larger content of:

- A. HbF
- B. HbA
- C. HbH
- D. HbS
- E. HbP

37. In a human, as a result of physical activity increased the rate of blood clotting. The reason for this is the increased concentration in the blood:

- A. Adrenaline
- B. Thyroxine
- C. Growth Hormone
- D. Cortisol
- E. Plasmin

38. What should be added to the donor blood, canned with sodium citrate, to induce clotting?

- A. Calcium ions
- B. Sodium ions
- C. Prothrombin
- D. Vitamin K
- E. Fibrinogen

39. Patient after liver disease was found to decrease the content of prothrombin in the blood. It will, first of all, lead to violation of:

- A. second phase of coagulation.
- B. First phase koagulyatsiyngo hemostasis.
- C. vascular-platelet hemostasis.
- D. fibrinolysis.
- E. anticoagulant properties of blood

40. The patient has slowed down the process of blood coagulation, which threatens a large blood loss during surgery. What might be the cause of mitigating the coagulation system?

- A. increased activity of anticoagulation
- B. increase in the amount of fibrinogen in the blood
- C. increase in the amount of adrenaline in the blood
- D. increased tone of the parasympathetic system
- E. trigger is activated Hageman factor

41. With age, the walls of blood vessels are formed cholesterol «plaques». Why in the presence of «plaques» increases the likelihood of thrombus formation within the vessel?

- A. destruction of platelets and erythrocytes takes place
- B. reversible platelet aggregation takes place
- C. it is formed blood plasminogen activator
- D. it is activated factor XII
- E. increased  $Ca^{++}$  levels in the blood

42. To stop bleeding in trauma, it is important to determine the type of damaged vessels. Why normally venous blood color is different from the arterial?

- A. it contains deoxyhemoglobin
- B. it contains a lot of metabolites
- C. it contains a lot of salts in plasma
- D. contains a lot of carbon dioxide
- E. it contains low glucose

43. By transfusion of citrated blood to the patient after the injury the doctor didn't take into account the fact that this blood does not clot and bleeding does not stop. What the doctor did not consider?

- A. absence of  $Ca^{2+}$  in such blood
- B. of  $K^{+}$
- C.  $Na^{+}$
- D.  $Mg^{+2}$
- E.  $Fe^{+2}$

44. In the blood after microvascular injury increased content of thromboxane A<sub>2</sub>, which led to a decrease in bleeding time due to accelerated hemostasis during the development of phase:

- A. reversible aggregation of platelets
- B. platelet adhesion
- C. irreversible aggregation of platelets
- D. coagulation
- E. a retraction clot

45. Blood is poured into the tube and determined that its clotting time is 6 min. After the clot formation the tube was placed in a thermostat for the night and found the destruction of a thrombus due to activation:

- A. plasmin
- B. kinins
- C. kalikrein

D. heparin  
E. antithrombin

46. In a boy of 16 years after the disease reduced the function of protein synthesis in the liver due to lack of vitamin K, which led primarily to a breach in:

- A. Blood clotting
- B. erythrocyte sedimentation rate
- C. formation anticoagulants
- D. formation erythropoietin
- E. oncotic pressure of the blood

47. To prevent blood clotting in the erythrocyte sedimentation rate determination blood was mixed with sodium citrate. What bounds these reagent ions?

- A. calcium.
- B. Potassium.
- C. Magnesium.
- D. chlorine.
- E. Sodium.

48. The patient in the transfusion of large amounts of citrated blood there stopped the activity of the heart. Specify the possible mechanism of the changes obtained:

- A. Lack of calcium ions in the blood
- B. excess of iron
- C. lack of fibrinogen
- D. Excess of erythrocytes
- E. Circulating immune complexes

49. In the clinic there is a man 49 years old with a significant increase in blood clotting time, gastrointestinal bleeding, subcutaneous bleeding. Lack what vitamin can be the reason of these symptoms?

- A. K
- B. B1
- C. PP
- D. H
- E. E

50. Before blood sampling in experimental rats, which have very high rate of bleeding, there sometimes administered heparin. For what purpose?

- A. Increase anticoagulation
- B. Lower anticoagulation
- C. Increased coagulation
- D. Increase fibrinolysis
- E. Reduction of fibrinolysis

51. In the damage of the vessel wall there also destroyed blood cells. What come out from destroyed platelets?

- A. factors education prothrombinase
- B. heparin
- C. thrombin
- D. Rh - factor
- E. plasminogen

52. The patient complains of increased bleeding, bleeding that occur under minor injuries. What substances can contribute to bleeding while increasing in their content in the blood?

- A. heparin
- B. thromboplastin
- C. histamine
- D. Serotonin
- E. plasminogen

53. In a patient with liver disease was found a decrease in the blood fibrinogen. What phase of hemostasis was violated in this case?

- A. third phase of hemocoagulation hemostasis
- B. retraction of platelet thrombus
- C. platelet adhesion
- D. formation of prothrombinase
- E. platelet aggregation

54. In a patient with thrombosis of the left shin was found a decrease in the activity of the blood anticoagulation system. The content of what factor of the following can be reduced in the blood?

- A. antithrombin
- B. prothrombin
- C. trombostenin
- D. fibrinogen
- E. histamine

55. A person, 40 years old, with a body weight of 80 kg during stress revealed the total blood coagulation time was 2 min, that was a result of the action on hemocoagulation primarily:

- A. catecholamines.
- B. Cortisol.
- C. Aldosterone.
- D. Growth Hormone.
- E. Vasopressin.

56. The patient has high activity of prothrombin, there is a danger of thrombosis. What anticoagulant we should apply in this case?

- A. Heparin.
- B. sodium oxalate.
- C. potassium oxalate.
- D. Sodium citrate
- E. Ethylene diamine tetraacetate.

57. Patients after liver disease was found to decrease prothrombin in the blood. What are the stages and phases of hemostasis violated in this case?

- A. second phase of coagulation
- B. platelet aggregation
- C. platelet adhesion
- D. platelet clot retraction
- E. the third phase of coagulation

58. At what stage of vascular-platelet hemostasis trombostenin acts?

- A. Retraction of platelet thrombus formation.
- B. reflex vasospasm.
- C. platelet adhesion.
- D. Reversible aggregation of platelets.
- E. Irreversible aggregation of platelets.

59. In a patient with Hageman factor deficiency there found infringements of fibrinolysis. Which of these factors activates fibrinolysis by internal mechanism?

- A. XIIa
- B. III
- C. VIIa
- D. XIa
- E. IXa.

60. In a patient with minor mechanical injuries appear bruising. What could cause this phenomenon?

- A. Thrombocytopenia
- B. eritropeniya
- C. Leukopenia
- D. lymphocytosis
- E. Decrease in hemoglobin content.

61. A patient, by a physician's prescribing, takes coagulants. What clinical analysis of the blood is required at the same time?

- A. Determination of the main indicators of coagulation
- B. Quantification of erythrocyte

- C. Determination of leukocytes
- D. Quantification of haematocrit
- E. Definition of ESR.

62. After applying a tourniquet were found petechiae. With dysfunction of which blood cells is it connected?

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

63. Coagulation and anticoagulation mechanisms are regulated by the nervous system. How does react the process of blood coagulation by increasing the tone of the sympathetic nervous system?

- A. coagulation intensifies
- B. coagulation falters
- C. coagulation will not change
- D. activating of anticoagulant system
- E. depressing of antifibrinolytic system

64. Prior to the surgery was revealed that a person increased in bleeding time to 15 minutes. Deficit of what elements in the blood can be responsible for these changes?

- A. Platelets
- B. erithrocytes
- C. Lymphocytes
- D. Leukocyte
- E. Monocytes

65. In a boy of 16 years, after the disease was reduced the function of protein synthesis in the liver due to the lack of vitamin K, which lead primarily to a breach in:

- A. Blood clotting
- B. erythrocyte sedimentation rate
- C. formation of anticoagulants
- D. formation of erythropoietin
- E. blood osmotic pressure

66. A woman in the delivery eve has ESR 40 mm/hour. This ESR is due to the fact that in the blood is/are increased the level(s) of:

- A. Fibrinogen
- B. albumins
- C. Proteins
- D. Erythrocytes

E. Lipoproteins

67. In the clinical emergency and resuscitation practice are not uncommon the conditions, that are accompanied by oedema of the brain cells. To fight that state, it is advisable to introduce the substances to patients, which:

- A. increase the colloid-osmotic pressure of blood
- B. Change the acid-base balance of blood
- C. reduce systemic blood pressure
- D. Reduce central venous pressure
- E. Reduce circulating blood volume (CBV)

68. Analysis of a woman's blood found an increased in erythrocyte sedimentation rate (ESR), which was due to:

- A. pregnancy
- B. physical work
- C. blood loss
- D. Stress
- E. having meals

69. In the patient the content of albumin in the blood plasma and oncotic pressure are dramatically reduced. What will be the result of that like?

- A. Swelling (oedema)
- B. Decrease in urine output
- C. increase in blood volume
- D. Decrease in ESR
- E. increase in the density of blood

70. A man lost his consciousness in the car where he had been waiting his friend for a long time with the engine running. In his blood was then found the hemoglobin derivative. What substance exactly?

- A. carboxyhemoglobin
- B. deoxyhemoglobin
- C. Carbhemoglobin
- D. Methemoglobin
- E. Oxyhemoglobin

71. 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

## PROTECTIVE FUNCTIONS OF BLOOD

- D. Any changes will be observed  
E. Biological haemolysis
1. 10% of eosinophile in the blood has been detected in Clinical assessments of the patient. Which of the following processes is the most likely to have led to eosinophilia?  
A. Allergic state of the organism  
B. Inflammatory process of internals  
C. Muscle concussion of the lower limbs  
D. Lack of zymes of gastro-intestinal tract  
E. Faintness
2. At the result of stress situation woman's immunoprophylactic potential decreased. With the help of which formed elements is immunity defined?  
A. Lymphocytes  
B. Monocytes  
C. Thrombocytes  
D. Eosinophiles  
E. Neutrophils
3. Immunity activity is connected with sufficient number of antibodies in the blood. Which of the substances of plasm are the bearers of antibodies?  
A. Gamma globulins  
B. Albumins  
C. Polysaccharose  
D. Ca<sup>++</sup> ions  
E. Lipids
4. Antibodies content in the blood defines disease-resistance of the organism. Which formed elements produce antibodies?  
A. Lymphocytes  
B. Eosinophiles  
C. Monocytes  
D. Neutrophils  
E. Basophils
5. The results of blood examination are a significant objective index of medical condition of the patient. Blood samples are drawn on an empty stomach because after food consumption ... is observed.  
A. Leukocytosis  
B. Erythrocytosis  
C. Increase of blood coagulability  
D. Increase of the content erythropoietin  
E. Change of blood Ph
6. Autoimmune responses, which are an excessive increase of antibody production, are detected. Deficit of what kind of white blood cells may be the reason of this phenomenon?  
A. Regulatory T-cell  
B. Monocytes  
C. T-helper cells  
D. Eosinophiles  
E. Neutrophils
7. Postoperative wound of the patient matured five days after surgical intervention. Which of the white blood cells will most probably phagocyte if the wound has acidic conditions?  
A. Monocytes  
B. Eosinophiles  
C. Neutrophils  
D. Basophils  
E. Lymphocytes
8. Decrease of antibody content of the patient has been detected. Decrease of the count of what white blood cells may be the reason of hypoactivity of immune system?  
A. B- lymphocytes  
B. Neutrophils  
C. Eosinophiles  
D. Monocytes  
E. Basophils
9. Shift of leukogram of the patient to the left is observed. Which of the factors can lead to this phenomenon?  
A. Acute inflammatory process  
B. Mental stress  
C. Carbohydrate food consumption  
D. Protein food consumption  
E. Greasy food consumption
10. Eosinophilia has been stated while examining the blood of a 10 year-old child. Which of the following reasons is the most probable to have caused it?  
A. Helminthism  
B. Physical activity  
C. Consumption of poor-quality food

- D. Acute situational reaction  
E. Upper arm concussion

11. An evident autoimmune response of the patient is observed. Which hormones have to be injected to the patient in order to decrease the concentration of autoimmune bodies?  
A. Glucocorticoids  
B. Catecholamines  
C. Mineralocorticoids  
D. Insulin  
E. Glucagon
12. 12% of eosinophile in the blood of the patient has been stated at the result of blood examination. Which abnormal changes should the doctor consider first of all?  
A. Allergy  
B. Acute inflammation  
C. Chronic inflammation  
D. Decrease in immunity  
E. None of the answers is correct
13. White blood cell count increase in the blood is called:  
A. Leukocytosis  
B. Leucosis  
C. Leukopenia  
D. Agranulocytosis  
E. Mononucleosis
14. The patient with acute abdomen diagnosis has been administered to the hospital. The doctor suspected acute appendicitis and appointed emergent blood estimation to prove his version. Which of blood values can confirm the presence of acute inflammation?  
A. Leukocytosis  
B. Erythrocytosis  
C. Leukopenia  
D. Erythropania  
E. Eosinophilia
15. A range of substances is synthesized in neutrophils. Which one of them influences viruses?  
A. Interferon  
B. Lysozyme  
C. Phagocytin  
D. Myeloperoxidase  
E. Hydrolyzing enzyme
16. As we know specific cell-mediated immunity is playing a significant part. Which of

the following glands is taking part in specific cell-mediated immunity formation?

- A. Thymus gland  
B. Prepituitary gland  
C. Thyroid body  
D. Reproductive glands  
E. Suprarenal cortex
17. After a long-lasting anti-biotic intake the patient got allergy in the form of significant rubor at the result of vascular distention and blood flow increase. Which types of leucocytes take part in allergy progress most of all?  
A. Basophils  
B. Monocytes  
C. Neutrophils  
D. Eosinophiles  
E. Lymphocytes
18. A bulge with matterly content appeared one day after the cut of the finger. Which elements of non-specific hemic system take part in decontamination of the inflammation?  
A. Neutrophils  
B. Basophils  
C. Red blood cells  
D. Monocytes  
E. Eosinophiles
19. Diapedesis is the term that includes:  
A. Neutrophil migration from the blood flow  
B. Blood clotting  
C. Predisposition to allergic reaction  
D. Specific blood examination  
E. Brake action of antibody production
20. An insignificant increase of white blood cell count (leukocytosis) of the patient has been detected at the result of blood examination while the rest of blood values have not changed. What has the patient most probably done before examination despite warnings of the doctor?  
A. He has had breakfast  
B. He has not had any breakfast  
C. He has drunk 200 ml of juice  
D. He has smoked a cigarette  
E. He has drunk 200 ml of sweet tea
21. After cardiac transplantation the patient had transplant rejection. What cells of immune system cause this effect first of all?  
A. Macrophagocytes

- B. Neutrophils
- C. Eosinophiles
- D. Basophils
- E. Thrombocytes

22. During periodic health examination of the patient who had no physical complaint leukocytosis had been detected. The reason of this phenomenon is the fact that blood sample has been drawn after:

- A. Physical activity
- B. Mental work
- C. Repose at the resort
- D. Large consumption of water
- E. Consumption of alcohol

23. A child has been detected helminthes. What changes in peripheral blood would be observed?

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

24. A child is 5 years old. Which physiological peculiarity will you count?

- A. The count of neutrophils and lymphocytes is the same
- B. The count of neutrophils is larger than the one of lymphocytes
- C. Erythropenia
- D. Thrombocytosis
- E. The count of lymphocytes is larger than the one of neutrophils

25. Blood examination of the patient who had been administered to the hospital indicated increase of blood sedimentation rate. What is the reason of this change?

- A. Inflammatory process
- B. Acute situational reaction
- C. Food consumption
- D. Intensive physical activity
- E. Loss of blood

26. Determination of leukogram is a significant part of clinical research study. What does it indicate?

- A. Percentage of divergent types of white blood cells
- B. Systemic white blood cell count
- C. Percentage of granular leukocytes and agranular leukocytes

- D. Percent of white blood cells in relation to Systemic white blood cell count
- E. Percentage of granular leukocytes

27. The doctor has arranged medical examination of the workers after fulfillment of heavy work in order to estimate adaptation for physical activity. What changes of clinical blood analysis can be observed?

- A. Relative leukocytosis
- B. Leukopenia
- C. Anaemia
- D. Hypoalbuminemia
- E. Shift of the leukogram to the left

28. The patient has been suffering from bronchial asthma for a long period of time. What changes of leukogram can the doctor find while examining the patient?

- A. Eosinophilia
- B. Basophilia
- C. Leukocytosis
- D. Leukopenia
- E. Shift of the leukogram to the left

29. An increased count of eosinophiles (12%) of the patient (12 years old) has been detected. Choose the state in which this phenomenon is observed:

- A. Ascariasis
- B. General toxic syndrome
- C. Pulmonary fever
- D. Immunodeficiency
- E. Acute respiratory virus infection

30. Clinical studies of blood are recommended to be run at fasting state in the morning. What blood components changes are possible, if we take the blood sample postprandially?

- A. increase in the number of leukocytes
- B. increase in the number of red blood cells
- C. Increase in the level of plasma proteins
- D. decrease in the number of platelets
- E. decrease in the number of red blood cells

31. Lymphocytes and other cells of our body synthesize universal antiviral agents as a response to viral invasion. Name these protein factors:

- A. Interferon
- B. Interleukin – 2
- C. Cytokines

## BLOOD TYPING, HAEMOSTASIS

- D. Interleukin – 4
- E. Tumor necrosis factor

1. Primipregnancy of a woman with Rh-negative blood led to rhesus incompatibility. Why did that happen?

- A. Anti-rh antibodies changed
- B. pH of blood changed
- C. Blood sedimentation rate changed
- D. Packed cell volume changed
- E. Shift of leucogram took place

2. Four blood groups are detected by antigenic specificity of:

- A. Red blood cells
- B. White blood cells
- C. Thrombocytes
- D. Neutrophils
- E. Eosinophiles

3. Blood group of pregnant woman had been detected. Hemagglutination reaction took place with test serums of I (0) and B (III) groups and did not with test serum of A (II) group. The examined blood belongs to ... group.

- A. A(II)
- B. 0(I)
- C. B(III)
- D. AB(IV)
- E. None of the answers is correct

4. The patient with AB(IV) Rh (-) blood group needs repeated blood transfusion. Two months ago he was transfused donor's blood. Why cannot the patient be transfused the blood from the same donor?

- A. Immunization of the certain blood system has already taken place
- B. Immunization in AB system has already taken place
- C. Immunization in Rh system has already taken place
- D. Immunization in AB0 and Rh system has already taken place
- E. Immunization in one of the 20 systems of red blood cells has already taken place

5. In which blood group are A and B agglutinogens absent?

- A. The first

- B. The second
- C. The third
- D. The forth
- E. That is impossible

6. According to intravital indications the patient with Rh-negative had been transfused new blood of the first group. The patient died at the result of incompatible blood transfusion reaction. What was the doctor's mistake?

- A. The doctor did not find out whether the blood had been earlier transfused including patient's Ph(-)
- B. The patient should have been transfused the IV blood group
- C. The blood should have been transfused to the artery but not to the vein
- D. The blood should have been warmed up to the temperature of the body
- E. The blood of the close relative should have been transfused

7. While defining the blood group according to AB0 system test serums of I and II groups caused hemagglutination reaction of the examined blood while test serum of III group did not. Which agglutinogens are present in these red blood cells?

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

8. "Yes" response of agglutination with anti-B and anti-D reagents had been detected while defining blood group of the patient with the help of monoclonal reagents test. What is the blood group of the patient?

- A. B (III)Rh+
- B. A (II)Rh
- C. B (III)Rh-
- D. A (II)Rh-
- E. 0 (I)Rh+

9. The following results have been obtained while defining the blood group according to AB0 system test with the help of test serums: agglutination took place in the serums of I, II and III groups. What is the blood group?

- A. IV (AB)

- B. BIII (B)  
 C. II (A)  
 D. I (O)  
 E. It is impossible to define
10. Cardiac arrest took place at the result of transfusing large amount of citrated blood to the patient. What is the reason of this phenomenon?  
 A. Decrease of Ca<sup>2+</sup> in plasm  
 B. Increase of Na<sup>+</sup> in plasm  
 C. Decrease of K<sup>+</sup> in plasm  
 D. Increase of Ca<sup>2+</sup> in plasm  
 E. Increase of Na<sup>+</sup> in plasm
11. While examining the factors of blood-group specificity the blood of the III group of a new-born and of an adolescent was studied. What was the distinction of the blood of a new-born?  
 A. Absence of agglutinin matter in plasm  
 B. Absence of agglutinogens in membranes of red blood cells  
 C. Low agglutinin content I plasm  
 D. Presence of agglutinogens in membranes of red blood cells  
 E. Presence of agglutinogens in a different system
12. During the act of delivery a woman had been detected blood group due to loss of blood. Hemagglutination reaction took place with standard serums of O (I) and A (II) groups and it did not take place with standard serum of B (III) group. The examined blood belongs to:  
 A. B (III)  
 B. O (I)  
 C. A (III)  
 D. AB (IV)  
 E. It is impossible to define
13. A pregnant woman had been detected the blood group. Hemagglutination reaction took place with standard serums of O (I) and B (III) groups and it did not take place with standard serum of A (II) group. The examined blood belongs to:  
 A. A(II)  
 B. O(I)  
 C. B(III)  
 D. AB(IV)  
 E. None of the answers is correct

14. A man (30) years old was detected blood group before surgical intervention. Hemagglutination reaction took place with standard serums of O (I), A (II) B (III) groups. The examined blood belongs to:  
 A. O (I)  
 B. A(II)  
 C. B(III)  
 D. AB(IV)  
 E. None of the answers is correct
14. While defining the blood group according to ABO system test serums of I and II groups caused hemagglutination reaction of the examined blood while test serum of III group did not. What is the blood group?  
 A. B (III) alpha  
 B. A (II) beta  
 C. AB (IV)  
 D. O (I) alpha beta  
 E. It is impossible to define
15. While defining the blood group of the patient (33 years old) test serums of I and II groups caused hemagglutination reaction of the examined blood while test serum of III group and Anti-rh serum did not. Blood of which group may be transfused in case of necessity considering the system of rhesus blood factor?  
 A. III (B) Rh –  
 B. II (A) Rh –  
 C. I (O) Rh+  
 D. IV (AB) Rh+  
 E. IV (AB) Rh –
16. At the result of gastric hemorrhage the patient lost about 2 l of blood. It was defined that O (I) blood is Rh-negative. With the substitutive goal the doctor transfused 1 l of O(I) Rh-positive blood. What will be the most probable consequences of the transfusion?  
 A. Immunization of recipient by Rh-agglutinogens of the donor  
 B. Degradation of red blood cells of the donor  
 C. Degradation of red blood cells of the recipient  
 D. Blood clot formation  
 E. Increase of blood coagulability
17. A pregnant woman had been transfused blood of the group of ABO, Rh+ system for

- the first time. Yet the effect of incompatible blood transfusion reaction appeared. What was the doctor's mistake?  
 A. Rhesus blood factor of the blood was not examined  
 B. Anticoagulant factors were not included  
 C. More than 500 ml of blood were transfused  
 D. Hematocrit was not defined  
 E. Time of blood coagulation according was not counted
18. After blood donation the donor feels thirst. What is the warning agent?  
 A. Angiotensin  
 B. Aldosterone  
 C. Antidiuretic hormone  
 D. Epinephrine  
 E. Norepinephrine
19. Ferrihemoglobin (a compound in which ferrous iron turns into ferric iron) appears at the result of strong oxidizers' getting into the blood. What can the doctor do to save the patient?  
 A. Arrange exchange transfusion  
 B. Allow to breath medical grade air  
 C. Take the patient to the open air  
 D. Use respiratory center stimulators  
 E. Set the patient at rest and get him into the bed
20. After serious surgical intervention a woman (38 years old) was transfused packed red blood cells of the same group in the volume of 800 ml. What changes of blood will most probably be observed?  
 A. Hematocrit will increase  
 B. Hematocrit will decrease  
 C. Blood sedimentation rate will increase  
 D. Blood sedimentation rate will decrease  
 E. Globular value will increase
21. During surgery, there was a need of massive blood transfusion. Patient's blood type is III (B) Rh+. What kind of donor should be chosen?  
 A. III (B) Rh+  
 B. I (O) Rh-  
 C. II (A) Rh+  
 D. IV (AB) Rh-  
 E. III (B) Rh-

22. While determining the blood type by the ABO system with using the standard sera were obtained the following results: agglutination occurred in I, II and III serum types. What type of the blood that is being analysed?  
 A. IV (alpha, beta)  
 B. III (alpha)  
 C. II (beta)  
 D. I (O)  
 E. it's impossible to determine
23. In a person, due to physical load there increased the rate of blood clotting. The reason for this was the increase in the blood the concentration of:  
 A. Adrenaline  
 B. Thyroxine  
 C. Growth Hormone  
 D. Cortisol  
 E. plasmins
24. What should be added to a donor's blood sample, canned with sodium citrate, in attempt to induce clotting?  
 A. calcium ions.  
 B. sodium ions  
 C. Prothrombin  
 D. Vitamin K  
 E. Fibrinogen
25. In a human, as a result of physical activity increased the rate of blood clotting. The reason for this is the increased concentration in the blood:  
 A. Adrenaline  
 B. Thyroxine  
 C. Growth Hormone  
 D. Cortisol  
 E. Plasmin
26. What should be added to the donor blood, canned with sodium citrate, to induce clotting?  
 A. Calcium ions  
 B. Sodium ions  
 C. Prothrombin  
 D. Vitamin K  
 E. Fibrinogen
27. Patient after liver disease was found to decrease the content of prothrombin in the blood. It will, first of all, lead to violation of:  
 A. second phase of coagulation.  
 B. First phase koagulyatsyngo hemostasis.



- C. vascular-platelet hemostasis.  
 D. fibrinolysis.  
 E. anticoagulant properties of blood
28. The patient has slowed down the process of blood coagulation, which threatens a large blood loss during surgery. What might be the cause of mitigating the coagulation system?  
 A. increased activity of anticoagulation  
 B. increase in the amount of fibrinogen in the blood  
 C. increase in the amount of adrenaline in the blood  
 D. increased tone of the parasympathetic system  
 E. trigger is activated Hageman factor
29. With age, the walls of blood vessels are formed cholesterol «plaques». Why in the presence of «plaques» increases the likelihood of thrombus formation within the vessel?  
 A. destruction of platelets and erythrocytes takes place  
 B. reversible platelet aggregation takes place  
 C. it is formed blood plasminogen activator  
 D. it is activated factor XII  
 E. increased Ca ++ levels in the blood
30. To stop bleeding in trauma, it is important to determine the type of damaged vessels. Why normally venous blood color is different from the arterial?  
 A. it contains deoxyhemoglobin  
 B. it contains a lot of metabolites  
 C. it contains a lot of salts in plasma  
 D. contains a lot of carbon dioxide  
 E. it contains low glucose
31. By transfusion of citrated blood to the patient after the injury the doctor didn't take into account the fact that this blood does not clot and bleeding does not stop. What the doctor did not consider?  
 A. absence of Ca<sup>2+</sup> in such blood  
 B. of K<sup>+</sup>  
 C. Na<sup>+</sup>  
 D. Mg<sup>2+</sup>  
 E. Fe<sup>2+</sup>
32. In the blood after microvascular injury increased content of thromboxane A<sub>2</sub>, which led to a decrease in bleeding time due

- to accelerated hemostasis during the development of phase:  
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 B. platelet adhesion  
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 A. Blood clotting  
 B. erythrocyte sedimentation rate  
 C. formation anticoagulants  
 D. formation erythropoietin  
 E. oncotic pressure of the blood
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 B. Potassium.  
 C. Magnesium.  
 D. chlorine.  
 E. Sodium.
36. The patient in the transfusion of large amounts of citrated blood there stopped the activity of the heart. Specify the possible mechanism of the changes obtained:  
 A. Lack of calcium ions in the blood  
 B. excess of iron  
 C. lack of fibrinogen  
 D. Excess of erythrocytes  
 E. Circulating immune complexes
37. In the clinic there is a man 49 years old with a significant increase in blood clotting time, gastrointestinal bleeding, subcutaneous

- bleeding. Lack what vitamin can be the reason of these symptoms?  
 A. K  
 B. B1  
 C. PP  
 D. H  
 E. E
38. Before blood sampling in experimental rats, which have very high rate of bleeding, there sometimes administered heparin. For what purpose?  
 A. Increase anticoagulation  
 B. Lower anticoagulation  
 C. Increased coagulation  
 D. Increase fibrinolysis  
 E. Reduction of fibrinolysis
39. In the damage of the vessel wall there also destroyed blood cells. What come out from destroyed platelets?  
 A. factors education prothrombinase  
 B. heparin  
 C. thrombin  
 D. Rh - factor  
 E. plasminogen
40. The patient complains of increased bleeding, bleeding that occur under minor injuries. What substances can contribute to bleeding while increasing in their content in the blood?  
 A. heparin  
 B. thromboplastin  
 C. histamine  
 D. Serotonin  
 E. plasminogen
40. In a patient with liver disease was found a decrease in the blood fibrinogen. What phase of hemostasis was violated in this case?  
 A. third phase of hemocoagulation hemostasis  
 B. retraction of platelet thrombus  
 C. platelet adhesion  
 D. formation of prothrombinase  
 E. platelet aggregation
41. In a patient with thrombosis of the left shin was found a decrease in the activity of the blood anticoagulation system. The content of what factor of the following can be reduced in the blood?

- A. antithrombin  
 B. prothrombin  
 C. trombostenin  
 D. fibrinogen  
 E. histamine
42. A person, 40 years old, with a body weight of 80 kg during stress revealed the total blood coagulation time was 2 min, that was a result of the action on hemocoagulation primarily:  
 A. catecholamines.  
 B. Cortisol.  
 C. Aldosterone.  
 D. Growth Hormone.  
 E. Vasopressin.
43. The patient has high activity of prothrombin, there is a danger of thrombosis. What anticoagulant we should apply in this case?  
 A. Heparin.  
 B. sodium oxalate.  
 C. potassium oxalate.  
 D. Sodium citrate  
 E. Ethylene diamine tetraacetate.
44. Patients after liver disease was found to decrease prothrombin in the blood. What are the stages and phases of hemostasis violated in this case?  
 A. second phase of coagulation  
 B. platelet aggregation  
 C. platelet adhesion  
 D. platelet clot retraction  
 E. the third phase of coagulation
45. At what stage of vascular-platelet hemostasis trombostenin acts?  
 A. Retraction of platelet thrombus formation.  
 B. reflex vasospasm.  
 C. platelet adhesion.  
 D. Reversible aggregation of platelets.  
 E. Irreversible aggregation of platelets.
46. In a patient with Hageman factor deficiency there found infringements of fibrinolysis. Which of these factors activates fibrinolysis by internal mechanism?  
 A. XIIa  
 B. III  
 C. VIIa  
 D. XIa  
 E. IXa.

47. In a patient with minor mechanical injuries appear bruising. What could cause this phenomenon?

- A. Thrombocytopenia
- B. eritropeniya
- C. Leukopenia
- D. lymphocytosis
- E. Decrease in hemoglobin content.

48. A patient, by a physician's prescriptions, takes coagulants. What clinical analysis of the blood is required at the same time?

- A. Determination of the main indicators of coagulation
- B. Quantification of erythrocyte
- C. Determination of leukocytes
- D. Quantification of haematocrit
- E. Definition of ESR.

49. After applying a tourniquet were found petechiae. With dysfunction of which blood cells is it connected?

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

50. Coagulation and anticoagulation mechanisms are regulated by the nervous system. How does react the process of blood coagulation by increasing the tone of the sympathetic nervous system?

- A. coagulation intensifies
- B. coagulation falters
- C. coagulation will not change
- D. activating of anticoagulant system
- E. depressing of antifibrinolytic system

51. Prior to the surgery was revealed that a person increased in bleeding time to 15 minutes. Deficit of what elements in the blood can be responsible for these changes?

- A. Platelets
- B. erithrocytes
- C. Lymphocytes
- D. Leukocyte
- E. Monocytes

52. In a boy of 16 years, after the disease was reduced the function of protein synthesis in the liver due to the lack of vitamin K, which lead primarily to a breach in:

- A. Blood clotting

- B. erythrocyte sedimentation rate
- C. formation of anticoagulants
- D. formation of erythropoietin
- E. blood osmotic pressure

53. When de fining blood group according to the AB0 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)

54. Determining a patient's blood group with monoclonal test-reagents revealed positive agglutination reaction to anti-A and antiB reagents, and negative reaction to anti-D. What blood group does this patient have?

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

55. During determining the blood group according to the AB0 system with salt solutions of monoclonal antibodies agglutination did not occur with any of the solutions. What blood group is it?

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

56. A patient is diagnosed with hereditary coagulopathy that is characterised by factor VIII deficiency. Specify the phase of blood clotting during which coagulation will be disrupted in the given case:

- A. Thromboplastin formation
- B. Thrombin formation
- C. Fibrin formation
- D. Clot retraction
- E. -

57. A woman with the III (B), Rh- blood group gave birth to a child with the II (A) blood group. The child is diagnosed with hemolytic disease of newborn caused by rhesus incompatibility. What blood group and Rh can the father have?

## HIGHER NERVOUS ACTIVITY

- A. II (A), Rh+
- B. I (0), Rh+
- C. III (B), Rh+
- D. I (0), Rh-
- E. II (A), Rh-

1. A man has memorized a telephone number for a short period of time (a couple of minutes). Having phoned to the subscriber he could not remember the sequence of numbers any more. Which type of memory was the basis of this memorizing process?

- A. Inermediate memory
- B. Immediate memory
- C. Short-term memory
- D. Long-term memory
- E. Secondary and tertiary memory

2. What type of inhibition appears when the man spends to much time in the room with high rate of noise?

- A. Protective
- B. Conditional
- C. Differentiating
- D. Extinctive
- E. Internal

3. Behavior salivary reflex in respond to the call disappears when:

- A. The caused reflex is not supported by food
- B. Pyramidal tract is damaged
- C. Retinal separation takes place
- D. Spinal medulla is damaged at L2-L4
- E. Quadriceps muscle of thigh takes place

4. A woman (15 years old) delivered a baby and gave it away to an orphan asylum because of social problems. However in a short time she felt an inexpugnable desire to take it back home. Which instinct stimulates this desire most probably?

- A. Parental
- B. Sexual
- C. Imitating
- D. Salutary
- E. Zoo social

5. The patient is being in suspended animation. Which of the following sphincters can be regulated consciously but cannot be regulated in comatose state?

- A. External proctal
- B. Internal proctal
- C. Pyloric
- D. Cardiac
- E. Ileocecal

6. The patient was being dreaming when he was awoken. In which sleep phase was he awoken?

- A. Paradoxical phase
- B. Synchronized sleep
- C. Soporific phase
- D. Lethargic phase
- E. Somnific phase

7. I. Pavlov concluded that higher nervous activity type is defined by the strengh, bakance and mobility of excitative and inhibitory processes of central nervous system. The strengh of excitative process of the animal/human can be examined by way of:

- A. Forming behavior reflex
- B. Causing neurosis
- C. Inhibiting behavior reflex
- D. Examining fatigue rate
- E. Registering electroencephalogram

8. Sensory aphasia has been detected while examining an elderly patient. Which zone of cerebral cortex has been damaged?

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

9. Alpha-rhythm had been detected on electroencephalogram of cervical leads. What is the patient's state?

- A. Repose with the eyes closed
- B. Deep sleep
- C. Repose with the open eyes
- D. Acute situational condition
- E. Anesthetized state

10. The basis of the spectator's perceiving visual images and actions in the movie is:

- A. Short-term memory
- B. Immediate memory
- C. Sensory memory
- D. Long-term memory
- E. Verbal logic memory

11. Systemic arterial tension of the student who had suddenly seen his girlfriend increased. Intensified realization of which reflexes caused this arterial tension change?

- A. Behavior sympatic
- B. Behavior parasympathetic
- C. Behavior sympatic and parasympathetic
- D. Inborn parasympathetic
- E. Inborn sympatic

12. After cerebral accident a man (60 years old) had a prolonged sleep. Defect of which structures of central neural system most probably led to this effect?

- A. Ascending part of reticular substance
- B. Substantia nigra
- C. Little brain
- D. Precentral gyrus
- E. 5-9 pares of cranial nerves

13. What type of behavior reflex inhibition is formed when disconfirmation of excitor that resembles the main conditioned signal takes place?

- A. Differentiating
- B. Extinctive
- C. Protective
- D. Delayed
- E. Conditional

14. Examination that concerns cerebral cortex function is taking place in the hospital. Delta rhythm is registered on encephalogram. What is the patient's state?

- A. Slow wave sleep
- B. Sleep onset
- C. The process of solving mathematical equation
- D. Visual stimuli analyze
- E. Paradoxical sleep

15. During wakefulness and absence of hard headwork ... is predominantly registered on electroencephalogram.

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

16. Decrease of reflectory activity is observed when strong long-lasting excitors influence the organism. What is the leading inhibitory process?

- A. Protective inhibition
- B. Extinctive inhibition

- C. Delayed inhibition
- D. Differentiating inhibition
- E. Conditional inhibition

17. Which temper according to Hippocrates's classification corresponds to weak type of nervous system according to Pavlov?

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

18. To which specific type of higher nervous activity does simultaneous predominance of I and II signal system belong?

- A. Artistic thinking type
- B. Artistic
- C. Thinking
- D. Introvert
- E. Extravert

19. To which specific type of higher nervous activity does predominance of I signal system over the II one belong?

- A. Artistic
- B. Middle
- C. Thinking
- D. Artistic thinking
- E. None of the answers is correct

20. To which specific type of higher nervous activity does predominance of II signal system over the I one belong?

- A. Thinking
- B. Artistic thinking
- C. Middle
- D. Extravert
- E. Artistic

21. Damage of short-term memory of the patient is observed after the trauma. Which of the following memorizing mechanisms is most probably damaged?

- A. Reverberation of closed loop cycle of neurons
- B. Structure function change of synaptic junction of central nervous system
- C. Ion shifts in receptor membranes
- D. Ion shifts in sensory neurons
- E. Structural changes in neurons

22. At the result of cerebral accident the lower part of the third frontal gyrus of the

left cerebral hemisphere was damaged. What are the possible consequences?

- A. Defect of performance of the oral speech
- B. Defect of understanding of the oral speech
- C. Defect of count
- D. Defect of performance of the written language
- E. Defect of understanding of the written language

23. A patient consulted the doctor complaining on bad memorizing of new information. Damage of functioning of which neurotransmitter systems may cause these symptoms?

- A. Cholinergic
- B. Serotonergic
- C. Adrenergic
- D. GABA-ergic
- E. Glutamnergic

24. A woman complains on insomnia. Damage of functioning of which neurotransmitter systems may cause this symptoms?

- A. Adrenergic
- B. Serotonergic
- C. GABA-ergic
- D. Cholinergic
- E. Glutamnergic

25. An animal had been formed behavior food reflex on audible signal of 100 hz during the experiment. The other signals like the ones of 900 hz or 1100 hz do not cause the reflex. What is the reason of this phenomenon?

- A. Differentiating inhibition
- B. External inhibition
- C. Protective inhibition
- D. Extinctive inhibition
- E. Delayed inhibition

26. A man (67 years old) has the damage of oral speech performance, but he understands the speech normally. Which structure of the brain is most probably damaged?

- A. Back part of frontal gyrus on the left
- B. Occipital lobe
- C. Temporal lobe on the right
- D. Postcentral gyrus
- E. Precentral gyrus

27. A man (55 years old) has the damage of speech reception, but oral speech perform-

ance is normal. Which structure of the brain is most probably damaged?

- A. Back part of temporal gyrus on the left
- B. Frontal lobes
- C. Occipital lobes
- D. Precentral gyrus on the right
- E. Postcentral gyrus on the left

28. A man was sitting in the armchair with his eyes closed when the phone rang. How will his electroencephalogram change?

- A. Alpha rhythm will turn into beta rhythm
- B. Beta rhythm will turn into theta rhythm
- C. Alpha rhythm will increase
- D. Theta rhythm will increase
- E. Theta rhythm will turn into alpha rhythm

29. Ataxic aphasia has been detected at the result of examination of an elderly patient. Where is the lesion of the brain located?

- A. In Broca's center
- B. In Heschl gyrus
- C. In angular gyrus
- D. Postcentral gyrus
- E. Precentral gyrus

30. The man sitting with eyes closed, it's been recorded electroencephalogram (EEG). What rhythm appears on the EEG if a loud sound is given?

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

31. Loud sound during conditioned reflex activity led to its inhibition. Indicate the type of inhibition, which reasoned the case:

- A. External
- B. Beyond
- C. The extinguishing
- D. differentiation
- E. belatedly

32. The patient from stroke damaged the rear of the first temporal gyrus of the left hemisphere (Wernicke's center). What consequences will this lead to?

- A. Inability in understanding the speech
- B. Inability to calculate
- C. Inability to playback the speech
- D. Inability to write
- E. Breach of understanding the written language

## Krok - test

What kind of muscle contraction occurs in an upper limb during an attempt to lift a load beyond one's strength?

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

A 3-year-old boy with pronounced hemorrhagic syndrome has no anti-hemophilic globulin A (factor VIII) in the blood plasma. Hemostasis has been impaired at the following stage:

- A. Internal mechanism of prothrombinase activation
- B. External mechanism of prothrombinase activation
- C. Conversion of prothrombin to thrombin
- D. Conversion of fibrinogen to fibrin
- E. Blood clot retraction

A person is in a room with air temperature of 38°C and relative air humidity of 50%. What type of heat transfer ensures maintenance of constant body core temperature under these conditions?

- A. Evaporation
- B. Radiation
- C. Conduction and convection
- D. Convection
- E. -

Electrical activity of neurons is being measured. They fire prior to and at the beginning of inhalation. Where are these neurons situated?

- A. Medulla oblongata
- B. Diencephalon
- C. Mesencephalon
- D. Spinal cord
- E. Cerebral

Investigation of an isolated cardi-ac myocyte determined that it does not generate excitation impulses automatically, which means this cardiac myocyte was obtained from the following cardiac structure:

- A. Ventricles
- B. Sinoatrial node

- C. Atrioventricular node
- D. His' bundle
- E. Purkinje's fibers

A man presents with glomerular filtration rate of 180 ml/min., while norm is  $\pm 25$  ml/min. The likely cause of it is the decreased:

- A. Plasma oncotic pressure
- B. Effective filtration pressure
- C. Hydrostatic blood pressure in the glomerular capillaries
- D. Renal blood flow
- E. Permeability of the renal filter

During experiment a part of the brain was extracted, which resulted in asynergy and dysmetria development in the test animal. What part of the brain was extracted in the animal?

- A. Cerebellum
- B. Frontal lobe
- C. Parietal lobe
- D. Mesencephalon
- E. Reticulum

A woman with the III (B), Rh (-) blood group gave birth to a child with the II (A) blood group. The child is diagnosed with hemolytic disease of newborn caused by rhesus incompatibility. What blood group and Rh are likely in the father?

- A. II (A), Rh (+)
- B. I (0), Rh (+)
- C. III (B), Rh (+)
- D. I (0), Rh (-)
- E. II (A), Rh (-)

A short-term physical load resulted in reflex increase of heart rate and systemic arterial pressure in a person. What receptor activation was the most contributory to inducing the pressor reflex?

- A. Proprioceptors of the working muscles
- B. Vascular chemoreceptors
- C. Vascular volume receptors
- D. Vascular baroreceptors
- E. Hypothalamic thermoreceptors

During experiment a skeletal muscle is being stimulated with a series of electrical impulses. What type of muscular contraction

will develop, if each following impulse occurs within the relaxation period after the previous single contraction of the muscle?

- A. Incomplete tetanus
- B. Smooth tetanus
- C. Series of single contractions
- D. Muscle contracture
- E. Asynchronous tetanus

A 16-year-old girl fainted when she tried to quickly change her position from horizontal to vertical. What caused the loss of consciousness in the girl?

- A. Decreased venous return
- B. Increased venous return
- C. Increased central venous pressure
- D. Decreased oncotic plasma pressure
- E. Increased arterial pressure

Blood test of an athlete shows the following: erythrocytes -  $5,5 \cdot 10^{12}/l$ , hemoglobin - 180 g/l, leukocytes -  $7 \cdot 09/l$ , neutrophils - 64%, basophils - 0,5%, eosinophils - 0,5%, monocytes - 8%, lymphocytes - 27%. These values primarily indicate the stimulation of:

- A. Erythropoiesis
- B. Leukopoiesis
- C. Lymphopoiesis
- D. Granulocytopenia
- E. Immunogenesis

Experimental stimulation of the sympathetic nerve branches that innervate the heart caused an increase in the force of heart contractions because the membrane of typical cardiomyocytes permitted an increase in:

- A. Calcium ion entry
- B. Calcium ion exit
- C. Potassium ion exit
- D. Potassium ion entry
- E. Calcium and potassium ion exit

The patient's ECG shows that in the second standard lead from the extremities the P waves are positive, their amplitude is 0,1 mV (norm is 0,05-0,25 mV), duration - 0,1 seconds (norm is 0,07-0,10 seconds). It can be concluded that the following process occurs normally in the cardiac atria:

- A. Depolarization
- B. Repolarization
- C. Activation

- D. Contraction
- E. Relaxation

Pupil dilation occurs when a person steps from a light room into a dark one. What reflex causes such a reaction?

- A. Sympathetic unconditioned reflex
- B. Sympathetic conditioned reflex
- C. Metasympathetic reflex
- D. Parasympathetic unconditioned reflex
- E. Parasympathetic conditioned reflex

A patient had a trauma that caused dysfunction of motor centers regulating activity of head muscles. These centers can normally be located in the following area of the cerebral cortex:

- A. Inferior part of the precentral gyrus
- B. Superior part of the precentral gyrus
- C. Supramarginal gyrus
- D. Superior parietal lobule
- E. Angular gyrus

A person with vitamin A deficiency develops twilight vision disturbance. Name the cells that fulfill this photoreceptor function:

- A. Rod cells
- B. Horizontal cells of retina
- C. Bipolar neurons
- D. Cone cells
- E. Ganglionic nerve cells

In hot weather ventilators are often used to normalize the microclimate in the heated rooms. It leads to intensified heat transfer from the human body by means of:

- A. Convection
- B. Conduction and convection
- C. Conduction
- D. Radiation
- E. Evaporation

Cell membrane rest potential changed from -85 to -90 mV. It can be caused by activation of the following cell membrane channels:

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

During training session in the laboratory the students were performing spirometry

on themselves. What indicator CANNOT be measured with this method?

- A. Functional residual capacity
- B. Vital capacity
- C. Respiratory minute volume
- D. Respiration rate
- E. Maximal breathing capacity

A 30-year-old woman developed the signs of virilism (body hair growth, balding temples, disturbed menstrual cycle). What hormone can cause this condition when hyperproduced?

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

During the sports competition a boxer received a strong blow to the abdomen, which caused a knockout due to a brief drop in blood pressure. What physiological mechanisms are the cause of this condition?

- A. Stimulation of parasympathetic nerves
- B. Alteration of transcapillary exchange
- C. Ischemia of the central nervous system
- D. Abrupt change in body fluid volume
- E. Stimulation of sympathetic nerves

Corticosteroid hormones regulate the adaptation processes of the body as a whole to environmental changes and ensure the maintenance of internal homeostasis. What hormone activates the hypothalamo-pituitary-adrenal axis?

- A. Corticoliberin
- B. Somatoliberin
- C. Somatostatin
- D. Corticostatin
- E. Thyroliberin

On examination the patient is found to have low production of adrenocorticotropic hormone. How would this affect production of the other hormones?

- A. Decrease adrenocorticotropic hormones synthesis
- B. Decrease hormone synthesis in the adrenal medulla
- C. Decrease insulin synthesis
- D. Increase sex hormones synthesis
- E. Increase thyroid hormones synthesis

Parkinson's disease is caused by disturbance of dopamine synthesis. What brain structure synthesizes this neurotransmitter?

- A. Substantia nigra
- B. Globus pallidus
- C. Corpora quadrigemina
- D. Red nuclei
- E. Hypothalamus

Determining a patient's blood group with monoclonal test-reagents revealed positive agglutination reaction to anti-A and anti-B reagents, and negative reaction to anti-D. What blood group does this patient have?

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

During ascent into mountains a person develops increased respiration rate and rapid heart rate. What is the cause of these changes?

- A. Decrease of O<sub>2</sub> partial pressure
- B. Increase of C O<sub>2</sub> partial pressure
- C. Increase of blood pH
- D. Increase of nitrogen content in air
- E. Increase of air humidity

When taking exams students often have dry mouth. The mechanism that causes this state results from the following reflexes:

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

Atria of an experimental animal were superdistended with blood, which resulted in decreased reabsorption of Na<sup>+</sup> and water in renal tubules. This can be explained by the influence of the following factor on kidneys:

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

For people adapted to high external temperatures profuse sweating is not accompanied by loss of large volumes of sodium chloride.

This is caused by the effect the following hormone has on perspiratory glands:

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

The processes of heat transfer in a naked person at room temperature have been studied. It was revealed that under these conditions the greatest amount of heat is transferred by:

- A. Heat radiation
- B. Heat conduction
- C. Convection
- D. Evaporation
- E. —

Due to destruction of certain structures of the brainstem an animal has lost its orientation reflexes in response to strong light stimuli. What structures were destroyed?

- A. Anterior quadrigeminal bodies
- B. Posterior quadrigeminal bodies
- C. Red nuclei
- D. Vestibular nuclei
- E. Substantia nigra

Urine analysis has shown high levels of protein and erythrocytes in urine. This can be caused by the following:

- A. Renal filter permeability
- B. Effective filter pressure
- C. Hydrostatic blood pressure in glomerular capillaries
- D. Hydrostatic primary urine pressure in capsule
- E. Oncotic pressure of blood plasma

A patient has a traumatic injury of sternocleidomastoid muscle. This has resulted in a decrease of the following value:

- A. Inspiratory reserve volume
- B. Expiratory reserve volume
- C. Respiratory volume
- D. Residual volume
- E. Functional residual lung capacity

After a craniocerebral injury a patient has lost the ability to recognize shapes of objects by touch (stereognosis). What area of cerebral cortex normally contains the relevant center?

- A. Superior parietal lobule
- B. Inferior parietal lobule

- C. Supramarginal gyrus
- D. Postcentral gyrus
- E. Angular gyrus

Cardiac arrest occurred in a patient during a surgery of the small intestine. What regulatory mechanisms resulted in the cardiac arrest in this case?

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

Blood group of a 30-year-old man has been determined before a surgery. The blood was Rhesus-positive. Agglutination did not occur with standard 0(I), A (II), and B (III) serums. The blood belongs to the following group:

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

A patient has insufficient blood supply to the kidneys, which caused the development of pressor effect due to the constriction of arterial resistance vessels. This is the result of the vessels being greatly affected by the following substance:

- A. Angiotensin II
- B. Angiotensinogen
- C. Renin
- D. Catecholamines
- E. Norepinephrine

Experimental stimulation of sympathetic nerve branches that innervate heart caused an increase in force of heart contractions because membrane of typical cardiomyocytes permitted an increase in:

- A. Calcium ion entry
- B. Calcium ion exit
- C. Potassium ion exit
- D. Potassium ion entry
- E. Calcium and potassium ion exit

Microelectrode technique allowed to register a potential following "all-or-none" law and capable of undecremental spreading. Specify this potential:

- A. Action potential

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

A patient demonstrates functional loss of nasal halves of the retinas. What area of visual pathways is affected?

- A. Optic chiasm
- B. Left optic tract
- C. Right optic tract
- D. Left optic nerve
- E. Right optic nerve

A patient with injury sustained to a part of the central nervous system demonstrates disrupted coordination and movement amplitude, muscle tremor during volitional movements, poor muscle tone. What part of the central nervous system was injured?

- A. Cerebellum
- B. Medulla oblongata
- C. Olfactory bulb
- D. Mesencephalon
- E. Prosencephalon

A passenger of a fixed-run taxi 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

A patient with signs of osteoporosis and urolithiasis has been admitted to an endocrinology department. Blood test 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

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

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

Patient's systolic blood pressure is mm Hg, diastolic - 70 mm Hg. Such blood pressure is caused by decrease of the following factor:

- A. Pumping ability of the left heart
- B. Pumping ability of the right heart
- C. Aortic compliance
- D. Total peripheral resistance
- E. Vascular tone

During recording of a spirogram a patient calmly exhaled. How do we call the volume of air remaining in the lungs?

- A. Functional residual capacity
- B. Pulmonary residual volume
- C. Expiratory reserve volume
- D. Tidal volume
- E. Vital capacity of lungs

During experiment a dog has developed conditioned digestive reflex in response to a sound stimulus. This conditioned reflex will not be exhibited anymore after the extirpation of the following areas of the cerebral hemispheres:

- A. Temporal lobe on both sides
- B. Occipital lobe on one side
- C. Parietal lobe on both sides
- D. Temporal lobe on one side
- E. Occipital lobe on both sides

A laboratory experiment on a dog was used to study central parts of auditory system. One of the mesencephalon structures was destroyed. The dog has lost the orienting response to auditory signals. What structure was destroyed?

- A. Inferior colliculi of corpora quadrigemina
- B. Superior colliculi of corpora quadrigemina
- C. Substantia nigra
- D. Reticular formation nuclei
- E. Red nucleus

Prior to glucose utilization in cells it is transported inside cells from extracellular space through plasmatic membrane. This process is stimulated by the following hormone:

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

Glomerular filtration of a person, who has been starving for a long time, has increased by 20%. The most likely cause of filtration changes in the given conditions is:

- A. Decrease of blood plasma oncotic pressure
- B. Increase of systemic blood pressure
- C. Increase of renal filter permeability
- D. Increase of filtration factor
- E. Increase of renal plasma flow

When measuring power inputs of a person by the method of indirect calorimetry the following results were obtained: oxygen consumption is 1000 ml and carbon dioxide production is 800 ml per minute. The person under examination has the following respiratory coefficient:

- A. 0,8
- B. 1,25
- C. 0,9
- D. 0,84
- E. 1,0

A patient is diagnosed with hereditary coagulopathy that is characterised by factor VIII deficiency. Specify the phase of blood clotting during which coagulation will be disrupted in the given case:

- A. Thromboplastin formation
- B. Thrombin formation
- C. Fibrin formation
- D. Clot retraction
- E. -

A patient has insufficient blood supply to the kidneys, which has caused the development of pressor effect due to constriction of arterial resistance vessels. This condition results from the vessels being strongly affected by the following substance:

- A. Angiotensin II
- B. Angiotensinogen
- C. Renin
- D. Catecholamines
- E. Norepinephrine

A doctor asked a patient to make a deep exhalation after a normal inhalation. What muscles contract during such exhalation?

- A. Abdominal muscles
- B. External intercostal muscles
- C. Diaphragm
- D. Trapezius muscles
- E. Pectoral muscles

In a cat with decerebrate rigidity the muscle tone is to be decreased. This can be achieved by:

- A. Destruction of the vestibular nuclei of Deiters
- B. Stimulation of the otolithic vestibular receptors
- C. Stimulation of the vestibular nuclei of Deiters
- D. Stimulation of the vestibulocochlear nerve
- E. Stimulation of the ampullar vestibular receptors

Surface with an intact toad on it was inclined to the right. Tone of extensor muscles became reflexively higher due to the activation of the following receptors:

- A. Vestibuloreceptors of utricle and saccule
- B. Vestibuloreceptors of semicircular ducts
- C. Mechanoreceptors of foot skin
- D. Photoreceptors of retina
- E. Proprioceptors

A patient had a trauma that caused dysfunction of motor centres regulating activity of head muscles. In what parts of cerebral cortex can the respective centre normally be located?

- A. Inferior part of precentral gyrus
- B. Superior part of precentral gyrus
- C. Supramarginal gyrus
- D. Superior parietal lobule
- E. Angular gyrus

In the 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

During determining the blood group according to the ABO system with salt solutions of monoclonal antibodies agglutination did not occur with any of the solutions. What blood group is it?

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

During ventricular systole the cardiac muscle does not respond to additional stimulation because it is in the phase of:

- A. Absolute refractoriness
- B. Relative refractoriness
- C. Hyperexcitability
- D. Subnormal excitability
- E. There is no correct answer

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

- A. Na<sup>+</sup>
- B. K<sup>+</sup> and Cl<sup>-</sup>
- C. K<sup>+</sup> and Na<sup>+</sup>
- D. Ca<sup>2+</sup> and Cl<sup>-</sup>
- E. Ca<sup>2+</sup>

In an elderly person the change in heart force and vessels physical properties were detected; they can be clearly observed on graphic recording of carotid pulse waves. What method was applied?

- A. Sphygmography
- B. Plethysmography
- C. Rheography
- D. Myography
- E. Phlebography

Microelectrode analysis of nerve fiber bioelectrical activity revealed, that its membrane potential equals 90 mV. Its initial rest potential was 85 mV. What process occurs in this case?

- A. Hyperpolarization
- B. Depolarization
- C. Repolarization
- D. Overshoot
- E. Supernormality

Parkinson's disease is caused by disruption of dopamine synthesis. What brain structure synthesizes this neurotransmitter?

- A. Substantia nigra
- B. Globus pallidus
- C. Corpora quadrigemina
- D. Red nucleus
- E. Hypothalamus

Determining a patient's blood group with monoclonal test-reagents revealed positive agglutination reaction to anti-A and anti-B reagents, and negative reaction to anti-D.

What blood group does this patient have?

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

An experiment was aimed at testing flexor reflex in a spinal frog, which was initiated by simultaneous stimulation with isolated pre-threshold electrical impulses. The frequency of those impulses was such, that the reflex occurred. What process in the nerve centers can be observed during this experiment?

- A. Temporal summation
- B. Spatial summation
- C. Presynaptic summation
- D. Postsynaptic summation
- E. Threshold summation

A soldier with explosion-caused trauma was delivered to a hospital. Examination revealed his tympanic membrane to be intact. What defense reflex prevented the tympanic membrane from rupturing?

- A. Contraction of m. tensor tympani
- B. Relaxation of m. tensor tympani
- C. Contraction of m. auricularis anterior
- D. Relaxation of m. auricularis anterior
- E. Relaxation of m. stapedius

In a young man during exercise, the minute oxygen uptake and carbon dioxide emission equalled to 1000 ml. What substrates are oxidized in the cells of his body?

- A. Carbohydrates
- B. Proteins
- C. Fats
- D. Carbohydrates and fats
- E. Carbohydrates and proteins

A sportsman spontaneously held breath for 40 seconds, which resulted in an increase in heart rate and systemic arterial pressure. Changes of these indicators are due to activation of the following regulatory mechanisms:

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

An animal experiment is aimed at studying the cardiac cycle. All the heart valves are closed. What phase of the cycle is characterized by this status?

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

A patient has increased thickness of alveolar-capillary membrane caused by a pathologic process. The direct consequence will be reduction of the following value:

- A. Diffusing lung capacity
- B. Oxygen capacity of blood
- C. Respiratory minute volume
- D. Alveolar ventilation of lungs
- E. Expiratory reserve volume

After a craniocerebral injury a patient is unable to recognize objects by touch. What part of brain has been damaged?

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

As a result of a craniocerebral injury, a patient has a decreased skin sensitivity. What area of the cerebral cortex is likely to be damaged?

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

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

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

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

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

A 16-year-old female patient has fainted after quickly changing her body position from horizontal to vertical one. Which process from the ones listed below has caused the loss of consciousness in the first place?

- A. Decreasing venous return
- B. Increasing venous return
- C. Increasing central venous pressure
- D. Decreasing oncotic pressure of blood plasma
- E. Increasing arterial pressure

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

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 ion entry
- B. Calcium ion exit
- C. Potassium ion exit
- D. Potassium ion entry
- E. Calcium and potassium ion exit

In the course of an experiment adeno-hypophysis 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. Tropic hormones
- B. Thyroid hormones
- C. Somatotropin
- D. Cortisol
- E. Thyroxin

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

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

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.  $S_2 - S_4$
- B.  $Th_1 - Th_5$
- C.  $L_1 - L_2$
- D.  $Th_2 - Th_5$
- E.  $Th_1 - L_1$

When defining blood group according to the AB0 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. -

A patient complains of pain in the heart area during acute attack of gastric ulcer. What vegetative reflex can cause this painful feeling?

- A. Viscerovisceral reflex
- B. Viscerodermal reflex
- C. Visceromotor reflex
- D. Dermatovisceral reflex
- E. Motorvisceral reflex

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. Irritant receptors
- B. Juxtacapillary (J) receptors
- C. Stretch receptors of lungs
- D. Proprioceptors of respiratory muscles
- E. Thermoreceptors

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

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

A patient has the oxyhemoglobin dissociation curve shifted to the left. What blood changes induce this condition?

- A. Alkalosis, hypocapnia, temperature drop
- B. Acidosis, hypercapnia, temperature rise
- C. Acidosis, hypercapnia, temperature drop

- D. Acidosis, hypocapnia, temperature rise
- E. -

It has been experimentally proven that the excitation of the motor neurons of flexor muscles is accompanied by the inhibition of the motor neurons of extensor muscles. What type of inhibition underlies this phenomenon?

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

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

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

A patient with respiratory failure has blood pH of 7,35.  $pCO_2$  test revealed hypercapnia. Urine pH test revealed an increase in the urine acidity. What form of acid-base imbalance is the case?

- A. Compensated respiratory acidosis
- B. Compensated metabolic acidosis
- C. Decompensated metabolic acidosis
- D. Compensated respiratory alkalosis
- E. Decompensated respiratory alkalosis

The temperature in a production room is 36°C. Relative air humidity is 80%. Under these conditions the human body transfers heat mainly through:

- A. Sweat evaporation
- B. Heat conduction
- C. Radiation
- D. Convection
- E. -

As a result of a craniocerebral injury a patient has a 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

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. Parasympathetic unconditioned reflexes
- B. Sympathetic unconditioned reflexes
- C. Parasympathetic conditioned reflexes
- D. Sympathetic conditioned reflexes
- E. Peripheral reflexes

A pregnant woman underwent AB0 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. B(III)
- B. 0(I)
- C. A(II)
- D. AB(IV)

An attack of tachycardia that occurred in a patient was stopped by pressing on his eyeballs. Which of the following reflexes underlies this phenomenon?

- A. Aschner
- B. Goltz
- C. Bainbridge
- D. Hering
- E. Bernard's

A 35-year-old male developed acute heart failure while running for a long time. What changes in the 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

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. Vestibulospinal
- B. Medial corticospinal



- C. Reticulospinal
- D. Rubrospinal
- E. Lateral corticospinal

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

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. Ventricles
- B. Atria
- C. Atrio-ventricular node
- D. Right ventricle
- E. Left ventricle

To assess the effectiveness of breathing in patients, the indicator of functional residual capacity is used. It includes the following volumes:

- A. Expiratory reserve volume and residual volume
- B. Inspiratory reserve volume and residual volume
- C. Inspiratory reserve volume, tidal volume, residual volume
- D. Expiratory reserve volume and tidal volume
- E. Inspiratory reserve volume and tidal volume

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

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

During ventricular systole, the cardiac muscle does not respond to additional stimulation because it is in the phase of:

- A. Absolute refractoriness
- B. Relative refractoriness
- C. Hyperexcitability

- D. Subnormal excitability
- E. There is no correct answer

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

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

A patient who had been continuously taking drugs blocking the production of angiotensin II developed bradycardia and arrhythmia. A likely cause of these disorders is:

- A. Hyperkalemia
- B. Hypokalemia
- C. Hypernatremia
- D. Hypocalcemia
- E. Hypercalcemia

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. Adrenaline, vasopressin
- B. Cortisol
- C. Sex hormones
- D. Oxytocin
- E. Aldosterone

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 struc-

tures of the CNS are responsible for these cardiorespiratory reactions in this patient?

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

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. Decreased force of respiratory muscle contraction
- B. Gas composition of the air
- C. Physical build of a person
- D. Height of a person
- E. Body mass of a person

As a result of a cold a patient has the abnormal pain and temperature sensitivity of the frontal 2/3 of his tongue. Which nerve must have been damaged?

- A. Trigeminal
- B. Sublingual
- C. Accessory
- D. Vagus
- E. Glossopharyngeal

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

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

The temperature of the ambient environment is 38°C and relative air humidity is

50%. What ways of heat emission provide maintaining a constant temperature of the human body?

- A. Evaporation
- B. Radiation
- C. Heat conduction
- D. Convection
- E. Convection and conduction

A 30 year old woman has subnormal concentration of enzymes in the pancreatic juice. This might be caused by the hyposecretion of the following gastrointestinal hormone:

- A. Cholecystokininpancreozymin
- B. Somatostatin
- C. Secretin
- D. Gastro-inhibiting peptide
- E. Vaso-intestinal peptide

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

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. Angiotensin-II
- B. Vasopressin
- C. Adrenaline
- D. Noradrenaline
- E. Serotonin

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

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

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

Blood minute volume of a 30 year old woman at rest is 5 l/m. What blood volume is pumped through the pulmonary vessels per minute?

- A. 5 l
- B. 3,75 l
- C. 2,5 l
- D. 2,0 l
- E. 1,5 l

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. 10 l/min
- B. 5 l/min
- C. 4 l/min
- D. 6 l/min
- E. 7 l/min

A patient presents with the following motor activity disturbances: tremor, ataxia and asynergia movements, dysarthria. The disturbances are most likely to be localized in:

- A. Cerebellum
- B. Basal ganglions
- C. Limbic system
- D. Brainstem
- E. Medulla oblongata

A man has a considerable decrease in diuresis as a result of 1,5 l blood loss. The primary cause of such diuresis disorder is the hypersecretion of the following hormone:

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

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 this symptoms?

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

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. Insulin
- B. Glucagon
- C. Thyroxin
- D. Aldosterone
- E. Adrenalin

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

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

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

- A. Axons of motoneurons and axons of neurons of lateral horns

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

Atria of an experimental animal were super-distended by blood that resulted in decreased reabsorption of Na<sup>+</sup> 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-

Power inputs of a man were measured. In what state was this man if his power inputs were lower than basal metabolism?

- A. Sleep
- B. Relaxation
- C. Simple work
- D. Nervous tension
- E. Rest

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.

When measuring power inputs of a man by the method of indirect calorimetry the following results were obtained: 1000 ml oxygen consumption and 800 ml carbon dioxide liberation per minute. The man under examination has the following respiratory coefficient:

- A. 0,8
- B. 1,25
- C. 0,9
- D. 0,84
- E. 1,0

An isolated cell of human heart automatically generates excitement impulses with

frequency of 60 times per minute. This cell was taken from the following heart structure:

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

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. Carbohydrates
- B. Fats
- C. Proteins
- D. Cellulose
- E. Lactose

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 hydrostatic pressure of blood in veins
- B. Decrease in hydrostatic pressure of blood in veins
- C. Decrease in hydrostatic pressure of blood in arteries
- D. Increase in oncotic pressure of blood plasma
- E. Increase in systemic arterial pressure

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

A 5-month-old boy was hospitalized for tonic convulsions. He has a life-time history of this disease. Examination revealed coarse hair, thinned and fragile nails, pale and dry skin. In blood: calcium - 1,5 millimole/l, phosphor - 1,9 milli-mole/l. These changes are associated with:

- A. Hypoparathyroidism
- B. Hyperparathyroidism

- C. Hyperaldosteronism
- D. Hypoaldosteronism
- E. Hypothyroidism

A 64 year old woman has impairment of twilight vision (hemeralopy). What vitamin should be recommended in the first place?

- A. A
- B. B<sub>2</sub>
- C. E
- D. C
- E. B6

A doctor asked a patient to breath out fully after taking a normal breath. What muscles contract during such exhalation?

- A. Abdominal muscles
- B. External intercostal muscles
- C. Diaphragm
- D. Trapezius muscles
- E. Pectoral muscles

A patient presents with dysfunction of cerebral cortex accompanied by epileptic seizures. He has been administered a biogenic amine synthesized from glutamate and responsible for central inhibition. What substance is it?

- A. Gamma-amino butyric acid
- B. Serotonin
- C. Dopamine
- D. Acetylcholine
- E. Histamine

Heart rate of a 30-year-old man under emotional stress reached 112 bpm. The reason for the heart rate increase is the altered condition of the following conducting system of heart:

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

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. Catecholamines
- B. Sympathetic unconditioned reflexes
- C. Parasympathetic unconditioned reflexes

- D. Sympathetic conditioned reflexes
- E. Parasympathetic conditioned reflexes

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

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

A 30-year-old male patient with acute pancreatitis has been found to have a disorder of cavitory protein digestion. The reason for such condition can be the hyposynthesis and hyposecretion of the following enzyme:

- A. Tripsin
- B. Pepsin
- C. Lipase
- D. Dipeptidase
- E. Amylase

A coprological survey revealed light-colored feces containing drops of neutral fat. The most likely reason for this condition is the disorder of:

- A. Bile inflow into the bowel
- B. Gastric juice acidity
- C. Pancreatic juice secretion
- D. Intestinal juice secretion
- E. Intestinal absorption

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

- A. Gonadotropic hormone
- B. Vasopressin
- C. Thyrotrophic hormone

- D. Somatotropic hormone
- E. Ocytocin

During preparation of a patient to a heart surgery it was necessary to measure pressure in heart chambers. In one of them pressure varied from 0 mm Hg up to 120 mm Hg within one cardiac cycle. What heart chamber is it?

- A. Left ventricle
- B. Right ventricle
- C. Right atrium
- D. Left atrium
- E. -

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. Vital capacity of lungs
- C. Inspiratory reserve volume
- D. Expiratory reserve volume
- E. Total lung capacity

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

As a result of continuous starvation the glomerular filtration rate has increased by 20%. The most probable cause of the glomerular filtration alteration under the mentioned conditions is:

- A. Decrease in the oncotic pressure of blood plasma
- B. Increase in the systemic arterial pressure
- C. Increase in the permeability of the renal filter
- D. Increase of the filtration quotient
- E. Increase of the renal blood flow

Which way of heat emission by the bodies of greenhouse workers is the most effective at the temperature of 36°C degrees and relative humidity of 70%?

- A. Liquid evaporation

- B. Thermal conduction
- C. Heat radiation
- D. Convection
- E. -

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. Left half of both eyes retina
- B. Right 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

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

A patient is 44 years old. Laboratory examination of his blood revealed that content of proteins in plasma was 40 g/l. What influence will be exerted on the transcapillary water metabolism?

- A. Filtration will be increased, reabsorption - decreased
- B. Both filtration and reabsorption will be increased
- C. Both filtration and reabsorption will be decreased
- D. Filtration will be decreased, reabsorption - increased
- E. Metabolism will stay unchanged

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. Prolactin
- B. Somatotropin
- C. Vasopressin
- D. Thyrocalcitonin
- E. Glucagon

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

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. Atrioventricular
- B. Sinus
- C. Atrial
- D. Ventricular
- E. Bundle-branch

A patient complains of hydruria (7 liters per day) and polydipsia. Examination reveals no disorders of carbohydrate metabolism. These abnormalities might be caused by the dysfunction of the following endocrine gland:

- A. Neurohypophysis
- B. Adenohypophysis
- C. Islets of Langerhans (pancreatic islets)
- D. Adrenal cortex
- E. Adrenal medulla

Before a surgery a blood sample of a 30-year-old man has been typed. Blood is Rh-positive. Standard serums of such groups as  $0\alpha\beta$  (I),  $A\beta$  (II),  $B\alpha$  (III) didn't activate erythrocyte agglutination reaction. The group of the analyzed blood is:

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

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 unconditioned reflexes
- B. Sympathetic unconditioned reflexes
- C. Parasympathetic conditioned reflexes

- D. Sympathetic conditioned reflexes
- E. Peripheral reflexes

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. Partial oxygen pressure
- B. Ultraviolet intensity
- C. Moisture level
- D. Temperature
- E. Earth gravity

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. Heart
- B. Skin
- C. Bowels
- D. Skeletal muscles
- E. Liver

Blood count of an athlete is as follows: erythrocytes -  $5,5 \cdot 10^{12}/l$ , Hb - 112 g/l, leukocytes -  $7 \cdot 10^9/l$ , neutrophils - 64%, basophils - 0,5%, eosinophils - 0,5%, monocytes - 8%, lymphocytes - 27%. First of all, such results indicate the stimulation of:

- A. Erythropoiesis
- B. Leukopoiesis
- C. Lymphopoiesis
- D. Granulocytopenia
- E. Immunogenesis

If a man has an attack of bronchospasm it is necessary to reduce the effect of vagus on smooth muscles of bronchi. What membrane cytoceptors should be blocked for this purpose?

- A. M -cholinoreceptors
- B. N -cholinoreceptors
- C.  $\alpha$ -adrenoreceptors
- D.  $\beta$ -adrenoreceptors
- E.  $\alpha$ - and  $\beta$ -adrenoreceptors

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

- A. Systemic constriction of the venous vessels

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

A newborn develops dyspepsia after the milk feeding. When the milk is substituted by the glucose solution the dyspepsia symptoms disappear. The newborn has the subnormal activity of the following enzyme:

- A. Lactase
- B. Invertase
- C. Maltase
- D. Amylase
- E. Isomaltase

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

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

A patient underwent an extraction of a part of a CNS structures by medical indications. As a result of the extraction the patient developed atony, astasia, intention tremor, ataxy and adiadochokinesis. Which part of CNS structure had been extracted?

- A. Cerebellum
- B. Amygdaloid corpus
- C. Hippocamp
- D. Basal ganglions
- E. Limbic system

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

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

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

A patient underwent a surgery for excision of a cyst on pancreas. After this he developed haemorrhagic syndrome with apparent disorder of blood coagulation. Development of this complication can be explained by:

- A. Activation of Fibrinolytic system
- B. Insufficient Fibrin production
- C. Reduced number of thrombocytes
- D. Activation of anticoagulation system
- E. Activation of Christmas factor

A 38-year-old patient with an uterine haemorrhage lasting for 2 days was delivered to the admission ward. Which of the following will be revealed in the patient's blood?

- A. Decrease in the haematocrite index
- B. Eosinophilia
- C. Deceleration in ESR
- D. Leukocytosis
- E. Increase in the colour index

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

ECG study showed that the T -waves were positive in the standard extremity leads, their

amplitude and duration were normal. The right conclusion would be that the following process runs normally in the heart ventricles:

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

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

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

Stimulation of an excitable cell by the electric current has led to the depolarization of its membrane. The depolarization has been caused mainly by the following ions penetrating into the cell through its membrane:

- A. Na<sup>+</sup>
- B. HCO<sup>3-</sup>
- C. Ca<sup>2+</sup>
- D. Cl<sup>-</sup>
- E. K<sup>+</sup>

In patients with the biliary tract obstruction the blood coagulation is inhibited; the patients have frequent haemorrhages caused by the subnormal assimilation of the following vitamin:

- A. K
- B. A
- C. D
- D. E
- E. C

As a result of continuous starvation the glomerular Filtration rate has increased by 20%. The most probable cause of the glomerular Filtration alteration under the mentioned conditions is:

- A. Decrease in the oncotic pressure of blood plasma
- B. Increase in the systemic arterial pressure
- C. Increase in the permeability of the renal Filter
- D. Increase of the Filtration quotient

E. Increase of the renal blood flow

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

Cooling of the human body in water is much more faster than in the air. What way of heat emission in water is much more effective?

- A. Heat conduction
- B. Convection
- C. Heat radiation
- D. Sweat evaporation
- E. —

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

While determining power inputs of a patient's organism it was established that the respiratory coefficient equaled 1,0. This means that in the cells of the patient the following substances are mainly oxidized:

- A. Carbohydrates
- B. Proteins
- C. Fats
- D. Proteins and carbohydrates
- E. Carbohydrates and fats

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

- A. Sensitivity loss
- B. Loss of motor functions
- C. Decrease in muscle tone

D. Increase in muscle tone

E. Sensitivity loss and loss of motor functions

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

- A. Quadrigeminal plate
- B. Medial nuclei of the reticular formation
- C. Red nuclei
- D. Vestibular nuclei
- E. Black substance

A patient has osmotic pressure of blood plasma at the rate of 350 mOsmol/l (norm is 300 mOsmol/l). This will cause hypersecretion of the following hormone:

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

In the pubertal period cells of the male sexual glands start producing the male sexual hormone testosterone that is responsible for formation of the secondary sexual characters. What cells of the male sexual glands produce this hormone?

- A. Leidig cells
- B. Sustenocytes
- C. Sertoli's cells
- D. Sustentacular cells
- E. Spermatozoa

Examination of a patient revealed overgrowth of facial bones and soft tissues, tongue enlargement, wide interdental spaces in the enlarged dental arch. What changes of the hormonal secretion are the most likely?

- A. Hypersecretion of the somatotropic hormone
- B. Hyposecretion of the somatotropic hormone
- C. Hypersecretion of insulin
- D. Hyposecretion of thyroxin
- E. Hyposecretion of insulin

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. Prolactin
- B. Somatotropin
- C. Vasopressin
- D. Thyrocalcitonin
- E. Glucagon

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

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

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

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

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

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

A patient suffers from the haemorrhagic syndrome that shows itself in frequent nasal bleedings, posttraumatic and spontaneous intracutaneous and intraarticular haemorrhages. After a laboratory study a patient was diagnosed with the type B haemophilia. This disease is provoked by the deficit of the following factor of blood coagulation:

- A. IX
- B. VIII

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

After a craniocerebral trauma a patient lost the ability to execute learned purposeful movements (apraxia). The injury is most likely localized in the following region of the cerebral cortex:

- A. Gyrus supramarginalis
- B. Gyrus angularis
- C. Gyrus paracentralis
- D. Gyrus lingualis
- E. Gyrus parahippocampalis

A newborn develops dyspepsia after the milk feeding. When the milk is substituted by the glucose solution the dyspepsia symptoms disappear. The newborn has the subnormal activity of the following enzyme:

- A. Lactase
- B. Invertase
- C. Maltase
- D. Amylase
- E. Isomaltase

A man presents with increased heart rate, mydriatic pupils, dry mouth. This condition results from the activation of the following system of function regulation:

- A. Sympathetic
- B. Parasympathetic
- C. Metasympathetic
- D. Vagoinsular
- E. Hypothalamo-pituitary-adrenal

Vagus nerves of an experimental animal have been cut on the both sides. What respiratory changes will result from this?

- A. Respiration will become deep and infrequent
- B. Respiration will become shallow and frequent
- C. Respiration will become deep and frequent
- D. Respiration will become shallow and infrequent
- E. There will be no respiratory changes

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

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. White bread
- C. Meat
- D. Lard
- E. Tea

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. B,  $\alpha$  (I I I) Rh-
- B. A,  $\beta$  (I I) Rh-
- C. 0,  $\alpha$ ,  $\beta$ , (I) Rh+
- D. AB (I V), Rh+
- E. AB (I V), Rh-

A student takes notes of a lecture. Quality of his notes became significantly worse when his neighbours began talking. What type of conditional reflex inhibition was the cause of it?

- A. External
- B. Protective
- C. Extinctive
- D. Differentiated
- E. Delayed

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. Fall of oncotic pressure of blood plasma
- B. Rise of systemic arterial pressure
- C. Increased permeability of renal filter
- D. Growth of filtration coefficient
- E. Increase of renal plasma flow

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 testosterone

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

A human body cools in water much faster than in the air. What way of heat emission in water is much more efficient?

- A. Heat conduction
- B. Convection
- C. Heat radiation
- D. Sweat evaporation
- E. -

A patient has a decreased vasopressin synthesis that causes polyuria and as a result of it evident organism dehydratation. What is the mechanism of polyuria development?

- A. Reduced tubular reabsorption of water
- B. Reduced tubular reabsorption of N a ions
- C. Reduced tubular reabsorption of protein
- D. Reduced glucose reabsorption
- E. Acceleration of glomerular filtration

An isolated cell of human heart automatically generates excitement impulses with frequency of 60 times per minute. This cell was taken from the following heart structure:

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

As a result of posttranslative modifications some proteins taking part in blood coagulation, particularly prothrombin, become capable of calcium binding. The following vitamin takes part in this process:

- A. K
- B. C
- C. A
- D. B1
- E. B2

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. 55%
- D. 45%
- E. 50%

A pregnant woman had her blood group identified. Reaction of erythrocyte agglutination with standard serums of  $0\alpha\beta$  (I),  $B\alpha$  (III) groups didn't proceed with standard serum of  $A\beta$  (II) group. The blood group under examination is:

- A.  $A\beta$  (II)
- B.  $0\alpha\beta$  (I)
- C.  $B\alpha$  (III)
- D. AB (IV)
- E. -

Vagus branches that innervate heart are being stimulated in course of an experiment. As a result of it the excitement conduction from atria to the ventricles was brought to a stop. It is caused by electrophysical changes in the following structures:

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

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

Systemic arterial pressure of an adult dropped from 120/70 to 90/50 mm Hg that led to reflexory vasoconstriction. The vasoconstriction will be maximal in the following organ:

- A. Bowels
- B. Heart
- C. Brain
- D. Kidneys
- E. Adrenals

Surgical removal of a part of stomach resulted in disturbed absorption of vitamin B12, it is excreted with feces. The patient was diagnosed with anemia. What factor is necessary for absorption of this vitamin?

- A. Gastromucoprotein
- B. Gastrin
- C. Hydrochloric acid

- D. Pepsin
- E. Folic acid

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

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

A 35 year old man got an injury that caused complete disruption of spinal cord at the level of the first cervical segment. What respiration changes will be observed?

- A. It will come to a standstill
- B. No changes will be observed
- C. Diaphragmal respiration will be maintained, thoracic respiration will disappear
- D. Thoracic respiration will be maintained, diaphragmal respiration will disappear
- E. It will become infrequent and deep

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

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

A patient complains of dizziness and hearing loss. What nerve is damaged?

- A. Vestibulocochlear
- B. Trigeminal
- C. Sublingual
- D. Vagus
- E. Trochlear

Workers of a hothouse farm work under conditions of unfavourable microclimate:

air temperature is  $+37^{\circ}\text{C}$ , relative humidity is 90%, air speed is 0,2 m/s. The way of heat emission under these conditions will be:

- A. Evaporation
- B. Heat conduction
- C. Convection
- D. Radiation
- E. All the ways

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

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

A lightly dressed man is standing in a room, air temperature is  $+14^{\circ}\text{C}$ , windows and doors are closed. In what way does he emit heat the most actively?

- A. Heat radiation
- B. Heat conduction
- C. Convection
- D. Evaporation
- E. Perspiration

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. P P
- C. C
- D. B12
- E. K

Examination of a 43 y.o. patient revealed that his stomach has difficulties with digestion of protein food. Gastric juice analysis revealed low acidity. Function of which gastric cells is disturbed in this case?

- A. Parietal exocrinocytes
- B. Main exocrinocytes
- C. Mucous cells (mucocytes)
- D. Endocrinous cells
- E. Cervical mucocytes

A 2 y.o. child has convulsions as a result of lowered concentration of calcium ions in blood plasma. It is caused by reduced function of:

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

Heart rate of a man permanently equals 40 beats pro minute. What is the pacemaker?

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

Parents of a 10 y.o. 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 testosterone
- B. Of somatotropin
- C. Of oestrogen
- D. Of progesterone
- E. Of cortisol

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

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

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

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

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. Action potential
- D. Local response
- E. No changes

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

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

As a result of spinalcord trauma a 33 y.o. man has a disturbed pain and temperature sensitivity that is caused by damage of the following tract:

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

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

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

Inhabitants of territories with cold climate have high content of an adaptive thermoregulatory hormone. What hormone is meant?

- A. Thyroxin
- B. Insulin
- C. Glucagon
- D. Somatotropin
- E. Cortisol

Glutamate decarboxylation results in formation of inhibitory transmitter in CNS. Name it:

- A. GABA
- B. Glutathione
- C. Histamine

- D. Serotonin
- E. Asparagine

Osmotic pressure of a man's blood plasma is 350 mosmole/l (standard pressure is 300 mosmole/l). First of all it will result in high secretion of the following hormone:

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

A woman with (B), Rh- blood group born a child with (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. (A), Rh+
- B. I (0), Rh+
- C. I I I (B), Rh+
- D. I (0), Rh-
- E. I I (A), Rh-

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

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

Examination of a patient revealed a strong, balanced, inert type of higher nervous activity according to Pavlov. What temperament type does the patient have (according to Hippocrates classification)?

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

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. Trigemini
- D. Glossopharyngeal

#### E. Infraorbital

A newborn child suffers from milk curdling in stomach, this means that soluble milk proteins (caseins) transform to insoluble proteins (paracaseins) by means of calcium ions and a certain enzyme. What enzyme takes part in this process?

- A. Renin
- B. Pepsin
- C. Gastrin
- D. Secretin
- E. Lipase

Atria of an experimental animal were super-distended 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

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

After destruction of CNS structures an animal lost orientative reflexes. What structure was destroyed?

- A. Quadrigeminal plate
- B. Red nucleus
- C. Lateral vestibular nuclei
- D. Black substance
- E. Medial reticular nuclei

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 0αβ (I), Aβ (II), Bα (III) groups. The blood under examination is of the following group:

- A. 0αβ (I)
- B. Aβ (II)

- C. Bα (III)
- D. AB (IV)
- E. -

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 plasm
- D. Increased circulating blood volume
- E. Increased diuresis

Examination of a pregnant woman revealed twice as much concentration of fibrinogen

in blood plasm. What ESR can this woman have?

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

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. Juxtglomerular
- C. Pleura receptors
- D. Central chemoreceptors
- E. Peripheral chemoreceptors

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Укладачі:

ОНУФРИЕНКО Оксана Вікторівна  
ТОПАЛ Марина Михайлівна

*Англійською мовою*

Завідувачка редакції *Т. М. Забанова*  
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e-mail: [astro\\_print@ukr.net](mailto:astro_print@ukr.net)

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