МИНИСТЕРСТВО НАУКИ, ВЫСШЕГО ОБРАЗОВАНИЯ И ИННОВАЦИЙ КЫРГЫЗСКОЙ РЕСПУБЛИКИ
ОШСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ
МЕЖДУНАРОДНЫЙ МЕДИЦИНСКИЙ ФАКУЛЬТЕТ
Кафедра анатомии, гистологии и нормальной физиологии

«РАССМОТРЕНО и СОГЛАСОВАНО»
на заседании кафедры протокол №1
от «29» 08 2025 года
Зав. кафедрой доцент Джолдубаев С. Дж.

УТВЕРЖДАЮ
Председатель УМС ММФ
к.э.н., доцент Базиева А.М.
"12" 09 2025г.

ФОНД ТЕСТОВЫХ ЗАДАНИЙ

для итогового контроля по дисциплине «Human Physiology 2»
на 2025-2026 учебный год
по специальности «560001-Лечебное дело»

курс-2, семестр-3

Наименование дисциплины	Всего	Кредит	Аудиторные занятия		Внеаудиторные	
			Лекции	Практические	СРСП	СРС
Human Physiology 2	**120 ч**	**4кр**	**20 ч**	**28 ч**	**12ч**	**60ч**
Кол-во тестовых вопросов	**400**					

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г. Ош. 2025г.

ЭКСПЕРТНОЕ ЗАКЛЮЧЕНИЕ БАНКА ТЕСТОВЫХ ЗАДАНИЙ

кафедры «АГНФ»

от «01» 09 2025 г.

на разработанные тестовые задания по дисциплине

«_____»

наименование дисциплины

Нормальная физиология

/указать должность, ученую степень, Ф.И.О. автора (авторов)/

Тестовые задания проверены членом экспертной группы тестологов

Асылбек кызы К.

/указать должность, ученую степень, Ф.И.О./

Направления проведения оценки структуры и содержания тестового задания

№	Направление экспертизы	Оценка экспертов	
1	Соответствие задания программам и стандартам обучения	Соответствует	Не соответствует
		+	
2	Включение в тесты только наиболее важных, базовых знаний	Соответствует	Не соответствует
		+	
3	Ясность смысла тестовой ситуации и представления ТЗ	ясно	Не ясно
		+	
4	Правильность ответа на вопрос ТЗ	Соответствует	Не соответствует
		+	
5	Значимость содержания тестового задания (0-сомнительный, 1-допустимый, 2-важный, 3-существенный)	2 балл(ов)	
6	Соответствие необходимое число заданий по каждому разделу дисциплины исходя из его важности и числа часов, отведенных на его изучение в программе.	Соответствует	Не соответствует
		+	

Членом экспертной группы выявлены следующие недостатки в тестовом задании На вшивенет

Членом экспертной группы внесены следующие исправления (корректировки) в тестовое задание Нек. Богр. Вшее Орфограф.

На основании представления тестовых заданий автором (авторами) и проведенной проверки сделала следующее заключение:

1) Содержание тестовых заданий **соответствует (не соответствует)** содержанию УМКД *(нужное подчеркнуть)*

2) Представленные тестовые задания в следующем объеме 400 вопросов: **соответствуют (не соответствуют)** требованиям, предъявляемым к количеству, уровням сложности и формам заданий для составления тестов. *(нужное подчеркнуть)*

Тестолог Асылбек К К _____ / 25.12.25.
подпись дата

Ознакомлен зав. кафедрой Дмитрий С.Ю. _____ / 25.12.25 /
подпись дата

Паспорт фонда тестовых заданий.

Направление подготовки (специальность): 560001
Дисциплина: Human Physiology 2

№	Контролируемые разделы (темы) дисциплины	Контролируемые компетенции (или их части)	Кол-во тестовых заданий
1	Physiology of Blood	ОК-l, СЛК-2, ПК-5, ПК-15, ПК-32	50
2	Physiology of CVS	СЛК-2, ПК-5, ПК-15	100
3	Physiology of Respiration	ОК-l, ПК-5, ПК-15	69
4	Physiology of digestion and metabolism	СЛК-2, ПК-5, ПК-15, ПК-32	70
5	Physiology of thermoregulation	ОК-1, ПК-15, ПК-32	47
6	Physiology of excretion	ОК-1, ПК-5, ПК-15,	64

Blood Physiology.

1. The patient's blood pH is 7.0. Make a conclusion.
    A) Alkalosis.
    B) homeostasis
    C) acidosis *
    D) normal
2. Agglutination is defined as:
    A) the sticking of erythrocytes when blood of incompatible groups mixes *.
    B) clotting of blood when blood of incompatible groups is mixed
    C) destruction of erythrocytes when placed in a hypotonic solution
    D) breakdown of leukocytes when mixing blood of incompatible groups
3 Agglutinins are part of:
    A) red blood cells
    B) leucocytes
    C) platelets
    D) blood plasma *.
4. Agglutinogens are a part of:
    A) erythrocytes *
    B) leukocytes
    C) platelets
    D) blood plasma
5.The active blood reaction (pH) in normal blood is:
    A) 7,35-7,45 *
    B) 7,0-7,5
    C) 7,25-7,85
    D) 7,9-8,0
6.The heparin antagonist is the basophilic acid contained in:
    A) anaphylaxin
    B) heparin sulfate
    C) thrombostenin
    D) histamine *
7.Blood plasma proteins create:
    A) osmotic pressure
    B) oncotic pressure *
    C) hydrostatic pressure
    D) hemodynamic pressure
8.In what processes is blood coagulation factor XII (Hageman) involved?
    A) In the third phase of hemocoagulation
    B) In retraction and fibrinolysis
    C) In retraction and second phase of hemocoagulation
    D) In fibrinolysis and the first phase of secondary hemostasis *
9.Which cellular elements of the blood contain heparin?
    A) In erythrocytes
    B) In neutrophils
    C) In platelets
    D) in basophils*
10.In which case would leukocytosis be true?
    A) After a meal
    B) During physical exertion
    C) In inflammatory reactions *
    D) During stress
11.The first phase of hemocoagulation involves:
    A) thrombin formation
    B) fibrin formation
    C) prothrombinase formation*
    D) fibrinolysis
12.How long after the formation of the blood clot is the retraction completed?

A) 10-20 min
B) 1-2 min.
C) 5-10 s
D) 2-3 hours *

13.The third phase of hemocoagulation involves:
A) platelet adhesion and aggregation
B) fibrinolysis
C) prothrombinase formation
D) fibrinase formation *

14.Substances that dissolve clots or prevent blood clotting are called:
A) hemopoietins
B) antibodies
C) coagulants
D) anticoagulants*

15.The external pathway of the first phase of hemocoagulation (secondary hemostasis) is associated with:
A) damage to cellular elements and exposure of collagen fibers
B) platelet adhesion
C) release of serotonin and norepinephrine from platelets
D) damage of vascular wall and surrounding tissues *

16.The intrinsic pathway of the first phase of hemocoagulation (secondary hemostasis) is associated with:
A) damage to cell membranes and exposure of collagen fibers *
B) platelet adhesion
C) release of serotonin and norepinephrine from vascular wall
D) damage of vascular wall and surrounding tissues

17.The second phase of hemocoagulation involves:
A) platelet adhesion and aggregation
B) formation of thrombin *
C) prothrombinase formation
D) clot retraction and fibrinolysis

18. Blood clotting time can decrease during:
A) mental work
B) emotional stress*
C) rest
D) sleep

19.Select the compound of hemoglobin (Hb) that has the greatest ability to attach carbon dioxide.
A) methemoglobin.
B) HbS
C) Deoxyhemoglobin *
D) oxyhemoglobin

20.Where are most hematopoietic factors synthesized?
A) In the liver *
B) In plasma
C) In the kidneys
D) in the spleen

21.Hemophilia A (a disease in which blood does not clot) can occur in:
A) a deficiency of anti-hemophilic globulin in the plasma *
B) thromboplastin deficiency in platelets
C) absence of fibrin stabilizing factor
D) excessive content of antihemophilic globulin

22.Blood is diluted to count the number of leukocytes:
A) 5% sodium citrate solution
B) Thurk's liquid *
C) 0.9% NaCl solution
D) distilled water

23.To count erythrocytes in a Goryaev counting chamber, blood is diluted:
A) 4% acetic acid solution

B) 3% NaCl solution *
C) distilled water
D) 0.1 NaCl solution.

24.All phases of hemocoagulation require the participation of ions:
A) calcium *
B) chlorine
C) sodium
D) potassium

25. If the process of fibrinolysis is disrupted, there is a threat of development:
A) thromboembolism (clogging of blood vessels with blood clots *
B) massive blood loss
C) hemotransfusion shock
D) hemolysis of erythrocytes.

26. For the discovery of which phenomenon I.I. Mechnikov was awarded the Nobel Prize in 1908?
A) leukocytosis
B) humoral immunity
C) phagocytosis*
D) antitumor immunity

27.The importance of proteins as a buffer system is that they:
A) carry out carbon dioxide transport
B) prevent an increase in concentration of H+ ions in blood
C) behave as alkali in an acidic environment and as acid in an alkaline environment*
D) maintain osmotic pressure

28. To which group does the blood under study belong if it is agglutinated with standard Group I and Group II sera?
A) Group IV.
B) Group III*.
C) To group II *
D) To group I

29. Which group the blood under study belongs to if it is not agglutinated by standard sera:
A) Group IV.
B) group III
C) To group II
D) Group I *

30. Platelets are involved in:
A) synthesis of anticoagulants *
B) transport of oxygen and carbon dioxide
C) processes of specific immunity
D) phagocytosis processes

31.The increase in the number of red blood cells during adaptation to high altitude is associated with:
A) change in the shape of red blood cells
B) decrease in erythrocyte decay
C) increase in erythrocyte synthesis *
D) increase in blood supply to internal organs.

32. Specify the normal content of hemoglobin in the blood:
A) In women 95-115 g/l, in men 110-115 g/l
B) Women have 120-150 g/l, men 130-160 g/l*
C) women have 155-160 g/l, men 168-180 g/l
D) In women 100-110 g/l, in men 120-125 g/l

33. Functions of basophils:
A) participation in blood clotting (internal pathway)
B) phagocytosis, antibody synthesis
C) phagocytosis, histamine formation
D) formation of histamine and heparin *

34. Which substances are the functional components of blood?
a. nutrients transported by the blood
b. hormones and enzymes transported by the blood

c. minerals, blood proteins *
d. macromolecules

35. What processes occur after coagulation?
a. vascular-platelet hemostasis
b. conversion of fibrinogen into fibrin
c. clot retraction and fibrinolysis *
d. viscous metamorphosis of platelets

36. Which blood plasma protein in coagulation changes from soluble state into insoluble state?
a. plasminogen is converted into plasmin
b. fibrinogen is converted into fibrin *
c. prothrombin changes into thrombin
d. angiotensinogen turns into angiotensin.

37. Which of vessels provides the stopping of bleeding vascular-platelet hemostasis?
a. from the vessels of the microcirculatory*
b. from the middle arteries
c. from medium veins
d. from large vessels

38. How do thromboxane (I) and prostacyclin (II) affect platelet aggregation platelets aggregation?
a. I- stimulates, II - inhibits *
b. I-inhibits, II-stimulates
c. I and II - stimulate
d. I and II - inhibit

39. How does the blood flowing out of the lungs clot compared to the blood flowing into the lungs?
a. slower *
b. faster
c. at the same rate
d. it is unable to clot

40. How does the rate of blood coagulation change with the activation of sympathetic (I) and parasympathetic (II) divisions of the autonomic autonomic nervous system?
a. I - increases, II - decreases
b. I - decreases, II - increases.
c. I and II - unchanged
d. I and II - increase *

41. Why does the rate of erythrocyte sedimentation during pregnancy increases;
a. due to increased number of erythrocytes in blood
b. due to an increase in plasma albumin content
c. because of an increase in plasma fibrinogen*
d. due to a decrease in fibrinogen in plasma
e. due to an increase in blood volume

42. Why does the rate of erythrocyte sedimentation of erythrocytes increases?
a. due to an increase in the number of white blood cells
b. due to an increase in plasma albumin content
c. due to an increase in the content of large molecular proteins in plasma *
d. decrease in the amount of large molecular weight proteins in plasma

43. In which solution does osmotic hemolysis occur of erythrocytes (I) and in which solution does plasmolysis (II) occur?
a. I - in hypotonic, II - in isotonic
b. I - in hypertonic, II - in isotonic
c. I - in hypotonic, II - in hypertonic *
d. I - in hypertonic, II - in hypotonic

44. A patient with acute blood loss requires urgent transfusion. His medical history indicates a previous hemolytic transfusion reaction. Laboratory testing reveals the presence of anti-A and anti-D antibodies in the plasma. Which blood type is the safest for transfusion in this patient?

A. A (II) Rh^+
B. B (III) Rh^-

C. O (I) Rh^{-}*
D. AB (IV) Rh^{-}

45. A pregnant woman is Rh-negative, while the fetus is Rh-positive. She has a history of one previous delivery without prophylactic anti-D immunoglobulin. The newborn develops hemolytic disease of the newborn. What is the main pathogenic mechanism responsible for this condition?

A. Activation of the complement system via the alternative pathway
B. Transfusion of maternal erythrocytes to the fetus
C. Transplacental passage of maternal IgG antibodies*
D. Immune aggregation of fetal platelets

46. A patient with septic shock presents with severe hypotension despite an increased cardiac output. Which hemodynamic change most likely explains this condition?
A. Increased total peripheral resistance
B. Decreased venous return
C. Arteriolar dilation with reduced peripheral resistance*
D. Decreased stroke volume

47. During assessment of microcirculation, blood flow velocity in capillaries is found to be significantly lower than in arteries. What is the primary reason for this phenomenon?

A. Increased blood viscosity in capillaries
B. Large total cross-sectional area of capillaries*
C. Reduced pressure in venules
D. Decreased elasticity of the vessel wall

48. A patient presents with frequent gingival bleeding and petechial hemorrhages. Platelet count is normal, but platelet adhesion to the vascular wall is impaired. Deficiency of which factor is most likely responsible?

A. Fibrinogen
B. Factor VIII
C. von Willebrand factor*
D. Prothrombin

49. Laboratory tests show a prolonged activated partial thromboplastin time (aPTT) with a normal prothrombin time (PT). Which part of the hemostatic system is most likely impaired?

A. Extrinsic coagulation pathway
B. Intrinsic coagulation pathway*
C. Platelet hemostasis
D. Fibrinolysis

50. A patient with polycythemia has a hematocrit level of 65%. Sluggish blood flow and a tendency toward thrombosis are observed. Which factor most strongly contributes to these hemodynamic disturbances?

A. Reduced cardiac output
B. Increased plasma osmotic pressure
C. Increased blood viscosity*
D. Decreased venous tone

PHYSIOLOGY OF CVS
1. Basal vascular tone is caused by:
A) influence of the parasympathetic nervous system
B) automatism of vascular smooth muscle cells*
C) influence of sympathetic nervous system
D) humoral effects on blood vessels.
2. In which parts of the bloodstream is intravascular pressure lowest?
A) in capillaries

B) In arterioles*
C) In veins
D) in large-caliber arteries.
3. In which vessels are the resistance to blood flow most pronounced?
A) in capillaries
B) in veins
C) arterioles*
D) in the aorta
4. In which part of the vascular system does blood move most slowly?
A) in the aorta
B) in large-caliber arteries
C) in veins
D) in capillaries *
5. A 30-year-old woman's maximal BP was determined by her doctor to be 150 mmHg. Make a conclusion.
A) arterial hypertension *
B) normal BP
C) arterial hypotension
6. The time for the complete circulation of blood through the cardiovascular system is:
A) 20-23 s *
B) 1.5-2 min
C) 55-60 s
D) 40-45 s.
7. Select the definition of arterial pulse.
A) The rhythmic change in pressure in the heart cavities
B) Rhythmic oscillations of the chest wall during heart contractions
C) Stretching of the arterial wall as BP rises during cardiac systole *
D) Rhythmic contractions of the heart
8. Heterometric regulation of the heart consists of changes in the following parameters (including heart rate - HR):
A) force of heart contractions with changes in the end-diastolic length of muscle fibers *
B) heart rate with changes in aortic pressure
C) heart rate with changes in baseline muscle fiber length
D) force of heart contraction with changes in aortic pressure
9. Hyperpolarization of the membrane in the cells of the sinus-atrial node when the vagus nerve is stimulated by:
A) acetylcholinesterase
B) acetylcholine*
C) noradrenaline
D) adrenaline
10. The homeometric mechanism of heart regulation consists in:
A) intensification of heart contractions when there is a change in aortic pressure *
B) increase in heart rate when the baseline length of muscle fibers changes
C) increase in heart rate when the baseline length of muscle fibers changes
D) increase in heart rate with changes in aortic pressure
11. The diameter of the vascular lumen decreases under the influence of the above biologically active substances, except for:
A) angiotensin
B) vasopressin
C) serotonin
D) histamine*
12. Capacitance vessels are referred to as:
A) arterioles
B) veins *
C) capillaries
D) aorta
13. What elements does the intracardiac reflex arc consist of?

A) Extracardiac innervation elements
B) Elements of the conduction system and gap contacts
C) Sinus-atrial and atrial-ventricular nodes
D) From afferent neurons with stretch receptors, insertion neurons and efferent neurons innervating myocardium*

14. Intensity of blood supply to an organ is estimated by the value of:
A) the volumetric velocity of blood flow *
B) pulse wave velocity
C) blood pressure
D) time of complete blood circulation

15. The incisura of the sphygmographic wave corresponds in time to:
A) the slamming of the semilunar valves *
B) the moment of rapid expulsion of blood from the ventricle
C) opening of the semilunar valves
D) slamming of atrial-ventricular valves

16. How does turning off the vagus nerves (by cutting or injecting atropine) affect the heart rate (HR)?
A) first the HR will decrease, then it will increase
B) the HR will decrease
C) heart rate will remain unchanged
D) heart rate will increase *

17. How does irritation of vascular reflexogenic baroreceptors affect heart activity (including heart rate)?
A) It has no effect at all
B) HR increases
C) Heart rate decreases
D) HR decreases*

18. How does BP change with increasing physical activity?
A) Both systolic and diastolic BP do not change
B) Systolic BP decreases, diastolic BP increases.
C) Systolic BP increases and diastolic BP does not change.
D) Systolic BP doesn't change, diastolic BP increases. *

19. What is the difference between the values of systolic and diastolic BP?
A) Lateral pressure
B) end-diastolic pressure
C) mean pressure
D) pulse pressure *

20. Which waves on the BP curve in the acute experience have the highest frequency?
A) All of the above
B) Waves of order III
C) Waves of order II
D) First-order waves *

21. Which hemodynamic factors affect the value of BP?
A) Heart valve function and pulse wave velocity
B) Minute blood flow volume and respiratory excursions
C) Pulse wave velocity
D) Minute blood flow volume and peripheral resistance value *

22. Which hormones stimulate cardiac activity?
A) Adrenaline, noradrenaline, and thyroxine *
B) Serotonin
C) thyroxine and insulin
D) adrenaline and antidiuretic hormone

23. Which nerves going to the heart have a central tone?
A) Parasympathetic *
B) None
C) Sympathetic and parasympathetic
D) Sympathetic

24. Which BP parameters change in a person after physical activity?
A) None change
B) Minimum BP
C) Average BP
D) Maximum BP *
25. Which regulatory mechanisms are referred to as extracardiac?
A) Intercellular interactions
B) Intracardiac peripheral reflexes
C) Reflexes involving extracardiac nerves and humoral mechanisms *
D) Humoral mechanisms, peripheral reflexes
26. Which regulatory mechanisms are referred to as intracardiac mechanisms?
A) Intracellular mechanisms, intercellular interactions, intracardiac peripheral reflexes *
B) Intracellular mechanisms, nervous system influences
C) Intracellular mechanisms, humoral influences, intercellular interactions
D) Humoral influences, intercellular interactions, peripheral reflexes
27. What reflexes are caused by irritation of aortic arch and carotid sinus baroreceptors?
A) Does not cause any changes
B) Combined
C) Pressor
D) Depressor *
28. What is the value of blood pressure in the veins outside the chest?
A) 40-50 mmHg.
B) 5-9 mmHg. *
C) 25-30 mmHg.
D) 2-3 mmHg.
29. What is the amount of blood pressure at the arterial end of a capillary?
A) 50-60 mmHg.
B) 3-5 mmHg.
C) 10-15 mmHg.
D) 20-30 mmHg. *
30. What is the amount of blood pressure at the venous end of a capillary?
A) 10-15 mmHg. *
B) 45 mmHg.
C) 10 mmHg.
D) 3 mmHg.
31. What is the speed of pulse wave propagation through medium-diameter elastic vessels?
A) 100-140 cm/s
B) 6-9 m/s *
C) 0.5-1 cm/s
D) 1-2 m/s.
32. What mechanism underlies the increase in heart rate during the athlete's condition before the start?
A) Intracardiac peripheral reflex
B) Influence of the carotid sinus
C) Purely hormonal influence
D) Conditioned reflex mechanism *.
33. Which division of the nervous system performs extracardiac regulation of cardiac activity?
A) Sympathetic and parasympathetic divisions of the autonomic nervous system *
B) Somatic and autonomic divisions
C) Somatic and parasympathetic divisions
D) somatic division
34. Which vasodilator is secreted by vascular endotheliocytes?
A) bradykinin
B) NO (nitric oxide) *
C) serotonin
D) acetylcholine
35. Blood flow in working skeletal muscles during physical activity:

A) does not change
B) it increases after 10 min.
C) it increases after 20-30 s*.
D) it increases in 0.5-1 s.
36. The linear velocity of blood flow in the aorta is equal to:
A) 1 mm/s
B) 0.5 cm/s
C) 0.5-1 m/s.*
D) 25 cm/sec.
37. The linear velocity of blood flow in capillaries is:
A) 0.5 cm/s
B) 25 cm/s
C) 50 cm/sec.
D) 0.5-1 mm/s*.
38. The linear velocity of blood flow reflects:
A) circulating blood volume (RBC)
B) time of complete blood circulation
C) amount of blood flowing through a vessel per unit of time
D) the rate of progression of a blood particle along a vessel *
39. A method of examining arterial vessels:
A) pneumography
B) plethysmography
C) sphygmography *
D) phlebography
40. A method of recording the oscillation of the walls of the venous vessels:
A) pneumography
B) phlebography *
C) sphygmography
D) plethysmography
41. Against the background of strong irritation of the vagus nerves, the heart stopped. After some time, despite continued irritation, the heart resumed its work. What is this effect called?
A) The phenomenon of slipping away *
B) The law of the ladder
C) Negative inotropic effect
D) Frank-Starling's Law
42. State the mechanism of vasoconstriction resulting from activation of nerve fibers innervating smooth muscle cells in a blood vessel.
A) parasympathetic cholinergic nerve fiber activation
B) Sympathetic adrenergic fibers activation and neurotransmitter interaction with alpha-adrenoreceptors*
C) Sympathetic adrenergic fibers activation and neurotransmitter interaction with beta-adrenoreceptors
D) Sympathetic cholinergic fibers activation and neurotransmitter interaction with M-cholinoreceptors
43. State the main mechanisms of distant regulation of vascular tone.
A) Humoral and neurogenic *
B) Myogenic and metabolic
C) Neurogenic and metabolic.
D) Humoral and myogenic.
44. The greatest number of smooth muscle cells is found in the wall of:
A) arterioles*
B) lymphatic vessels
C) venules
D) capillaries
45. Normal BP level with decreased vascular resistance is provided by:
A) decreased frequency and increased force of heart contractions
B) decrease in heart rate and force
C) an increase in the frequency and strength of the heartbeat*
D) increase in heart rate and decrease in force of heart beats
46. The state of elastic properties of arterial vessels can be judged by the value of:

A) pulse wave velocity *
B) amplitude of A waveform
C) heart rate
D) R-R interval on electrocardiogram
47. Exchange vessels are referred to as:
A) arteries
B) veins
C) arterioles
D) capillaries *
48. Total peripheral vascular resistance depends on:
A) heart rate
B) linear velocity of blood flow
C) volumetric blood flow rate
D) lumen diameter and vessel length *
49. The volumetric blood flow rate reflects:
A) circulating blood volume (CVC)
B) the time of a complete blood cycle
C) the amount of blood flowing through the vascular bed per unit of time *
D) velocity of blood particles along a vessel
50. The basic law of the heart (Franck-Starling's law) is based on the mechanism of:
A) homeometric regulation of the heart
B) heterometric regulation of the heart *
C) humoral regulation of the heart
D) extracardiac regulation of the heart
51. The main factor in the movement of blood through the arteries:
A) presence of valves
B) difference between intravascular and tissue pressure
C) pressure difference in the proximal and distal parts of the vessels *
D) suctioning action of the thorax during inhalation
52. The main link in the microcirculatory system is:
A) capillaries *
B) arteriolo-venular anastomoses
C) venules
D) arterioles.
53. Under the influence of acetylcholine, potassium conductance of sinus-atrial node cell membrane:
A) does not change
B) at first decreases, then increases
C) it increases*
D) decreases
54. Under the influence of histamine, the diameter of the lumen of peripheral vessels:
A) increases only in the presence of angiotensin
B) it increases *
C) decreases
D) does not change
55. When acetylcholine is applied to the myocardium, it occurs:
A) myocyte membrane hyperpolarization *
B) repolarization of myocyte membrane
C) depolarization of myocyte membrane
D) rapid heartbeat
56. When norepinephrine is applied to the myocardium, the following occurs:
A) membrane polarization will not change
B) hyperpolarization
C) depolarization of myocyte membrane *
D) repolarization of myocyte membrane
57. When the vagus nerve is irritated, the sinus-atrial node cells experience:
A) lengthening of the diastolic depolarization phase *
B) membrane repolarization

C) shortening of diastolic depolarization phase
D) membrane depolarization.
58. The path traversed by a blood particle per unit time reflects:
A) minute blood flow volume
B) linear velocity of blood flow*
C) time of a complete blood cycle
D) blood volume flow rate
59. Resistive vessels are called:
A) arterioles *
B) veins
C) capillaries
D) aorta
60. What heart structures are intracardiac peripheral reflexes associated with?
A) With the crevicular contacts
B) With the intramural ganglia of the myocardium*
C) With intercellular contacts
D) With elements of the conduction system
61. Sympathetic cholinergic nerve fibers cause in blood vessels:
A) have no significant effect
B) sometimes vasoconstriction, sometimes vasodilation
C) vasodilation *
D) vasoconstriction
62. The speed of pulse wave propagation is the higher the:
A) greater the stiffness of the arterial wall *
B) less stiffness of arterial wall
C) more force of heartbeat
D) lower BP.
63. The vasomotor center is located in:
A) medulla oblongata*
B) hypothalamus
C) cerebellum
D) thalamus
64. Average BP during physical activity:
A) first increases and then decreases
B) increases *
C) decreases
D) does not change
65. A 60-year-old man was found to have a maximal BP of 140 mmHg in the brachial artery. Make a conclusion.
A) arterial hypotension
B) BP is normal *
C) arterial hypertension
66. Increased blood pressure in the aortic arch and carotid sinuses causes:
A) depressor reflex *
B) Aschner's eye reflex
C) pressor reflex at rest, depressor reflex during physical activity
D) pressor reflex.
67. An increase in the end-diastolic length of myocardial muscle fibers occurs when:
A) increase in total peripheral vascular resistance
B) decrease in venous inflow to the heart
C) increase in venous blood flow to the heart*
D) increase in blood pressure in the aorta
68. What is the last name of the researcher who suggested listening for vascular tones when measuring BP?
A) Samoilov
B) Ludwig
C) Riva Rocci

D) Korotkov *
69. Elastic shock-absorbing vessels are called:
A) capillaries
B) veins
C) large vessels of elastic and muscular types *
D) arterioles
70. Increased contraction of the left ventricle with increased blood pressure in the aorta refers to:
A) homeometric regulation of the heart *
B) metabolic regulation of the heart
C) extracardiac regulation of the heart
D) heterometric regulation of the heart
71. The enhancement of myocardial contraction by an increase in the end-diastolic length of muscle fibers (heterometric mechanism) is provided by:
A) the influence of the vagus nerve on cardiac function
B) intracardiac peripheral reflex
C) intercellular interaction mechanism
D) intracellular regulatory mechanism *.
72. What can explain working hypertrophy of cardiac muscle?
A) decreased synthesis of contractile proteins
B) Increased activity of cardiac conduction system
C) Increased number of muscle fibers
D) Increased synthesis of contractile proteins *.
73. What is the maximum (systolic) BP of a healthy middle-aged person in the brachial artery?
A) 95-100 mmHg.
B) 140-160 mmHg.
C) 110-125 mmHg. *
D) 60-80 mmHg.
74. What is the maximum BP in the brachial artery in newborns?
A) 100 mmHg.
B) 50 mmHg.
C) 80 mmHg. *
D) 35 mmHg.
75. What is the minimum (diastolic) BP in the brachial artery in a healthy middle-aged person?
A) 105-120 mmHg.
B) 90-95 mmHg.
C) 35-50 mmHg.
D) 60-80 mmHg. *
76. What is the average BP of a healthy middle-aged person?
A) 110-120 mmHg.
B) 50-70 mmHg.
C) 90-95 mmHg. *
D) 35-60 mmHg.
77. What is called the law of the heart (Frank-Starling's law)?
A) Increase in heart rate with an increase in aortic pressure
B) Increase in heart force in proportion to diastolic myocardial distension*.
C) Decrease in the force of heart contraction with increasing blood flow to the heart
D) Increased force of heart contraction with increasing BP
78. Blood flow to the heart, head, and upper limbs of the fetus is oxygenated by:
А) 40%
Б) 50%
В) 60% *
Г) 70%
79. Which of the following best characterizes the oval window?
A) Drops blood from right to left *
B) Connects the pulmonary artery to the aorta
C) Discharges deoxygenated blood into the left atrium
D) Functions after birth

80. What causes slow diastolic depolarization of the heart's pacing cells?
A) Entry of potassium ions into the cell.
B) Exit of calcium ions from the cell.
C) Entry of sodium and calcium ions into the cell*
D) release of sodium ions from cell.
81. What is the degree of automatism of the different parts of the cardiac conductive system?
A. decreases from the sinoatrial node to the atrioventricular node and then increases
b. decreases from the base of the heart to the apex*
c. Same
d. decreases from the apex to the base of the heart
e. increases from the sinoatrial node to the atrioventricular node and then decreases
82. The occurrence of extrasystoles is based on
a. hypocapnia
b. hypoxia
c. hypercapnia
d. hyperoxia
e. Hypokalemia*.
83. Slow diastolic depolarization is characteristic of cells:
a. contractile atrial cardiomyocytes
b. skeletal muscle fibers
c. skeletal muscle fibers
d. heart pacing cells*
e. contractile cardiomyocytes of ventricles
84. The aortic valve opens in the left ventricle at a pressure (in mm Hg):
a. more than 5-7
b. more than 10-15
c. more than 120-130
d. more than 70-80*
e. more than 25-30
85. What is normal systolic volume at rest?
a. 65-70 ml*
b. 10-15 ml
c. 4,5-5,0 л
d. 150-200 ml
e. 20-30 ml
86. After the aortic semilunar valve is opened, the blood pressure in the left ventricle
a. Rises from 80 to 120 mmHg*.
b. Decreases to 0 mmHg.
c. Decreases to 80 mmHg.
d. Rises from 10 to 25 mmHg.
e. Does not change
87. Which phase of the cardiac cycle is most pronounced when the heart rate increases?
a. rapid ejection
b. tension
c. slow ejection
d. slow filling*
e. atrial systole
88. The absolute refractoriness of a typical ventricular cardiomyocyte lasts for:
a. 5-10 ms
b. 250.0-300.0 ms*
c. 0.5-1.0 ms
d. 25.0-30.0 ms
e. 2.0-5.0 ms
89. What is the normal end-systolic blood volume (in ml)?
a. 160-200
b. 120-140
c. 20-30

d. 70-80*
e. 15-20
90. Excitation conduction velocity is slowest in
a. Sinus node
b. Purkinje fibers
c. Ventricular cardiomyocytes
d. Bundle of His
e. Atrioventricular node*
91. The rapid depolarization phase of a typical cardiomyocyte is determined by ions:
a. sodium*
b. potassium
c. chlorine
d. magnesium
e. calcium
92. The human AV node is capable of generating APs with a frequency of
a. 20-40 per min
b. 10-20 per min
c. 60-80 per min
d. 80-100 per min
e. 40-60 per min*.
93. What is the normal end-diastolic blood volume (in ml)?
a. 15-20
b. 70-80
c. 120-140*
d. 20-30
e. 160-200
94. The QRST complex on the electrocardiogram reflects:
a. excitation of the venous sinus
b. atrial excitation
c. ventricular depolarization
d. ventricular repolarization
e. ventricular excitation*.
95. Electrodes for recording ECG in the III standard lead are placed as follows:
a. right arm - left leg
b. left arm-left leg*
c. right arm-left arm
d. right arm and left arm-left leg
e. right arm and left leg-left arm
96. The T wave on the electrocardiogram reflects:
a. atrial repolarization
b. atrial depolarization
c. venous sinus excitation
d. ventricular depolarization
e. ventricular repolarization*
97. Electrodes for ECG recording in the first standard lead are placed as follows:
a. right arm and left arm-left leg
b. right arm-left arm
c. right arm-left leg*
d. right arm and left leg-left arm
98. After bilateral transection of sympathetic nerves in the dog
a. The heart rate will decrease*.
b. The heart rate will first increase and then decrease
c. The heart rate will not change
d. The heart will stop
99. The electrocardiogram can be used to judge:
a. myocardial excitability and conduction*
b. heart valve function

c. pumping function
d. strength of heart contractions
100. The dromotropic effect on cardiac function is a change in:
a. pumping function
b. myocardial conduction*
c. myocardial excitability
d. heart rate

Physiology of Respiration

1. How does the minute volume of respiration change with an increase in the pressure of carbon dioxide in the alveolar air?
A) Does not change
B) Significantly reduced
C) Decreases
D) Increases *
2.How does the volume of the chest change when exhaling?
A) Does not change
B) Decreases *
C) Increases
D) not changed
3.How does the volume of the lungs change with an increase in the pressure difference in the pleural cavity and alveoli?
A) Remains unchanged
B) Increases *
C) Decreases
D) not changed
4. What is the name of the maximum volume of air that can be exhaled after a deep breath?
A) The reserve volume of breathing
B) Minute volume of breathing
C) The vital capacity of the lungs *
5.In case of violation of the tightness of the pleural cavity, pulmonary ventilation:
A) decreases
B) intensifies
C) does not change
D) is terminated *
6. What is the volume of anatomical dead space?
A) 80-100 ml
B) 140-150 ml *
C) 200-250 ml
D) 300-400 ml
7. What is the volume of minute ventilation?
A) 10-16 l
B) 4-6 l
C) 6-9 l *
D) 16-20 l
8. What is the volume of minute pulmonary ventilation under load?
A) 15-20 l
B) 60-90 l *
C) 200-250 l
D) 300-350 l
9. What is the volume of residual air?
A) 2000-2500 ml
B) 1000-1200 ml *
C) 350-500 ml
D) 400-450 ml
10. What is the reserve volume of inspiration?
A) 1200-1500 ml
B) 2000-3000 ml *

C) 1000-1200 ml
D) 1500-2000 ml
11. What is the reserve volume of exhalation?
A) 2000-2500 ml
B) 1000-1300 ml *
C) 400-700 ml
D) 300-600 ml
12. What is the vital capacity of the lungs in women?
A) 2000-2500 ml
B) 1500-2500 ml
C) 3000-4500 ml *
D) 4500-5000 ml
13. What is the vital capacity of the lungs in men?
A) 5000-8000 ml
B) 2500-3000 ml
C) 4000-6000 ml *
14.What is the total lung capacity?
A) Vital lung capacity + collapsed volume
B) Vital capacity of the lungs + respiratory volume
C) Vital capacity of the lungs + residual volume *
D) collapsed volume + respiratory volume
15. How much air can a person inhale with a calm breath?
A) 800-1000 ml
B) 1300-1500 ml
C) 350-500 ml *
D) 700-800 ml
16. How much air can a person exhale at rest?
A) 150-350 ml
B) 350-500 ml *
C) 750-850 ml
D) 900-1000 ml
17. In what phase of breathing does the blood pressure in the veins of the chest cavity become lower than atmospheric?
A) When exhaling
B) When inhaling *
C) In all phases of breathing
D) When breathing stops
18. In the pleural cavity during inhalation, the pressure is lower than atmospheric:
A) by 6 mm Hg. *
B) by 9 mm Hg.
C) by 2 mm Hg.
D) by 5 mm Hg.
19. In the pleural cavity after exhalation, the pressure is lower than atmospheric:
A) by 6 mm Hg.
B) by 3 mm Hg. *
C) by 10 mm Hg.
D) by 12 mm Hg.
20. How many times does the consumption of O2 and the formation of CO2 increase during physical activity?
A) 15-20 times *
B) 50-60 times
C) 30-40 times
D) 100 times
21.What force ensures the passage of gases through the wall of the alveoli?
A) Contraction of the respiratory muscles
B) Surface tension force
C) The difference in negative pressure in the pleural cavity during inhalation and exhalation

D) Partial pressure difference *
22.Which receptors are involved in the stimulation of lung ventilation during the initial period of physical activity?
A) Proprioreceptors of skeletal muscles *
B) Central and peripheral chemoreceptors
C) Peripheral chemoreceptors
D) Central chemoreceptors
23.What is the reason for the intake of air into the lungs when inhaling?
A) An increase in the volume of the chest *
B) Pressure in the alveoli, lower than atmospheric
C) pressure in the alveoli, higher than atmospheric
D) pressure in the alveoli equals atmospheric
24. What is the function of surfactant?
A) Prevents the friction of pleural leaflets
B) Facilitates the exchange of gases in the lungs
C) Does not allow the alveoli to subside *
D) Allows the alveoli to subside
25.What is the relative gas content in the alveolar air?
A) O2 - 16.5%, CO2 - 4.5%, N2 - 79%
B) O2- 20%, CO2 - 0.3%, N2- 79%
C) O2 - 14.5%, CO2 - 6.5%, N2 - 79% *
D) O2 - 22%, CO2 - 3%, N2 - 79%
26.What is the relative content of gases in the exhaled air?
A) O2- 21%, CO2- 0.03%, N2- 79%
B) O2 - 20%, CO2 - 5%, N2 - 79%
C) O2 - 16.5%, CO2 - 4.5%, N2 - 79% *
D) O2 - 22%, CO2 - 3%, N2 - 79%
27.What is the relative content of gases in the inhaled air?
A) O2 - 21%, CO2 - 0.03%, N2 - 79% *
B) O2 -15.5%, CO2 - 6.5%, N2 - 79%
C) O2 - 16.5%, CO2 - 4.5%, N2 - 79% *
D) O2 - 22%, CO2 - 3%, N2 - 79%
28. What is the partial pressure of oxygen in the alveolar air?
A) 200 mmHg.
B) 100 mmHg. *
C) 80 mmHg
D) 40 mmHg 6.

29. What is the partial pressure of carbon dioxide in the alveolar air?
A) 200 mmHg
B) 100 mmHg
C) 40 mmHg *
D) 46 mm Hg.
30. What is the composition of the air contained in the anatomical dead space?
A) Alveolar
B) Pleural
C) Inhaled *
D) Exhaled
31. Blood is injected into a space filled with nitrogen alone. Nitrogen pressure - 750 mm Hg. What gases will pass into and out of the blood?
A) N2 and O2 - into the blood, CO 2 - out of the blood
B) N2 - into the blood, O2 and CO2 - out of the blood *
C) N2 - from the blood, O2 and CO2 - into the blood
D) N2, O2 and CO2 - from blood
32.A stable level of lung ventilation, or plateau level, with increased physical activity occurs on average after:
A) 30 s *

B) 3 s
C) 10 ms
D) 1 ms
33. The number of respiratory movements in an adult at rest is equal to:
A) 30-35 per minute
B) 8-10 v min
C) 16-20 v min *
D) 20-28 v min
34. Mountain sickness in humans develops at an altitude of more than:
A) 3000 m *
B) 2000 m
C) 1000 m
D) 500 m
35.The dissociation of oxyhemoglobin increases under the condition:
A) increasing the pH of the blood, reducing the CO2 content in the blood
B) decrease in body temperature, increase in the content of carboxyhemoglobin
C) increase in blood pH, increase in body temperature, increase in CO2 content in the blood *
D) increase in blood pH and increase in body temperature
36. What are the main muscles involved in the act of calm inhalation?
A) Diaphragm, stair and rhomboid muscles
B) Diaphragm, abdominal and trapezius muscles
C) Diaphragm, intercostal external and intercostal muscles *
D) Abdominal and trapezius muscles
37.What parameters do I need to know to calculate minute pulmonary ventilation?
A) The frequency of respiratory movements and the reserve volume of inspiration
B) The frequency of respiratory movements and the residual volume
C) The frequency of respiratory movements and respiratory volume *
D) The frequency of respiratory movements
38. What is the oxygen tension in arterial blood?
A) 40 mm Hg.
B) 20 mm Hg.
C) 96 mm Hg. *
D) 120 mm Hg.
39. What is the oxygen voltage in the venous blood?
A) 40 mm Hg. *
B) 96 mm Hg.
C) 120 mm Hg.
D) 46 mm Hg.
40.When does excitation occur in the lung stretch receptors?
A) When the hypothalamic centers are excited
B) When the expiratory department of the respiratory center is excited
C) With a decrease in lung volume
D) With an increase in lung volume *
41.The method for determining the content of oxyhemoglobin in the blood is called:
A) pneumography
B) tachography
C) spirometry
D) oxyhemometry *
42.Carbon dioxide tension in arterial blood:
A) 45 mmHg.
B) 39 mmHg. *
C) 15 mm Hg.
D) 96 mm Hg.
43.The voltage of carbon dioxide in venous blood:
A) 100 mm Hg.
B) 46 mm Hg. *
C) 40 mm Hg.

D) 15 mm Hg.
44.With respiratory alkalosis, the partial pressure of CO 2 in the blood:
A) increases first and then decreases
B) does not change
C) increases
D) decreases *
45.During physical exertion, ventilation of the lungs:
A) first decreases and then increases
B) decreases
C) increases *
D) does not change
46. An increase in the oxygen content in the blood causes:
A) hyperventilation of the lungs
B) does not affect lung ventilation
C) hypoventilation of the lungs *
D) hyperventilation and hypoventilation
47.An increase in the content of carbon dioxide in the blood causes:
A) does not affect lung ventilation
B) hypoventilation of the lungs
C) hyperventilation of the lungs *
D) hyperventilation and hypoventilation
48. What is the direct cause that causes hyperventilation of the lungs in the mountains?
A) Stimulation of the mechanoreceptors of the lungs
B) Stimulation of irritant receptors
C) Stimulation of chemoreceptors of sinocarotid zones *
D) Stimulation of central chemoreceptors
49. What is called the oxygen capacity of blood?
A) The maximum amount of oxygen that can bind blood when hemoglobin is fully saturated with oxygen *
B) Diffusion of oxygen and alveolar air into the blood
C) Part of the oxygen absorbed by tissues from venous blood
D) Part of the oxygen absorbed by tissues from arterial blood
50. What is called the oxygen utilization coefficient?
A) The maximum amount of oxygen that can bind blood when hemoglobin is fully saturated with oxygen
B) Most of the oxygen contained in arterial blood
C) Part of oxygen absorbed by tissues from venous blood
D) Part of oxygen absorbed by tissues from arterial blood *
51. From which neurons of the bulbar department does the impulse flow to the external intercostal muscles?
A) From the neurons of the Varoliev bridge
B) From cerebellar neurons
C) From expiratory neurons of the respiratory center
D) From inspiratory neurons of the respiratory center *
52. Where is the respiratory center located?
A) In the cerebral cortex
B) In the cerebellum
C) In the midbrain
D) In the medulla oblongata *
53. If a person dives without special equipment with preliminary hyperventilation, the cause of sudden loss of consciousness may be increasing:
A) asphyxia
B) hypoxia *
C) hyperoxia
D) hypercapnia
54.Which parts of the central nervous system are involved in the regulation of respiration?
A) Cerebral cortex, spinal cord, midbrain
B) Bulbar, cerebellum, limbic system

C) Bulbar, hypothalamus, cerebral cortex *
55.Which department of the central nervous system provides voluntary breathing?
A) Subcortical nuclei
B) Bulbar department
C) The cerebellum
D) The cerebral cortex *
56. The danger of preliminary hyperventilation when diving without special equipment is the probable development of:
A) metabolic alkalosis
B) metabolic acidosis
C) respiratory alkalosis *
D) respiratory acidosis
57. Why is it impossible to increase the length of a standard tube (30-35 cm) when diving with a mask and a tube?
A) There is a pressure gradient between the air pressure in the alveoli and the water pressure on the chest *
B) Due to the risk of hypercapnia
C) Due to the risk of hypoxia
D) The volume of dead space increases
58. When diving to a depth with special equipment, the pressure of the supplied gas mixture:
A) for every 10 m of immersion, it increases by 1 atm. *
B) 2 times higher than atmospheric
C) below atmospheric
D) equal to atmospheric
59.When submerged under water, there is a danger of hypothermia, since:
A) the heat capacity and thermal conductivity of water is less than that of air
B) the thermal conductivity of water is less, and the heat capacity is greater than that of air
C) the thermal conductivity of water is greater and the heat capacity is less than that of air
D) the thermal conductivity and heat capacity of water is greater than that of air *
60. What is called a respiratory dead space?
A) Bronchioles with alveolar passages
B) Respiratory tract in which there is no gas exchange between air and blood *
C) Alveoli that are not perfused with blood
D) Respiratory tract in which there is gas exchange between air and blood
61. What is called the partial pressure of a gas?
A) The force with which the dissolved gas molecules tend to escape into the gas medium
B) The amount of pressure in the alveoli
C) The pressure per one fraction of this gas in the gas mixture *
D) The amount of pressure in the capillaries of the interalveolar septum
62. What does the term "respiratory coefficient" mean?
A) The ratio of the number of molecules of released CO_2 to the number of molecules of absorbed O_2 *
B) The amount of nitrogen absorbed and released
C) The number of molecules of O_2 absorbed by the body
D) The number of molecules of CO_2 released from the body
63. What is considered the strongest respiratory stimulant?
A) Hypoxia
B) Hypocapnia
C) Hyperoxia
D) Hypercapnia *
64. Increased ventilation of the lungs with increased physical activity is accompanied by:
A) hypocapnia and hypoxia
B) hypercapnia and hypoxia *
C) hypocapnia
D) hypoxia
65. Where is the carbonic anhydrase enzyme located?
A) In mucus
B) In surfactant

C) In red blood cells *
D) In blood plasma
66. What is the functional residual lung capacity?
A) Residual volume + collapsed volume
B) Residual volume + reserve volume of inspiration
C) Residual volume + reserve expiratory volume *
D) Collapsed volume + reserve volume of inspiration
67. The danger of pre-hyperventilation when diving without special equipment is the likely development of:
A) metabolic alkalosis
B) metabolic acidosis
C) respiratory alkalosis *
D) respiratory acidosis
68. Why is it impossible to increase the length of a standard tube (30-35 cm) when diving with a mask and a tube?
A) There is a pressure gradient between the air pressure in the alveoli and the water pressure on the chest *
B) Due to the risk of hypercapnia
C) Due to the risk of hypoxia
D) The volume of dead space increases
69.Which parts of the central nervous system are involved in the regulation of respiration?
A) Cerebral cortex, spinal cord, midbrain
B) Bulbar, cerebellum, limbic system
C) Bulbar, hypothalamus, cerebral cortex *
D) Cerebral cortex, cerebellum, midbrain

Digestion. Metabolism.

1. Alpha-amylase activity decreases in:
A) acidic environment *
B) neutral environment
C) alkaline environment
D) neutral and alkaline environments
2. Vitamin K is involved in the synthesis of:
A) fibrinolytic factors
B) secondary anticoagulants
C) primary anticoagulants
D) blood clotting factors *
3. From what components in the absence of fat in food can fat be synthesized?
A) From carbohydrates *
B) fiber
B) from amino acids
D) from starch
4. Inactivation of hydrochloric acid and pepsin in the duodenum occurs under the influence of:
A) bile *
B) mucoproteins
B) trypsin
D) enterokinase
5.What is the name of the method of determining the amount of heat generated by the body?
A) sphygmography
B) Oxyhemography
B) Calorimetry *
D) Spirometry
6.What food inhibits gastric secretion?
A) meat
B) Bread
B) fish
D) Fat *
7.What amino acids are called non-essential?

A) Amino acids that are not synthesized in the human body
B) Amino acids that can be synthesized in the human body *
C) Amino acids that must be supplied to the body
D) Amino acids not involved in protein synthesis
8.What amino acids are called essential?
A) Amino acids that are not synthesized in the human body and must be supplied with food *
B) Amino acids that can be synthesized in the human body
C) Amino acids that must be supplied to the body
D) Amino acids not involved in protein synthesis
9.What types of motor activity are characteristic of the stomach?
A) Peristalsis *
B) Rhythmic segmentation
C) pendulum movements
D) pendulum and Rhythmic
10.What vitamins are synthesized by bacteria in the large intestine?
A) Vitamin D
B) Vitamins A and E
C) Vitamins P and C
D) Vitamins K and B vitamins *
11.What are the main enzymes secreted by the salivary glands?
A) amylase, lipase
B) Lipase, maltase
C) Maltase, enterokinase
D) Maltase, amylase *
12.Which salivary glands secrete predominantly serous secretions?
A) sublingual
B) Parotid *
C) submandibular
D) sublingual, submandibular
13.What enzymes are secreted by the pancreas in an active state?
A) Pepsin
B) Trypsinogen
C) Procarboxypeptidases A and B
D) Amylase, lipase, nucleases *
14.What is the pH of gastric juice in the presence of protein foods?
A) 4.0-5.5
B) 0.8-1.5 *
C) 5.5-6.0
D) 7.4-8.0
15.What is the normal basal metabolic rate for a man with an average body weight of 70 kg?
A) 500 kcal
B) 3000 kcal
C) 2000 kcal
D) 1700 kcal *
16.What is the main role of the digestive tract hormone gastrin?
A) Stimulates the secretion of the pancreas
B) Stimulates the secretion of gastric juice *
C) converts pepsinogen to pepsin
D) Activate pancreatic enzymes
17.What is the role of the gastrointestinal hormone secretin?
A) Stimulates the secretion of pancreatic juice*
B) Stimulates the secretion of gastric juice
C) Stimulates the secretion of bile
D) Stimulates the secretion of intestinal juice
18.What type of contraction of the muscles of the small intestine ensures the movement of food through the intestines?
A) Rhythmic segmentation

B) pendulum movements
C) Propulsive peristalsis *
D) Non-propulsive peristalsis
19.What type of contraction is performed by the longitudinal layer of the muscles of the small intestine?
A) rhythmic segmentation
C) Pendulum contractions *
B) peristaltic contractions
D) pendulum and Rhythmic
20.What part of the CNS directly controls appetite, fat synthesis and breakdown?
A) hypothalamus *
B) Thalamus
C) cerebellum
D) Midbrain
21.What factor in the gastrointestinal tract converts insoluble fatty acids into soluble?
A) hydrochloric acid in the stomach
B) Bile acids *
C) gastric lipase
D) pancreatic juice lipase
22.What phase of gastric secretion can be studied in the "sham feeding" experiment?
A) intestinal
B) gastric
C) complex reflex (brain) *
D) gastric, intestinal
23.The intestinal phase of gastric secretion is observed when chyme enters:
A) oral cavity
B) duodenum *
C) stomach
D) large intestine
24.At what level does the reflex arc of the chewing reflex close?
A) on the thalamic
B) on the spinal
C) On the bulbar *
D) on the cerebellum
25.At what level of the CNS does the reflex arc of the swallowing reflex close?
A) On the bulbar *
B) on the thalamic
C) on the spinal
D) on the cerebellum
26.What food produces the most acidic gastric juice?
A) for bread
B) For meat *
C) for milk
D) for sugar
27.The intestinal phase of gastric secretion is mainly affected by:
A) hydrolysis products and intestinal hormones *
B) local nervous mechanisms
C) local reflex mechanisms
D) local reflex + nervous
28.The formation of secretin is stimulated by:
A) pepsin
B) trypsinogen
C) hydrochloric acid *
D) hydrolysis products
29.Pepsin of gastric juice hydrolyzes:
A) fats
B) proteins *
C) mucopolysaccharides

D) carbohydrates
30.Digestion of carbohydrates in the stomach occurs under the action of amylase:
A) saliva*
B) gastric juice
C) pancreas
D) juice of large intestine
31.The process happens periodically:
A) both processes
B) formation of bile
C) bile secretion *
D) bile excretion
32.Hepatic bile differs from gallbladder:
A) low content of water, potassium ions
B) high content of fatty acids, sodium ions, chlorine, cholesterol, calcium
C) low content of bile acids, bile pigments, cholesterol *
D) high content of fatty acids, potassium ions
33.In relation to plasma saliva:
A) hypotonic *
C) isotonic
B) hypertonic
D) isotonic, hypotonic
34.Under the influence of gastrin, gastric motility:
A) varies depending on the phase of digestion
B) amplifies *
C) does not change
D) getting weaker
35.Under the influence of bile are absorbed:
A) glucose
B) products of protein hydrolysis
C) fat-soluble vitamins, cholesterol, calcium *
D) monosaccharides, amino acids
36.The conversion of pepsinogen to pepsin is activated under the influence of:
A) saliva
B) hydrochloric acid and pepsin *
C) enterokinase
D) gastrin
37.Under what conditions is trypsinogen converted to trypsin?
A) under the influence of gastric enzymes
B) Under the influence of bile
C) Under the influence of hydrochloric acid of gastric juice
D) Upon contact with the mucous membrane of the duodenum and the action of enterokinase *
38.Cystic bile differs from hepatic bile in a high content of:
A) water, potassium ions
B) fatty acids, sodium ions, chlorine, cholesterol
C) cholesterol, bile acids, bile pigments *
D) high content of fatty acids, potassium ions
39. Saliva reaction:
A) always alkaline
B) varies depending on the composition of food *
C) always neutral
D) always sour
40.The receptors that are irritated by the swallowing reflex are located on:
A) the root of the tongue *
B) the middle third of the tongue
C) anterior third of the tongue
D) lateral surface of the tongue
41.With the highest speed evacuated from the stomach:

A) peptides
B) carbohydrates *
C) fats
D) proteins
42.With the lowest speed evacuated from the stomach:
A) peptides
B) proteins
C) fats *
D) carbohydrates
43.Secretin is formed:
A) in the duodenum
C) in the pancreas
B) in the stomach
D) in the large intestine
44.Secretin stimulates the secretion of pancreatic juice with a predominance of:
A) bicarbonates *
B) mucus
C) enzymes
D) HCL
45.The secretion of the gastric glands excites:
A) histamine *
B) cholecystokinin (pancreozymin)
B) VIP
D) secretin
46.The secretion of digestive enzymes is inhibited by the hormone:
A) growth hormone
B) insulin
C) aldosterone
D) adrenaline *
47.The secretion of hydrochloric acid by the glands of the stomach inhibits:
A) acetylcholine
B) secretin *
C) histamine
D) gastrin
49.What percentage of body weight is normally fat?
A) 50-60%
B) 0-1%
C) 10-20% *
D) 40-50%
50.How many amino acids are found in dietary proteins?
A) 5
B) 100
C) 60
D) 20*
51.How many liters of gastric juice is excreted in an adult per day?
A) 0.3 l
B) 2.5 l *
C) 10 l
D) 30 l
52.How many non-essential amino acids are there?
A) 12 *
B) 10
C) 5
D) 20
53.How many essential amino acids are there?
A) 12
B) 8*

C) 5
D) 20
54.According to the surface rule, a person's energy expenditure is proportional to him:
A) the size of the body surface *
B) age
C) body weight
D) growth
55.Stimulation of what nerve conductors innervating the salivary glands causes abundant secretion of liquid saliva?
A) recurrent nerve
B) sympathetic
C) Accessory nerve
D) Parasympathetic *
56.Stimulation of what nerve conductors that innervate the salivary glands leads to the release of a small amount of saliva rich in organic substances?
A) parasympathetic
B) recurrent nerve
C) Accessory nerve
D) Sympathetic *
57.Saliva enzymes act mainly on:
A) carbohydrates *
B) fats
C) proteins
D) peptides
58.The swallowing center is located in:
A) cerebellum
B) diencephalon
C) medulla oblongata*
D) midbrain
59.The salivary center is located in:
A) midbrain
B) medulla oblongata *
C) the hypothalamus
D) diencephalon
60.The centers of sympathetic innervation of the salivary glands are located in:
A) medulla oblongata
B) midbrain
C) spinal cord *
D) diencephalon
61.What is the respiratory coefficient for protein oxidation?
A) 0.5
B) 1.0
C) 0.1
D) 0.8 *
62.What is the respiratory quotient for fat oxidation?
A) 0.7 *
B) 1.0
C) 0.1
D) 0.8
63. What is the respiratory quotient for carbohydrate oxidation?
A) 0.8
B) 1.0 *
C) 0.1
D) 0.5
64.What causes proteins to swell in the digestive tract?
A) intestinal juice
B) bile

C) Hydrochloric acid *
D) Enzymes
65.What does the term "negative nitrogen balance" mean?
A) nitrogen retention in the body
B) Increasing the protein content in food
C) The state of nitrogen metabolism, in which the excretion of nitrogen from the body exceeds its intake with food *
D) The state of nitrogen metabolism, in which the intake of nitrogen from food exceeds its excretion from the body
66.What does the term "positive nitrogen balance" mean?
A) The amount of nitrogen excreted from the body
B) Protein content in food
C) The state of nitrogen metabolism, in which the excretion of nitrogen from the body exceeds its intake with food
D) The state of nitrogen metabolism, in which the intake of nitrogen from food exceeds its excretion from the body *
67.What causes the pyloric sphincter of the stomach to open?
A) Acid environment in the pylorus and duodenum
B) Alkaline environment in the pyloric region and duodenum
C) Acidic environment in the pyloric region, alkaline - in the duodenum *
D) Alkaline environment in the pyloric region, acidic - in the duodenum
68.What stimulates the digestive tract hormone cholecystokinin (pancreozymin)?
A) Increase in the alkalinity of pancreatic juice
B) Enrichment of pancreatic juice with salts
C) Formation of pancreatic enzymes *
D) Decrease in the alkalinity of pancreatic juice
69.What is the nitrogen balance of the body?
A) The difference between the amount of nitrogen that enters the body with food and the amount of nitrogen excreted from the body *
B) The amount of nitrogen ingested with food
C) The ratio of essential and non-essential amino acids in a protein
D) The ratio of amino acids in the protein
70.What is the biological value of food proteins?
A) The importance of food proteins for life
B) The relative amount of protein in food
C) high calorie content
D) The content of all amino acids in proteins, including essential ones *

Physiology of thermoregulation and Energy

1. **The polymer of glucose in the human body is**
    a) Starch
    b) **Glycogen**
    c) Cellulose
    d) Triglyceride
2. **Which of the following do you need to know to determine the daily intake of energy in the body?**
    a) The amount of oxygen consumed
    b) **The amount of proteins, fats and carbohydrates consumed**
    c) Volume of emitted carbon dioxide
    d) The amount of released heat
3. **The caloric value of carbohydrates is**
    a) 1.3 kcal/g
    b) **4.1 kcal/g**
    c) 7.2 kcal/g
    d) 9.3 kcal/g
4. **The caloric value of proteins is**
    a) 1.3 kcal/g
    b) **4.1 kcal/g**

c) 7.2 kcal/g
d) 9.3 kcal/g

5. **The caloric value of fats is**
   a) 1.3 kcal/g
   b) 4.1 kcal/g
   c) 7.2 kcal/g
   d) **9.3 kcal/g**
6. **Which of the chemical reactions occurring in the body leads to a greater release of energy per 1 g of the substrate?**
   a) Protein oxidation
   b) Carbohydrate oxidation
   c) **Fat oxidation**
   d) The amount of energy released in all the above cases is the same
7. **What food substances can participate in the metabolism in the body?**
   a) All received with food
   b) **All absorbed from the gastrointestinal tract into the blood**
   c) All hydrolyzed in the gastrointestinal tract
   d) Only complete organic matter
8. **Nutrients are considered digestible.**
   a) Broken down in the gastrointestinal tract
   b) **Absorbed from the gastrointestinal tract into the blood**
   c) Included in the cellular structures
   d) subjected to catabolism in cells
9. **Fully digestible food ingredients**
   a) Does not break down in cells
   b) **Not excreted in feces**
   c) Not found in urine
   d) Not hydrolyzed in the gastrointestinal tract
10. **Correction for digestibility must be made when determining**
    a) basal exchange
    b) **Daily income of energy**
    c) Completeness of proteins
    d) Daily energy consumption
11. **The main exchange is**
    a) Metabolism of proteins, fats and carbohydrates at rest
    b) **Energy consumption at rest**
    c) Method for determining energy costs
    d) Energy consumption in the usual way of life for a given person
12. **In order to calculate the daily energy intake in the body, you need to know**
    a) Daily oxygen intake
    b) Daily release of carbon dioxide
    c) **Caloric value of proteins, fats and carbohydrates**
    d) Daily excretion of nitrogen in the urine
    e) Daily release of heat
13. **Basal metabolic rate is the amount of energy a person expends while**
    a) normal load
    b) **In complete peace**
    c) To maintain body temperature when the ambient temperature changes
    d) During heavy physical work
14. **Basal metabolic rate is the amount of energy a person expends while**
    a) hard physical work
    b) type of activity for this person
    c) **In physical and emotional peace**
    d) During sleep
15. **The main exchange is**
    a) Metabolism of proteins, fats and carbohydrates at rest
    b) **Minimum energy consumption at rest**

c) Balance between income and expenditure of energy
d) Exchange with normal hormonal status

16. **What is basal exchange?**
    a) Protein metabolism
    b) Metabolism of essential amino acids
    c) Energy consumption with strictly dosed physical activity
    d) Sleep energy expenditure
    e) **The minimum energy expenditure of an awake person**
17. **Which of the following processes can consume basal metabolic energy?**
    a) Skeletal muscle work during exercise
    b) brain activity during sleep
    c) Brain activity during intense mental stress
    d) **The work of the heart at rest**
18. **Under mental load, energy consumption**
    a) **More main exchange**
    b) Less basal exchange
    c) Equal to basal exchange
    d) May be more or less than basal exchange, depending
19. **When measuring basal metabolic rate, the subject must**
    a) Stand
    b) Sit
    c) **Lie**
    d) Walk
20. **When measuring basal metabolism, the temperature in the room should be**
    a) 5 degrees from
    b) **20 degrees from**
    c) 36.6 degrees from
    d) Above 36.6 degrees
21. **Is it possible to measure basal metabolic rate after a meal?**
    a) Yes
    b) **Not**
    c) Only in children
    d) Depending on the composition of the food
22. **To determine the daily intake of energy in the body using**
    a) direct calorimetry
    b) Indirect calorimetry
    c) Answers (1) and (2) are correct
    d) **All answers are wrong**
23. **The method of calculating the energy consumption of the body by the amount of heat emitted by the body is called**
    a) thermometry
    b) **Direct calorimetry**
    c) Indirect calorimetry
    d) Physiological calorimetry
24. **When determining energy consumption by direct calorimetry, they examine**
    a) Composition of exhaled air
    b) The amount of nitrogen in urine and the composition of exhaled air
    c) **The amount of heat given off by the body**
    d) The number of calories in the food eaten
25. **In order to calculate daily energy expenditure using the Direct Calorimetry method, you need to know:**
    a) Daily intake of proteins, fats and carbohydrates
    b) Daily oxygen consumption and carbon dioxide release
    c) Diurnal excretion of nitrogen in the urine, excretion of carbon dioxide and water
    d) **Daily release of heat**
26. **Direct calorimetry can be used to determine**
    a) body temperature

b) Nutrient calorie content
c) **Daily energy consumption**
d) daily calorie intake

27. **cannot be determined by direct calorimetry.**
    a) BX
    b) Energy consumption at rest
    c) Daily energy consumption
    d) **Daily income of energy**
28. **To determine the daily energy consumption by indirect calorimetry, it is necessary to calculate:**
    a) **The amount of oxygen consumed and carbon dioxide released**
    b) The number of proteins, fats and carbohydrates consumed
    c) Nutrient absorption
    d) Nutrient calorie content
29. **The method of calculating the body's energy consumption by the ratio of gases consumed and released during breathing is called**
    a) Gasometry
    b) Direct calorimetry
    c) **Indirect calorimetry**
    d) Spirometry
30. **The ratio of the volume of CO2 released during respiration to the absorbed O2 I is used when**
    a) Determination of proper body temperature
    b) Calculation of the proper mass of adipose tissue
    c) **Definition energy consumption of the body**
    d) Determining the composition of food digested per day
31. **Indirect calorimetry can be used to determine**
    a) body temperature
    b) Nutrient calorie content
    c) **Daily energy consumption**
    d) daily calorie intake
32. **Cannot be determined using indirect calorimetry**
    a) BX
    b) Energy consumption at rest
    c) Daily energy consumption
    d) **Daily income of energy**
33. **The caloric value of proteins, fats and carbohydrates is used in**
    a) **Determination of the daily income of energy**
    b) Definition of the basic exchange
    c) Direct calorimetry
    d) Indirect calorimetry
34. **The central thermoreceptors are**
    a) in the medulla oblongata
    b) In the aortic arch
    c) **in the hypothalamus**
    d) In the cerebral cortex
35. **The thermoregulation center is located**
    a) in the medulla oblongata
    b) In the midbrain
    c) in the thalamus
    d) **in the hypothalamus**
36. **In what part of the nervous system is the center responsible for the occurrence of muscle tremors in the cold?**
    a) In the lateral horns of the spinal cord
    b) **in the hypothalamus**
    c) in the medulla oblongata
    d) In the midbrain

37. **Choose the right position**
    a) The thermoregulatory center is located in the medulla oblongata
    b) Thermoreceptors are located in the pons
    c) **The hypothalamus plays a major role in regulating body temperature**
    d) Thermoreceptors are located only in the skin, but not in the CNS
38. **Thermoreceptors are available**
    a) Only in skin
    b) Only in skin and mucous membranes
    c) **In the skin, mucous membranes and in the central nervous system**
    d) Only in the hypothalamus
39. **Heat dissipation refers to**
    a) Shiver
    b) **Radiation**
    c) Increased metabolism in the liver
    d) Increased metabolism in muscles
40. **Does not apply to heat dissipation**
    a) **Shiver**
    b) Evaporation
    c) Radiation
    d) Heat conduction
41. **Choose the correct statement**
    a) Trembling is a way to increase heat transfer, not heat production
    b) Heat transfer does not include radiation.
    c) Heat conduction is not a method of heat transfer in a living organism.
    d) **During the evaporation of water from the surface of the body, heat is released**
42. **Radiation is one of the mechanisms**
    a) Heat products
    b) **Heat dissipation**
    c) Both heat production and heat transfer
    d) Thermal conduction
43. **Heat conduction is one of the mechanisms**
    a) Heat production in the body
    b) **Heat transfer in the body**
    c) Both heat production and heat transfer in the body
    d) Heat transfer only in inanimate objects
44. **Which of the following is not required at determining the daily intake of energy in the body?**
    a) **The amount of oxygen consumed**
    b) The amount of protein consumed
    c) The amount of fat consumed
    d) The amount of carbohydrates consumed
45. **In an adult, the main mechanism of heat production When the ambient temperature decreases,**
    a) Glucose oxidation
    b) Decreased ADH production
    c) **Contraction of skeletal muscles**
    d) Spasm of skin vessels
46. **Muscle trembling when cooling a person**
    a) **Serves to generate heat in the muscles**
    b) Necessary for vasoconstriction of the skin and superficial muscles
    c) Needed to increase blood flow in the vessels of the skin and superficial muscles
    d) Is a rudimentary reaction
47. **In an adult, an increase in heat production will be most suppressed by drugs**
    a) Blocking increase in hepatic metabolism
    b) Blocking the expansion of skin vessels
    c) **Blocking muscle contractions**
    d) Sweat blocking

Physiology of excretion

1. All organs are involved in the excretion of end products of metabolism, with the exception of:
   A) kidneys
   B) gastrointestinal tract
   C) lungs and sweat glands
   D) spleens *
2. In which part of the nephron does aldosterone act?
   A) in the distal tubule
   B) In the ascending loop of Henle *
   C) descending loop of Henle
   D) In the proximal tubule
3. In what part of the nephron is the rotary-countercurrent mechanism carried out?
   A) in the capsule of the glomerulus
   B) in the distal tubule
   C) in the proximal tubule
   D) In the loop of Henle *
4. In which part of the nephron does obligatory reabsorption take place?
   A) In the Shumlyansky-Bowman capsule
   B) In the proximal *
   C) in the loop of Henle
   D) in the distal region
5. Where does reabsorption take place in the nephron?
   A) in the distal canal
   B) in the glomeruli
   C) in the loop of Henle
   D) In the proximal tubule *
6. In which part of the nephron does filtration occur?
   A) in the proximal tubule
   B) In the renal glomeruli *
   C) loop of Henle
   D) in the distal tubule
7. Synthesized in the cells of the renal tubules:
   A) creatinine
   B) aldosterone
   C) urea
   D) hippuric acid, ammonia *
8. Erythrocytes and protein were found in the urine. What does this indicate?
   A) About the violation of the secretion process in the tubules
   B) About the violation of the synthesis process in the tubules
   C) About the violation of the process of reabsorption in the tubules
   D) On violation of the permeability of the glomerular membrane and filtration *
9. The body revealed a deficiency of K^+. In this case, in the renal tubules, potassium ions undergo:
   A) filtering
   B) reabsorption and secretion
   C) secretions
   D) enhanced reabsorption *
10. Synthesized in the kidneys:
   A) adrenaline, aldosterone
   B) histamine, calcitonin
   C) angiotensin II, serotonin
   D) renin *
11. During urination, potassium ions are secreted into:
   A) proximal nephron
   B) distal nephron *
   C) loop of Henle
   D) collecting ducts

12. During urination, organic acids and bases are secreted into:
    A) proximal nephron *
    B) distal nephron
    C) loop of Henle
    D) collecting ducts
13. Hydrostatic pressure in the capillaries of the renal glomerulus is normally equal to:
    A) 70-80 mm Hg *
    B) 80-90 mm Hg
    C) 40-50 mm Hg
    D) 20-30 mm Hg.
14. What hormone can cause water retention in the body?
    A) aldosterone
    B) adrenaline
    C) glucagon
    D) Antidiuretic *
15. What hormone can cause sodium retention in the body?
    A) adrenaline
    B) antidiuretic
    C) Aldosterone*
    D) glucagon
16. Difficulty in the outflow of urine from the tubules of the nephron. How will glomerular filtration change?
    A) will increase significantly
    B) will decrease *
    C) will increase
    D) will not change significantly
17. What part of the nephron consumes a lot of oxygen?
    A) tubules *
    B) All departments are the same
    C) glomeruli
    D) collecting ducts
18. What is the mechanism of action of vasopressin on diuresis?
    A) Increases water reabsorption*
    B) Reduces water reabsorption
    C) Decreases sodium reabsorption
    D) Increases sodium reabsorption
19. What is the mechanism of action of aldosterone on diuresis?
    A) Increases sodium reabsorption*
    B) Reduces sodium reabsorption
    C) Reduces water reabsorption
    D) Increases water reabsorption in the proximal tubule
20. Which of the statements is incorrect? The kidneys are involved in the regulation of:
    A) leukopoiesis *
    B) excretion of protein metabolism products
    C) constancy of osmotic pressure and blood pH
    D) volume of blood and other body fluids
21. The amount of primary urine (filtrate) formed in the kidneys during the day is:
    A) 180-200 l *
    B) 200-300 l
    C) 10-15 l
    D) 1.5 l
22. The final urine is formed as a result of:
    A) filtration, reabsorption, secretion *
    B) filtration, osmosis
    C) filtration, hemolysis, secretion
    D) filtration, diffusion, absorption
23. Cleansing coefficient in the kidney:

A) the volume of plasma released from a non-threshold substance in 1 min *
B) the volume of plasma filtered into the capsule in 1 min
C) the volume of primary urine formed during the day
D) the amount of threshold substance released into the lumen of the tubules in 1 min

24. What part of the renal tubules is predominantly affected by antidiuretic hormone?
A) on the collecting duct *
B) loop of Henle
C) on the proximal tubule
D) To the distal tubule

25. Water is absorbed most intensively in:
A) proximal tubule *
B) collecting duct
C) loop of Henle
D) distal tubule

26. Obligate water reabsorption occurs mainly in:
A) descending part of the loop of Henle *
B) distal convoluted tubule
C) proximal convoluted tubule
D) ascending loop of Henle

27. Mandatory reabsorption of amino acids occurs in:
A) proximal convoluted tubule *
B) collecting ducts
C) distal convoluted tubule
D) loop of Henle

28. Mandatory reabsorption of amino acids occurs in:
A) proximal convoluted tubule *
B) collecting ducts
C) distal convoluted tubule
D) loop of Henle

29. Mandatory reabsorption of water, glucose, sodium and potassium - function:
A) proximal tubule *
B) distal tubule
C) collecting ducts
D) capillaries of the renal corpuscle

30. The oncotic pressure of blood plasma in the capillaries of the renal glomerulus is:
A) 25-30 mm Hg *
B) 50-70 mm Hg
C) 70-80 mm Hg
D) 80-90 mm Hg.

31. The main resulting force that provides blood filtration in the renal glomeruli:
A) effective filtration pressure in the glomeruli *
B) hydrostatic fluid pressure in the loop of Henle
C) hydrostatic pressure of the liquid in the Bowman capsule
D) oncotic pressure of plasma proteins

32. The main elements of the nephron are all of the following except:
A) capsules of the renal corpuscle
B) distal tubule
C) proximal tubule
D) renal pelvis *

33. From the difference in the lumen of the afferent and efferent arterioles and the permeability of the membrane of the capillaries of the glomerulus depends on the value:
A) blood plasma filtration *
B) tubular secretion
C) urine reabsorption
D) plasma oncotic pressure

34. Primary urine is formed in the process:
A) filtering *

B) concentration
C) osmosis
D) reabsorption

35. Primary active transport ensures the reabsorption of substances from the tubule of the kidney into the blood:
A) against an electrochemical gradient with energy consumption *
B) along the concentration gradient using energy
C) along the concentration gradient without energy expenditure
D) against the electrochemical gradient without energy consumption

36. Increases water reabsorption in the kidney:
A) vasopressin*
B) acetylcholine
C) renin
D) adrenaline

37. Bud. The category of non-threshold substances includes:
A) inulin *
B) urea
C) amino acids
D) glucose

38. Threshold substances include:
A) glucose *
B) albumin
C) hippuric acid
D) creatinine

39. At what level of glucose in the blood is it excreted in the urine?
A) Above 10 mmol/l *
B) Above 50 mmol/l
C) Above 20 mmol/l
D) Above 5.5 mmol/l

40. The process of secretion in the nephrons of the kidney is:
A) active removal of substances from the blood into the lumen of the tubules *
B) excretion of metabolic products from the body
C) active absorption of substances from the renal tubules into the blood
D) filtration of blood plasma into the lumen of the tubule

41. Reabsorption during urination is called:
A) the process of reabsorption of substances from the renal tubules into the blood *
B) release of substances from the blood into the lumen of the renal tubules
C) the formation of primary urine
D) only active absorption of substances from the renal tubules

42. Reabsorption in the renal tubules is regulated by:
A) aldosterone, vasopressin *
B) acetylcholine, histamine
C) serotonin, norepinephrine
D) adrenaline, oxytocin

43. Reabsorption of water in nephrons is carried out by:
A) passive transport *
B) facilitated diffusion
C) filtering
D) active transport

44. The reflex center of involuntary urination is located in:
A) sacral spinal cord *
B) cerebellum
C) medulla oblongata
D) thalamus

45. Which ion transport is associated with glucose reabsorption in the kidney?
A) sodium *
B) magnesium

C) chlorine
D) Potassium

46. The renal tubular system responsible for the concentration and osmotic dilution of urine is called:
A) countercurrent-multiplier tubular system *
B) a system of tubules
C) tubular system
D) glomerular system

47. An increase in the concentration of renin in the blood plasma leads to a narrowing of the lumen of the vessels, because. in the blood increases the content of:
A) angiotensin *
B) histamine
C) acetylcholine
D) bradykinin

48. The specific gravity of urine is normally:
A) 1010-1025 *
B) 1045-1050
C) 1030-1040
D) 1005-1010

49. Do not pass through the kidney filter:
A) large molecular proteins, cellular elements *
B) water, mannitol
C) inulin, egg albumin
D) glucose, Ca, K, Na ions

50. The effective filtration pressure in the glomeruli is:
A) 20 mm Hg *
B) 50 mm Hg
C) 120 mm Hg
D) 70 mm Hg.

51. The patient is in good health with BP=120/80 mm Hg. If his blood pressure drops to 100/60 mmHg, will his daily diuresis change?
A) decrease*
B) will not change significantly
C) will increase
D) first increases then decreases

52. A patient with liver cirrhosis and ascites develops decreased urine output. Arterial blood pressure is low, and the RAAS is activated. Which mechanism maintains GFR at the early stage?
A. Dilation of the afferent arteriole
B. Increase in plasma oncotic pressure
C. Selective constriction of the efferent arteriole*
D. Decrease in Bowman’s capsule pressure

53. A patient takes NSAIDs for chronic pain. After several days, serum creatinine increases. Which mechanism explains the decrease in GFR?
A. Blockade of angiotensin II
B. Inhibition of prostaglandin synthesis → constriction of the afferent arteriole*
C. Dilation of the efferent arteriole
D. Activation of the macula densa

54. A patient with ureteral obstruction develops oliguria. Which factor directly decreases GFR?
A. Decreased renal blood flow
B. Increased plasma oncotic pressure
C. Increased hydrostatic pressure in Bowman’s capsule*
D. Decreased filtration coefficient

55. A patient’s arterial pressure fluctuates between 90–160 mmHg, yet GFR remains stable. Which mechanism is responsible?
A. Sympathetic regulation
B. Myogenic response of the afferent arteriole*

C. ADH activation
D. Aldosterone-dependent regulation
56. A patient has increased NaCl delivery to the macula densa. Which consequence is most likely?
A. Increased renin secretion
B. Dilation of the afferent arteriole
C. Decreased GFR*
D. Activation of the sympathetic nervous system
57. A patient complains of thirst after prolonged exposure to hot weather. Plasma osmolarity is increased. What is the key hormonal response?
A. Decreased ADH secretion
B. Increased ADH secretion*
C. Decreased aldosterone secretion
D. Increased atrial natriuretic peptide secretion
58. A patient is diagnosed with syndrome of inappropriate ADH secretion (SIADH). Which findings are expected?
A. Hypernatremia and polyuria
B. Hyponatremia and concentrated urine*
C. Decreased water reabsorption
D. Increased sodium excretion
59. A patient receives intravenous normal saline. Which factor will decrease sodium reabsorption in the kidneys?
A. RAAS activation
B. Increased aldosterone secretion
C. Release of atrial natriuretic peptide (ANP)*
D. Decreased atrial pressure
60. A patient with renal failure is found to have hyperkalemia. Which compensatory mechanism will be activated?
A. Decreased aldosterone secretion
B. Increased ADH secretion
C. Increased aldosterone secretion*
D. Decreased distal potassium secretion
61. A patient is treated with thiazide diuretics. Two weeks later, hypokalemia is detected. Where does most potassium regulation occur?
A. Proximal tubule
B. Thin descending limb of the loop of Henle
C. Distal convoluted tubule and collecting ducts*
D. Glomerulus
62. A patient with hypocalcemia has elevated parathyroid hormone levels. Which renal effect of PTH is most important?
A. Decreased calcium reabsorption
B. Increased calcium reabsorption and decreased phosphate reabsorption*
C. Increased calcium excretion
D. Inhibition of calcitriol synthesis
63. A patient receiving loop diuretics develops hypomagnesemia. Which nephron segment is primarily affected?
A. Proximal tubule
B. Distal convoluted tubule
C. Thick ascending limb of the loop of Henle*
D. Collecting ducts
64. After administration of a loop diuretic, a patient develops hypocalcemia. The main reason is:
A. Reduced action of PTH
B. Blockade of the Na^+/Cl^- cotransporter
C. Inhibition of the $Na^+/K^+/2Cl^-$ cotransporter with loss of lumen-positive potential*
D. Increased calcium excretion in the proximal tubule