Monica Adriana Vaida **Daniela Puşcaşiu**
Adelina Jianu
Loredana Stana **Laura Haidar**

BIOLOGY

Multiple choice questions for the undergraduate admission exam (type III) for the study programme Pharmacy (300 ECTS) of „Victor Babeş" University of Medicine and Pharmacy, Timișoara

– 2025 –

Coordinator: **Marilena Motoc**

CONTENTS

CHAPTER 1 ▸ Introduction to anatomy and physiology

Cell and cell physiology

1. Select the correct associations referring to the subdivisions of anatomy:
A. Cytology – the study of cells and their functions
B. Developmental anatomy – the study of the structural changes of an individual from fertilization to adulthood
C. Macroscopic anatomy – the study of the structures of the body visible without the use of a microscope
D. Microscopic anatomy – the study of cells, tissues and organs visible under a microscope
E. Reproduction physiology – the study of reproductive organs and methods of reproduction

2. Select the correct statements referring to cytology:
A. It is one of the branches of physiology
B. It is the science that studies the structures of the body visible without the use of a microscope
C. It is the study of cells and their functions
D. It is the study of the excretory system and its functions
E. It studies of the functions of the nervous system and its involvement in human behaviour

3. Select the true statement(s) from the answers below:
A. An organ consists of two or more types of tissues
B. The stomach consists of all four main types of tissues: epithelial, connective, muscle and nervous
C. A system consists of several organs with different structures but identical functions
D. The muscle system includes striated muscles, smooth muscles and the cardiac muscle
E. The urinary system consists of the kidneys, the bladder and the associated urinary tracts

4. Select the correct associations referring to body functions:
A. Movement – voluntary or involuntary – is the result of muscle fibre contraction
B. Conductivity – the property of a cell to send stimuli – is characteristic for bone and muscle cells
C. Asexual reproduction – the production of a whole new individual – includes spermatogenesis and oogenesis
D. Sexual reproduction – the division of a single cell – is the generation of two identical daughter cells
E. Conductivity – the property of cells to send stimuli – is a characteristic of nervous and muscle cells

5. Which of the following statements are true?
A. When the body is in anatomical position, it is in vertical position (orthostatism), with the upper limbs near the body and the palms facing forwards
B. The anatomical position of the body refers to its horizontal position (orthostatism) with the upper limbs away from the body and the palms facing backwards
C. In anatomical position, the body has two sides, an anterior one (ventral) and a posterior one (dorsal)
D. In anatomical position, the body has two sides, a medial one (right) and a lateral one (left)
E. The term „ventral" is the opposite of the term „dorsal" (when the body is viewed frontally)

6. Select the correct associations regarding the body's directional terms:
A. The hand – proximal to the forearm – distal to the arm
B. Left hand – right foot– ipsilateral
C. Right hand – right foot – ipsilateral
D. Left arm – right foot – contralateral
E. Foot – distal to thigh – distal to shin/calf

7. Select the true statements referring to the body's anatomical planes:
A. There are three important planes (surfaces): sagittal, frontal, coronal
B. The midsagittal plane is a vertical plane that divides the body in two halves, left and right
C. The frontal plane has a vertical direction and divides the body in an anterior and a ventral part
D. The planes transect the human body and provide reference points for its organs

E. The frontal plane forms a right angle with the coronal plane coronal

8. Which of the following statements referring to body cavities and regions is/are true?
A. The heart, the oesophagus, the trachea and the primary bronchi are located in the mediastinum
B. The abdominopelvic cavity is separated by the thoracic cavity by a large quadrangular muscle (diaphragm)
C. The abdominopelvic cavity is called the peritoneal cavity and contains the internal abdominal and pelvic organs
D. The stomach is located in the abdominal subdivision of the abdominopelvic cavity
E. The umbilical region is situated in the centre of the abdomen, and the epigastric region lies inferior to it

9. Choose the correct statement(s) referring to body cavities and regions:
A. Organs such as the lungs, the heart, the thymus, the oesophagus are situated at the thoracic level
B. The lungs (two in number) are located in the mediastinum
C. The terms „quadrants" (upper – left and right, and lower – left and right) are commonly used in clinical practice
D. The intersection of two imaginary lines, a vertical one and a horizontal one, in the centre of the abdominopelvic cavity delimits four quadrants
E. The spinal canal, delimited by the meninges, contains interstitial fluid

10. Choose the correct statement(s) from below:
A. The solute is a chemical substance dissolved in a fluid called solvent
B. The solvent is a chemical substance dissolved in a fluid called solute
C. A solution that has a higher salt concentration than the cytoplasm is called hypertonic solution
D. A solution that has a higher water concentration than the cytoplasm is called hypertonic solution
E. A solution that has a higher sodium chloride concentration than the cytoplasm is called a hypertonic solution

11. The plasma membrane is a semipermeable membrane because:
A. It allows the passing of water from a low-concentration-solute area to a high-concentration-solute area
B. It allows just certain molecules to pass (e. g., O_2, water, CO_2)
C. It contains proteins called histones
D. Together with the ribosomes, it is the location of protein synthesis
E. It does not facilitate the passage of large molecules to or from the cell

12. Which of the following are transport mechanisms across the cell membrane?
A. Diffusion, osmosis, glycolysis
B. Diffusion, facilitated diffusion, exocytosis
C. Osmosis – water diffusion, for example, water reabsorption in the renal tubules
D. Active transport – for example, reabsorption of salts in the renal tubules
E. Karyokinesis, transport through the channels, osmosis

13. Choose the correct statement(s) referring to cytoplasm:
A. It is the place where certain cellular metabolic processes take place
B. It contains the cytoskeleton which consists of carbohydrate subunits
C. It contains specialised structures called organelles (endoplasmic reticulum, Golgi apparatus, etc)
D. It has a solid consistency, which is fundamental for a cell
E. Several cellular functions are carried out in the cytoplasmic organelles

14. The following statement(s) referring to lysosomes is/are true:
A. They contain enzymes which play a role in the cell digestion processes
B. They represent the site for the cell's sodium and calcium deposits
C. They contain enzymes which degrade the nutrient particles inside a cell and offers the final products to the cell
D. They represent a source of salts such as sodium chloride
E. They arere vesicles which derive from the sacs of Golgi apparatus and contain enzymes for intracellular digestion

15. Which of the following structures *do not belong* to cell organelles?
A. Golgi apparatus, the endoplasmic reticulum
B. Kinetochore, chromosome
C. Mitochondria, ribosomes
D. Centrosome, lysosomes

E. Nucleolus, chromatin

16. Which of the following are elements of the cell cytoskeleton?
A. Intermediate filaments and microfilaments
B. Fibres, filaments and combined molecules
C. Macrofilaments and cilia
D. Macrotubules and flagella
E. Microtubules and microfilaments

17. Choose the true statement(s) referring to cilia and flagella:
A. The flagellum is a part of the spermatozoa ensuring its movement
B. The cilia are shorter structures than the flagella
C. The flagellum is a prolongation present in some of the respiratory tract cells
D. The cilia are present in the respiratory tract cells where they undulate synchronously
E. Unlike the flagella, the cilia are immobile and much longer

18. Choose the correct statement(s) referring to the cell nucleus:
A. The shape and size of the nucleus differs from a cell type to another
B. The position of the nucleus inside the cell is a central one in all cell types
C. It is surrounded by a double membrane called nuclear membrane
D. Includes nucleoli, which contain ribonucleic acid (RNA)
E. The nucleoli are the site of lysosome synthesis

19. The following statement(s) is/are true regarding proteins:
A. They are inorganic compounds, used as enzymes in cellular chemical reactions
B. They are organic compounds, used as structural material in the cells of the body
C. They are present in the structure of microtubules and microfilaments
D. They are absent from the structure of the cytoskeleton, consisting of microtubules, microfilaments and intermediate filaments
E. They are specialised molecules which are exported by cells in order to be used in various extracellular activities

20. Choose the correct answers referring to enzymes:
A. With a few exceptions, the name of the enzymes ends in the suffix „*-ase"*
B. Most enzymes are polynucleotides
C. At high temperatures, enzyme reactions are much faster
D. The thermal activation energy of an endergonic or exergonic reaction is produced by enzymes
E. The heat excess may trigger changes in an enzyme's protein structure and its alteration

CHAPTER 2 ▸ The nervous tissue.

Organisation of the nervous tissue

1. Choose the correct statement(s) referring to the nervous system:
A. It coordinates complex processes which take place outside the body
B. It coordinates complex processes which take place inside the body
C. It ensures the integration of tissues and organs in the external environment
D. It responds to stimuli coming from the internal or external environment
E. It facilitates the senses (visual, auditory, taste, tactile, olfactory)

2. What could happen if the nervous system would cease to function?
A. The body's activity wouldn't change
B. Organ systems would function chaotically
C. The body's needs couldn't be met
D. Body temperature would be regulated by independent systems
E. Cognitive processes and emotions would cease

3. Select the components of the peripheral nervous system:
A. The 21 pairs of spinal nerves apparently originating in the base of the encephalon
B. The 21 pairs of cranial nerves which include 3 pairs of sensory nerves (I, II, VIII)
C. The 31 pairs of spinal nerves which apparently originate in the spinal cord
D. Cranial nerves IV trochlear, VI abducens, X accessory, XII hypoglossal
E. The spinal nerves which contain dorsal (efferent, motor) and ventral (afferent, sensory) roots

4. Choose the correct statement(s) referring to the cells of the nervous system:
A. They are represented by two types of cells: neurons and glial cells
B. Glial cells are supporting cells
C. The number of glial cells is ten times less than that of neurons
D. Neurons receive and transmit biochemical signals
E. Neurons can be differentiated from one another due to their cellular organelles

5. According to their structure, neurons can be:
A. Multipolar, when they have multiple axons and a single dendrite
B. Multipolar, when they have multiple dendrites and a single axon
C. Pseudounipolar, when they have a single projection which divides to form two dendrites
D. Pseudounipolar, when they have a single projection which divides to form a dendrite and an axon
E. Bipolar, when they nave a single axon and a single dendrite

6. According to their function, neurons can be classified into:
A. Afferent neurons, efferent neurons and association neurons
B. Multipolar neurons, bipolar neurons and pseudounipolar neurons
C. Sensory neurons, motor neurons and interneurons
D. Sensory neurons (efferent) and motor neurons (association neurons)
E. Neurons which send information from receptors to the central nervous system, neurons which send messages from the central nervous system to the muscles, heart and lymph nodes, and interneurons also called association neurons

7. Choose the true statement(s) referring to the structure of the neuron:
A. The cell body represents the major part of the cell's total size
B. The cell body represents a small part of the cell's total size
C. Dendrites are specialised in receiving nervous impulses and sending them from the cell body
D. The surface of dendrites is covered with thousands of spines which help dendrites connect to other neurons
E. The neuron's cell body contains the nucleus, mitochondria, Golgi apparatus, lysosomes, Nissl bodies

8. Which of the following statements referring to the reflex act is/are true?
A. It represents the anatomic base of certain neural circuits
B. It can be automatic and unconscious when it involves the encephalon or a mental activity
C. It can be automatic and unconscious without involving the encephalon or a mental activity
D. A reflex occurs when a sensory neuron receives a stimulus
E. A typical example of a reflex act is the patellar reflex

9. A synapse is the junction between:
A. A neuron and an effector (muscle)
B. A neuron and a lymph node
C. Two muscle cells
D. Two neurons (a presynaptic one and a postsynaptic one)
E. Two oligodendrocytes

10. The synapse between a neuron and a muscle cell is called:
A. Motor plate
B. Desmosome
C. „Gap" junction
D. Neuromuscular synapse
E. Neuromuscular junction

11. Acetylcholine is released by:
A. The neurons which innervate skeletal muscles at the point of their synapse with another neuron
B. The neurons which innervate skeletal muscles at the point of the neuromuscular junction
C. Certain neurons from the vegetative component of the peripheral nervous system
D. All the motor or efferent neurons in the encephalon
E. Some of the neurons in the encephalon

12. The following statement(s) is/are true referring to the spinal cord:
A. It is 45 cm long and it is located in the central canal
B. It lies in the bony canal formed by the vertebrae
C. It originates in the large opening (*foramen magnum)* of the occipital bone, extending downwards through the bony canal formed by the vertebrae
D. It ends near the intervertebral disc which separates the first two sacral vertebrae
E. The spinal cord's external surface contains a white substance mainly consisting of neuronal bodies and unmyelinated neurons

13. A cross section of the spinal cord reveals:
A. The nervous tissue enveloped by three meningeal layers
B. The central canal also called ependymar canal
C. A grey matter on the outside, consisting of horns (anterior, lateral and posterior)
D. A grey matter on the inside consisting of horns
E. A white mater on the outside consisting of myelinated nerve fibres

14. Which of the following membranes form the meninges?
A. The dura mater, fibrous, resistant connective tissue
B. The arachnoid, separated from the dura mater by the subarachnoid space
C. The arachnoid, network-like thin layer
D. The pia mater, richly vascularised external layer
E. The pia mater, richly-vascularised very thin layer

15. The following statement(s) is/are true about the cranial nerves:
A. They belong to the peripheral nervous system, together with the spinal nerves
B. They belong to the central nervous system, together with the cerebral trunk
C. Some of them originate in the cerebellar hemispheres
D. They are designated by numbers (I – XII) and a different name for each

E. The nerves I olfactory, II optic and VIII vestibulocochlear are sensory nerves

16. The following statement(s) is/are true referring to the vegetative or autonomic nervous system:
A. It regulates the activity of skeletal muscles and of exocrine glands
B. It acts involuntarily without conscious control
C. It regulates the activity of skeletal muscles of the trunk and limbs
D. It coordinates the homeostatic functions of certain viscera, such as the heart
E. Parasympathetic nerves relax the body after a situation of stress or danger

17. The sympathetic component of the autonomic (vegetative) nervous system:
A. Activate the body for fight or flight („fight or flight" reaction)
B. Its neurotransmitter is represented by noradrenalin released from postganglionic fibres
C. Releases acetylcholine from the postganglionic fibres
D. Prepares the body for emergency situations
E. Generates effects opposed to those triggered by adrenalin

18. The following processes are effects of the parasympathetic component of the autonomic (vegetative) nervous system:
A. Slowing down of the heart rate and dilatation of the arteries
B. Constriction of the pupil
C. Stimulation of the digestion
D. Inhibition of the erection of sex organs
E. Contraction of the urinary bladder

19. Choose the correct statement(s) referring to cerebral hemispheres:
A. They contain more than 10 billion neurons
B. They represent the largest part of the encephalon
C. The shallow groove of the hemispheres is called fissure
D. Each hemisphere is divided into five lobes
E. Each hemisphere is divided into four lobes

20. Choose the correct statement(s) referring to the cerebral hemispheres:
A. They contain neurons which interpret the nervous impulses coming from sense organs
B. They contain neurons which initiate voluntary responses to stimuli
C. Certain areas of the parietal lobe are associated with reasoning and learning
D. Certain areas of the parietal lobes are responsible for understanding speech and expressing ideas
E. Visual sensations are not interpreted in the occipital lobes

CHAPTER 3 ▸ Sense organs

1. Choose the correct statement(s) referring to senses:
A. Senses include vision, hearing and balance, excluding the sense of touch which belongs to the integumentary system
B. They include the sense of touch, balance and vision
C. Different sense organs have the same type of receptors
D. Sense organs have highly specialised receptors
E. They are tightly associated both functionally and structurally with the nervous system

2. In short, the following associations between sense organs and their anatomical location are true:
A. The olfactory mucosa – inferior in the nasal cavity
B. The olfactory mucosa – superior in the nasal cavity
C. Taste buds – the dorsal part of the tongue
D. The auditory apparatus – middle ear
E. The vestibular system – internal ear

3. The skin contains the following receptors of the sense of touch and related senses:
A. Free nerve endings (for pain)
B. Merkel discs (for pain)
C. Meissner corpuscles (for light pressures)
D. Meissner corpuscles (for strong vibrations)
E. Pacinian corpuscles (for strong pressures and vibrations)

4. Different stimuli are received as follows:
A. Strong vibrations – by the free nerve endings in the skin
B. Molecules of odorous substances – by the cilia of the olfactory cells
C. Pain – by the free nerve endings in the skin
D. Pain – by the Pacinian corpuscles in muscles and joints
E. Light stimuli – by the receptor cells in the retina

5. Choose the correct statement(s) from below:
A. The sense of smell is also called olfactory
B. The sense of balance is associated with canals and receptors located in the middle ear
C. The sense of taste is not associated with canals and receptors located in the cochlea
D. The intensity of sound waves is usually expressed in cycles/second or Hertz
E. The receptors which detect stimuli are specialised structures

6. The following statement(s) is/are true about the eye as the organ of vision:
A. It is stimulated by the light coming from the surrounding environment
B. Its receptors belong to the class of chemoreceptors
C. Its receptors belong to the class of photoreceptors
D. The nervous impulses generated by light stimuli are interpreted in the brain
E. The retina (a structure of the eye) detects light in its external layer, the retinal pigment epithelium

7. The accessory structures of the eye are:
A. Refractory structures represented by the crystalline, cornea, aqueous humour and vitreous humour
B. Eyebrows and lashes which protect the pupil from foreign bodies
C. Lacrimal glands whose secretion washes the eyeball and maintains it wet
D. Eyelids which protect the posterior part of the eye
E. The conjunctiva which lines the internal part of the eyelids

8. The following statements are true referring to the external wall of the eyeball:
A. It is richly vascularized
B. It contains the visual receptors

C. It is resistant and fibrous
D. It contains the cornea and sclera
E. It contains the choroid and the ciliary bodies

9. Choose the true statement(s) referring to the iris:
A. It contains pigments which define eye colour
B. It contains a peripheral aperture called pupil (optic disc)
C. It controls the amount of light passing through the pupil
D. It consists of two layers of smooth muscle
E. The dilator muscle of the iris contracts the pupil

10. The following statement(s) is/are true about the crystalline:
A. It belongs to the refractory structures of the eye
B. It consists of a concentric protein fibrous material
C. It is transparent and elastic
D. It focuses light onto the choroid
E. It is the main structure responsible for image focalising

11. The cone cells of the retina:
A. Are receptor neurons
B. Are located predominantly at the periphery of the retina
C. Are concentrated in the central fovea
D. Are responsible for day vision and for perceiving details and colours
E. Is responsible for twilight vision

12. Choose the correct statement(s) referring to taste:
A. It is also called gustation
B. It requires the contact between receptor connective cells and the molecules of substances
C. Its receptors are situated in the taste buds
D. It is involved in the stimulation of proprioceptors of the pharynx
E. The receptors of the taste buds detect chemical substances after they have been dissolved

13. The taste buds:
A. Are located at the basis of the taste papillae
B. Contain receptor gustatory cells and supporting cells
C. Have exclusively supporting cells and receptor nerve endings
D. Have sensory nerve fibres which send impulses to the encephalon
E. Have sensory, sympathetic and parasympathetic, nerve fibres

14. The primary tastes include:
A. Sour, bitter, spicy
B. Sour, bitter, umami
C. Sour, bitter, sweet
D. Umami, salty, spicy
E. Sweet, salty, umami

15. Choose the correct statement(s) referring to the sense of smell:
A. It has specialised receptors (olfactory cells)
B. It is a sense based on chemical insoluble and non-volatile substances
C. It requires the contact between receptors and the molecules of the substances which are to be detected
D. It is also called olfactory sense
E. It is involved in the absorption of water in the gastrointestinal mucosa

16. Choose the correct statement(s) about the olfactory receptors:
A. They are specialised olfactory cells
B. They are represented by multipolar ciliary cells in the olfactory mucosa
C. They are chemoreceptors which suffer from olfactory fatigue

D. They are located in the respiratory mucosa in the upper part of the oral cavity
E. They are cells having olfactory cilia and a single nucleus

17. The following are components of the external ear:
A. The external auditory orifice representing the entrance to the external auditory canal
B. The auricle
C. The external auditory canal which transmits sound vibrations
D. The malleus, incus and stapes which transmit vibrations to the tympanic membrane
E. The Eustachian tube which connects the pharynx to the middle ear

18. Select the true statement(s) referring to the external ear:
A. It consists of the auricle and the inner auditory canal
B. It is delimited from the middle ear by the tympanic membrane
C. It communicates with the middle ear through the oval window
D. It consists of the auricle and the external auditory canal
E. It communicates with the pharynx through the Eustachian tube

19. The following structures are involved in the hearing process:
A. The tympanum, which vibrates under the action of sound waves coming through the external auditory canal
B. The oval window, which is in contact with the stapes
C. Corti's organ in the middle ear
D. The tectorial membrane which mobilises the connective receptor cells in the middle ear
E. The temporal lobes in the cerebral hemispheres where sounds are interpreted

20. Choose the correct statement(s) referring to the sense of balance:
A. It derives from the activity of the middle ear, just like the sense of hearing
B. It derives from the activity of the inner ear, which contains a series of canals crossing the temporal bone
C. In the cochlea, there are structures which detect the dynamic and the static balance
D. In the utricle, saccule and the semicircular canals, there are structures which detect dynamic and static balance
E. The vestibular branch of nerve VIII sends to the encephalon the impulses from the ampulla and the macula

CHAPTER 4 ▸ The bone tissue

1. Choose the correct statement(s) referring to the skeletal system:
A. It includes all the organs in the body (solid and resistant organs)
B. It includes all the bones of the body and their connecting joints
C. It consists of organs which are not supplied by their own nerves and vessels
D. It is a system of organs which support locomotion and movement
E. It contains bones which consist wholly in semi-rigid connective tissue

2. Choose the correct statement(s) referring to bones and joints:
A. The skeleton is made up of bones connected to each other by joints
B. Joints can be mobile (synarthroses), semi-mobile (amphiarthroses) and fixed joints (diarthroses)
C. Diaphyses are the extremities of a bone and the epiphysis is the shaft or central part of a bone
D. Long bones consist of epiphysis and diaphysis
E. The skeleton supports the body and facilitates locomotion

3. Choose the correct statement(s) referring to the location of bones:
A. The axial skeleton includes the humerus, the femur and the patella
B. The axial skeleton consists of the thoracic cavity (rib cage), the spinal column and the bones of the head
C. The skeleton of the limbs includes the corresponding girdles which connect the limb to the axial skeleton
D. The pelvic girdle connects the upper limb to the trunk
E. The pectoral girdle connects the upper limb to the trunk

4. According to their shape, bones can be:
A. Long bones, such as the femur, the humerus and the scapula
B. Long bones, such as the femur, the humerus and the tibia
C. Flat bones, such as the scapula, the sternum and the cranial bones
D. Short bones, such as the carpal and the tarsal bones
E. Flat bones, such as the vertebrae, the ribs and the metatarsals

5. The following bones are short bones:
A. All the bones of the upper limb, without exception
B. The bones of the wrist (carpal bones)
C. The bones of the vertebral column
D. The bones of the tarsus (tarsal bones)
E. The bones of the skull

6. Irregular bones include:
A. The patellae and wormian bones
B. The carpal and tarsal bones
C. The vertebrae
D. The scapula and the ribs
E. The humerus and the femur

7. Select the flat bones from below:
A. Some of the cranial bones (the parietal)
B. The wrist bones
C. The pelvic bones
D. The cervical vertebrae
E. The scapula (the shoulder blade)

8. The compact bone tissue:
A. Can be found in flat and short bones and in the epiphyses
B. Is absent from the diaphysis of long bones
C. Contains cavities with red hematopoietic marrow

D. Is a component of the diaphysis of long bones
E. Is less dense than spongy tissue

9. According to shape, bones can be classified into:
A. Flat bones (shoulder blades)
B. Sesamoid bones (the trapezium bone)
C. Irregular bones (sesamoid)
D. Short bones (tarsals)
E. Long bones (sternum)

10. It is true that long bones:
A. Belong to the skeleton of the limbs
B. Have extensive surfaces for the insertion of tendons
C. Have a diaphysis or shaft
D. Have two epiphyses and a diaphysis
E. Have two diaphyses and an epiphysis

11. The following statement(s) is/are true about the bone tissue:
A. In order to carry out their functions, bones must be hard and rigid
B. In order to carry ut their functions, bones shouldn't be flexible
C. Bone flexibility is the ability of a bone to bend to a certain degree
D. Short bones include the tarsals and carpals
E. Characteristics such as hardness and flexibility are given by osteoclasts

12. Choose the correct associations between the shape of the bone and its location in the skeleton:
A. Sternum – flat bone – bony pelvis
B. Vertebra – irregular bone – vertebral column
C. Patella – knee joint – irregular sesamoid bone
D. Shoulder blade – flat bone – anterior wall of the thorax
E. Short bones – tarsal bones – pelvic girdle skeleton

13. The diaphysis and the epiphysis are components of:
A. The ribs and sternum
B. Carpal bones
C. Bones of the pelvic girdle
D. Humerus, femur, ulna
E. Tibia, fibula, sternum

14. Choose the true statement(s) referring to bone formation:
A. It is the result of a process called ossification
B. It is called intramembranous if it occurs in the connective membranes (in the case of long bones)
C. All the bones are formed as a result of intramembranous ossification
D. Isteoblasts are the main bone-forming cells
E. There are two types of bone formation: intramembranous for flat bones and endochondral for long bones

15. The perforating canals connect the central canals in the:
A. Epiphyseal plate
B. Periosteum
C. Compact bone
D. Osteon
E. Spongy bone

16. Choose the correct associations:
A. Hydroxyapatite – crystalline structure – bone hardness
B. Osteoporosis – calcium loss – high resistance to fractures
C. High calcium intake – physical activity – prevention of osteoporosis
D. Osteoblasts – highly active cells – bone-dissolving substances

E. Physical activity – mechanical stress – bone formation by osteoblasts

17. Diarthroses:
A. Are also called synovial joints
B. Have a relatively low or no mobility
C. Consist of two bone ends contained in the synovial cavity
D. Allow free movement
E. Examples of diarthroses include the following joints: elbow, shoulder, vertebral and sacroiliac

18. Choose the correct type(s) of diarthroses:
A. Pivotal (which ensure the movement of rotation)
B. Spheroidal (allow the greatest diversity of movements of all joints)
C. Semilunar (with spherical surfaces)
D. Condyloid (ellipsoid)
E. Saddle (allow the same movements as condyloid joints but have a greater freedom)

19. A synovial joint contains the following elements:
A. Articular tendons
B. Fibrous capsule
C. Synovial cavity
D. Tectorial membrane
E. Synovial membrane

20. Choose the true statements from below:
A. Abduction is the pulling of a limb away from the midline of the body
B. Abduction, also called protraction, is the vertical raising of the arm
C. Adduction is the rotation of a limb towards or away from the midline of the body
D. In supine position, the palm lies in anatomical position facing forward
E. Raising the shoulders (shrugging) is an example of elevation

CHAPTER 5 ▸ The muscular system

1. The following statement(s) is/are true about the muscular tissue:
A. It is one of the body's four main tissues (together with the epithelial, cartilaginous and fibrous tissues)
B. It is one of the body's four main tissues (together with the epithelial, connective and nervous tissues)
C. Its structural unit is the sarcomere (for the smooth muscle fibre)
D. Its structural unit is the muscle cell, also called muscle fibre
E. Anatomically, the terms muscle cell and muscle fibre are considered as opposite structures

2. The muscle tissue will form:
A. Skeletal striated muscles
B. The organs responsible for body movements
C. The organs which prevent the movement of body segments, but ensure the movement of the body as a whole
D. Bones which provide insertion points for muscles
E. Joints which mobilise bones and muscles

3. Choose the correct associations referring to the three types of muscle tissue:
A. Skeletal striated muscle – blood vessels, some ducts – cardiac wall
B. Multiple nuclei – skeletal striated tissue - myocardium
C. Central single nucleus – smooth muscle tissue, myocardium
D. Sarcomeres – skeletal striated muscle tissue – cardiac muscle tissue
E. Intercalated discs – smooth muscle tissue

4. Choose the statements which describe accurately the differences between the striated skeletal muscle and the cardiac muscle:
A. They have different locations, the striated skeletal muscle being inserted onto the bones
B. They have different locations, the cardiac muscle being also located in the walls of the heart's blood vessels
C. The striated skeletal muscle fibre is multinucleated, while the cardiac muscle fibre has a single nucleus
D. The striated skeletal muscle has a much slower contraction speed than the cardiac muscle
E. The striated skeletal muscle has a much faster contraction speed than the cardiac muscle

5. Choose the true statement(s) referring to the muscle tissue:
A. It is one of the four main tissues in the body
B. It has the ability to contract
C. It has the ability to perform mechanical work
D. The muscle cell (fibre) is the structural unit of the muscle tissue
E. The muscle cell can be cubical or cylindrical, being called muscle fibre

6. The following statement(s) is/are true referring to the smooth muscle:
A. It can be unitary and multi-unit
B. The fibres of unitary smooth muscle have gap junctions
C. The fibres of the multi-unit smooth muscle act in a coordinated, tightly interdependent fashion
D. The smooth muscle fibre receives nerve impulses from the vegetative (autonomic) nerves
E. It contains intermediate, contractile filaments, attached to the dense bodies in the entire cell

7. Choose the true statement(s) referring to the striated skeletal muscle:
A. The striated aspect is given by the absence of sarcomeres
B. Their tubular arrangement consists in two tubes/sarcomeres, located at the A – I junctions
C. It is controlled by the vegetative nervous system
D. It is controlled by the somatic nervous system
E. It has intercalated discs with gap junctions and desmosomes

8. Which of the following statements characterize(s) the cardiac muscle?
A. It is present in the structure of heart blood vessels (coronary vessels)
B. It is present only in the structure of the heart (in the heart wall)
C. Its fibres (often ramified) form a real network with adjacent fibres
D. Intercalated discs tightly connect the central parts of myocardial fibres
E. Intercalated discs facilitate the propagation of contractions from one cell to the other

9. The red muscle:
A. Contains a large quantity of myoglobin, an oxygen-storing protein
B. Is a slow or oxidative muscle
C. Is a glycolytic, fast muscle which contains a large quantity of glucose
D. It can contract repeatedly but it can't withstand muscle fatigue
E. It can withstand muscle fatigue, due to the oxygen stored in the myoglobin, which will be used in cellular respiration

10. The white muscle:
A. Contains a large quantity of reddish myoglobin
B. Is a slow, oxidative muscle, which uses the oxygen in the haemoglobin stored in its fibres
C. Is a fast, glycolytic muscle (so called due to its high glycogen content)
D. Rapidly uses ATP (adenosine triphosphate acid) but it cannot replace it as fast as it uses it
E. It has very little available oxygen necessary for cellular respiration

11. Myoglobin:
A. Is present in large quantities in red muscle fibres
B. Is present in large quantities in white muscle fibres
C. Is the muscle pigment which stores oxygen necessary for cellular respiration
D. Is the muscle molecule which stores adenosine triphosphate
E. Is one of the muscle contractile proteins, together with adenosine

12. A neuromuscular junction consists of:
A. A single muscle fibre, very close to the nerve ending, but without touching it
B. The end of a single nerve cell which touches the sarcolemma of the muscle fibre
C. The end of a single nerve cell which does not touch the sarcolemma of the muscle fibre
D. The synaptic cleft – a fluid filled space
E. A space filled with synovial fluid, called synaptic cleft

13. Which of the following substances are involved in the contraction of the striated skeletal muscle?:
A. Actin – myosin
B. Acetylcholine – STH
C. Myoglobin – myosin
D. Ionic calcium (Ca^{+}) – ionic sodium (Na^{2+})
E. Adrenalin – noradrenalin

14. The motor unit:
A. May contain a variable number of muscle fibres
B. Represents the functional unit of the striated skeletal muscle
C. Is represented by a muscle fibre together with all the sensory neurons which innervate it
D. Is represented by a motor neuron together with all the muscle fibres which it stimulates
E. Can contain a maximum of 10 muscle fibres

15. Unlike smooth muscle fibres, striated muscle fibres contain:
A. Sarcomeres
B. Striations
C. Troponin
D. Tropomyosin
E. Calmodulin

16. Choose the correct statement(s) from below:
A. The muscle's sustained maximal contraction is called a summation
B. The muscle as a whole, just like the individual muscle fibre, functions according to the law „all or nothing"
C. The muscle's sustained maximal contraction is called tetanus
D. Muscle tone is the muscle's partial contraction, maintained over a long period of time
E. Orthostasis does not require muscle tone, being induced by gravity

17. The following statement(s) is/are true about myoglobin:
A. It represents the molecule which contains heme and carries oxygen to the erythrocytes
B. It binds oxygen molecules and stores them temporarily in the muscles
C. Its presence in the muscle fibre decreases the necessity of a constant oxygen supply to the muscle during contraction
D. It represents a deposit of high-energy phosphate bonds
E. It participates in the completion of Krebs cycle

18. The smooth muscle tissue:
A. Does not contain actin and myosin filaments but contains tropomyosin and calmodulin
B. Does not have striations
C. Is present in the walls of certain viscera (stomach, uterus, rectum)
D. Contains cells interconnected by collagen fibres and sometimes by gap junctions
E. Is absent from the viscera but is present in blood vessels and certain ducts

19. Muscle fibres contain:
A. Proteins – myosin, troponin, actin in the striated muscle
B. Protein – calmodulin, in the smooth muscle
C. Troponin, calcium-fixating protein in the smooth muscle
D. Actin and myosin in a 1: 16 ratio in the smooth muscle
E. Calcium ions (Ca^{3+}) in the intracellular sarcoplasmic reticulum in the smooth muscle

20. Striated skeletal muscles:
A. Are responsible for the motor activity of certain segments of the digestive tract (stomach, small bowel)
B. Is inserted on bones, the muscle – bone unit ensuring the movements of the body and its various segments
C. Are responsible for the complex act of locomotion
D. Can act by triggering body part movements in opposite directions, when they are antagonistic muscles
E. Can never act one against the other (antagonistic) during the complex act of locomotion

CHAPTER 6 ▸ The digestive system

1. Which of the anatomical structures below belong to the digestive system?
A. The oral cavity, the oesophagus, the large bowel
B. The nasal cavity, the oropharynx, the oesophagus
C. The stomach, the small bowel, the large bowel
D. The liver, the pancreas, the parathyroid glands
E. The parotid glands, the liver, the pancreas

2. The following statement(s) referring to the digestive system is/are *not true*:
A. It is a part of the gastrointestinal tract
B. The tubular organs which make it up are represented by the salivary glands and the liver
C. One of its functions is the digestion of food and absorption of nutrients
D. One of its functions is the regulation of blood plasma volume
E. It consists of the gastrointestinal tract and a number of accessory organs

3. The following structures are a part of the gastrointestinal tract:
A. The oral cavity (mouth) and the pharynx – the first segments of the gastrointestinal tract
B. The oesophagus, situated in the continuation of the pharynx
C. The stomach and the liver – accessory organs of the digestive system
D. The duodenum and the pancreas – tubular organs of the gastrointestinal tract
E. The large bowel, the terminal segment of the gastrointestinal tract

4. The functions of the oral cavity are as follows:
A. Ingestion of food
B. Gustatory function
C. Elimination of digested food
D. Mechanical digestion of food
E. Lubrication of food

5. In the oral cavity:
A. Canines cut larger pieces of food
B. Incisors cut large pieces of food
C. Canines grab and tear food
D. Incisors grind cut food into smaller pieces/grind food
E. Premolars and molars cut food into smaller pieces/grind food

6. In the oral cavity:
A. The tongue turns food into food bolus with the help of saliva
B. Teeth turn food into food bolus with the help of saliva
C. Teeth carry out the mechanical digestion of food
D. The tongue carries out the mechanical digestion of food
E. Food is mixed with salivary secretions

7. Choose the true statement(s) referring to the teeth:
A. There are two types of teeth: deciduous and temporary
B. The milk teeth are 20 in number and they are usually lost by the age of 6, being replaced by permanent teeth
C. Permanent teeth form 32 pairs and replace deciduous teeth
D. Teeth consist of crown, body and root
E. Teeth consist of incisors, canines, premolars and molars

8. Choose the correct association referring to the teeth:
A. Incisors – crown, body and root – cutting large pieces of food
B. Canines – conical shape – grabbing and tearing food
C. Premolars – flat teeth – cutting into smaller pieces/grinding food
D. Central incisors – cutting large pieces of food – break through at the ages 7 - 21

E. Molars – flat teeth - cutting food into smaller pieces

9. Dental enamel:
A. Is one of a tooth's main components
B. Is the toughest substance in the body
C. Can be found on the tooth's inner surface
D. Mainly consists in calcium salts (major component of hydroxyapatite)
E. Surrounds the tooth's pulp

10. Dental enamel: *false* statements:
A. Is covered by the tooth's crown and covers dentin
B. Lies on the tooth's external surface
C. It is very hard, but not as hard as dentin
D. Contains hydroxyapatite in its structure, a mineral complex
E. Forms the largest part of the tooth

11. Dentin:
A. Is one of the tooth's main components
B. Is softer than dental enamel
C. Lies on the tooth's external surface
D. Mainly consists of organic components and does not contain hydroxyapatite
E. Surrounds the tooth's pulp

12. Dentin – *false* statements:
A. Surrounds the tooth's pulp, which is vascularised and innervated
B. Is softer than dental enamel
C. Lies under the enamel and represents the tooth's largest part
D. Mainly consists of hydroxyapatite, having the same hardness as enamel
E. Contains blood vessels, nerves and the tooth's connective tissue

13. Dental pulp:
A. Is the hardest substance in the body
B. Is located inside the tooth, in the pulp cavity
C. Is surrounded by dentin, covered by enamel
D. Mainly consists of hydroxyapatite
E. Contains blood vessels, nerves and the tooth's connective tissue

14. Salivary glands have the following functions:
A. The saliva they produce facilitates the lubrication and cohesion of food particles
B. They secrete enzymes which initiate the carbohydrate digestion process
C. They ensure the gastric absorption of food
D. They are responsible for amylase secretion, an enzyme which turns starch and glycogen into disaccharides (maltose)
E. They ensure food-protein decomposition to the stage of dipeptides

15. The following statement(s) is/are true about salivary amylase:
A. It participates in the processes of mechanical digestion
B. It initiates the processes of chemical digestion of starch molecules until the stage of disaccharides
C. It is secreted by the serous cells of the salivary glands
D. It breaks down starch and glycogen to the stage of maltose
E. It participates in the breaking down of monosaccharides

16. Choose the true statement(s) referring to the stomach:
A. It is situated in the upper left quadrant of the abdomen, immediately above the diaphragm
B. It extends from the cardiac sphincter to the pyloric sphincter

C. Its wall consists of four tunics, the muscular tunic having three striated layers: circular, longitudinal and oblique
D. It is a „J" -shaped organ
E. It communicates with the duodenum through the pyloric sphincter

17. Which of the elements below belong(s) to the small bowel?
A. The duodenum, the first segment, where the gastric chyme is expelled from the stomach
B. The jejunum and ileum, the main site of absorption
C. The jejunum of about 2.5 metres and the ileum of about 3.5 – 4 metres long
D. The duodenum, which extends from the pyloric sphincter to the ileocecal valve
E. The cecum and vermiform appendix

18. The large bowel consists of:
A. The cecum and the vermiform appendix
B. The ascending colon which lies vertically on the right of the abdomen
C. The descending colon which continues with the ascending colon
D. The sigmoid colon which is the continuation of the transverse colon and continues with the rectum
E. The transverse colon which horizontally crosses the abdomen, near the stomach and the spleen

19. Choose the true statement(s) referring to the liver:
A. It is the largest endocrine gland in the body
B. It is situated under the diaphragm and it is divided into four lobes: right, left, quadrate and caudate
C. Produces bile deposited in the gall bladder
D. The lobes of the liver are subdivided into lobules which contain hepatocytes and macrophages
E. The liver is supplied with oxygenated blood and nutrients by the portal vein

20. The following statement(s) referring to the pancreas is/are true:
A. It is an accessory organ of the digestive system, together with the salivary glands (sublingual, submandibular and parathyroid) and the liver
B. It is situated in the abdominal cavity, posterior to the stomach
C. It has both a digestive and an immune function
D. It contains cells that contribute to digestion and are organised in acini
E. Communicates with the duodenum via two ducts (the pancreatic duct and the accessory duct)

CHAPTER 7 ▸ Blood and the cardiovascular system

1. Choose the true statement(s) referring to blood:
A. It transports respiratory gases to and from the lungs
B. It contains figurative elements, embedded in a solid, yellowish substance called plasma
C. It carries metabolic products from the cells to the kidney
D. It is more viscous than water and its normal pH ranges between 7.35 – 7.45
E. Its major components are represented by plasma and figurative elements

2. Choose the true statement(s) referring to whole blood:
A. Its two major components are: plasma and figurative elements
B. Its components are represented by plasm, blood cells (erythrocytes and leukocytes) and platelets
C. The greatest part of its figurative elements is represented by erythrocytes or red blood cells
D. The smallest part of its figurative elements is represented by erythrocytes or red blood cells
E. The greatest part of figurative cells is represented by thrombocytes or platelets

3. Blood contains the following elements:
A. Figurative elements embedded in blood serum, a yellowish watery fluid
B. Blood plasma which contains water and several dissolved substances
C. Red blood cells or erythrocytes
D. White cells (leukocytes) and platelets (fragments from the cytoplasm of megakaryocytes)
E. Fragments from the nucleus of megakaryocytes

4. Blood consists of the following elements:
A. Figurative elements, up to 45%
B. Water, up to 99%
C. Three types of plasma proteins (albumins, globulins, haemoglobin)
D. Various ions (sodium, potassium, calcium, chloride, bicarbonate
E. Proteins that have a role in coagulation (fibrinogen)

5. Serum contains:
A. Albumins and globulins (proteins)
B. Globulins and haemoglobin (proteins)
C. Fibrinogen (protein involved in blood coagulation)
D. Lipids (cholesterol, triglycerides)
E. Glycogen (polysaccharide)

6. Choose the true statement(s) referring to the blood's figurative elements:
A. There are three types of figurative elements: red blood cells (erythrocytes), leukocytes (platelets) and thrombocytes (white cells)
B. Neutrophils and basophils are leukocytes belonging to the class of granulocytes
C. Eosinophils and platelets are white blood cells
D. Haematids are also called red blood cells or erythrocytes
E. Lymphocytes and monocytes are agranulocytes and belong to leukocytes

7. The following statement(s) is/are true referring to carbon monoxide:
A. It is a toxic gas whose molecules are transported in the form of carbaminohaemoglobin
B. It binds rapidly to iron ions in the heme groups forming a strong bond
C. It combines slowly to haemoglobin forming a weak link
D. When binding to haemoglobin, it takes up the space allotted to carbon dioxide
E. When binding to haemoglobin it takes up the space allotted to oxygen, with potentially lethal results

8. Choose the correct statement(s) referring to blood group 0:
A. It has both types of antigen, A and B, on the erythrocyte membrane
B. It has both types of antibodies, anti-A and anti-B, in the serum

C. Can receive blood from blood group A
D. Can donate blood to the blood group A
E. Can donate blood to the blood group B

9. Choose the correct statement(s) referring to blood group A:
A. It has A antigens on the erythrocyte surface
B. It has anti-A antibodies in the serum
C. It has anti-B antibodies in the serum
D. Can donate blood to blood group B
E. Can donate blood to blood group AB

10. Choose the correct statement(s) referring to blood group B:
A. It has B antigen in the serum
B. It has B antigen on the erythrocyte surface
C. Can donate blood to blood group 0
D. Can donate blood to blood group B
E. Has anti-A antibodies in the serum

11. Blood group AB, Rh- can receive blood from:
A. Blood group 0, negative Rh
B. Blood group A, negative Rh
C. Blood group B, positive Rh
D. Blood group AB, positive Rh
E. All blood groups with negative Rh

12. White blood cells or leukocytes:
A. Their primary role is to protect tissues against infections and foreign substances in the body
B. They have a nucleus which can have two or more lobes or can have different sizes and shapes
C. They are anucleated, just like erythrocytes
D. They have cellular organelles, but they don't have a nucleus
E. Enter the blood stream by diapedesis and leave the blood stream in the same way

13. Choose the correct statement(s) referring to thrombocytes:
A. Also called blood platelets, they are anucleated cells
B. They are formed in the red bone marrow from megakaryocytes
C. They are derived from the same precursor as red blood cells, called erythroblast
D. Their approximate number is of $300000/mm^3$ blood
E. They are involved in haemostasis by forming platelet aggregation

14. Choose the correct statement(s) about the heart and the cardiovascular system:
A. The heart is responsible for the transport of respiratory gases in dissolved form
B. The cardiovascular system consists of the heart and blood vessels
C. The cardiovascular system includes a set of tubes which transport blood (blood vessels)
D. The heart is the organ which acts like a pump in the cardiovascular system
E. The cardiovascular system actually supplies only certain regions of the body

15. Choose the correct statement(s) about the heart:
A. It is situated in the mediastinum, in the thoracic cavity
B. It is bordered by the lungs, which overlap on it
C. It is a two-cavity organ (an atrium and an auricle)
D. It is a four-cavity organ (two atria and two ventricles)
E. It lies posterior to the spinal column and anterior to the sternum

16. The following statement(s) is/are true about systemic circulation:
A. It begins in the left heart
B. The left ventricle receives, through the bicuspid valve, oxygenated blood from the left atrium

C. Oxygenated blood returns to the heart by the venae cavae
D. The arteries of the systemic circulation take the blood to the head, thorax, abdominal region and other parts of the body
E. Oxygenated blood returns to the left atrium by the pulmonary veins

17. The following statement(s) is/are true about the cardiac cycle:
A. It represents the succession of contractions, without intercalated relaxation, of the heart cavities
B. The term „systole" refers to the heart's contractions
C. The term „systole" refers to the heart's relaxation periods
D. The term „diastole" refers to the heart's relaxation periods
E. Consists of systole and diastole

18. Choose the correct statement(s) about blood vessels:
A. They form a network of tubes which transport blood from the heart to the body's tissues and back
B. The vessels that transport blood to the tissues are called veins
C. Veins result from the union of venules (small veins) and carry blood back to the heart
D. Capillaries leave the cellular environment and form arterioles
E. Arteries are divided into small vessels called arterioles and the latter are subdivided into capillaries

19. Choose the correct statement(s) about the pulse:
A. It represents a pressure wave in the arteries, due to the contractions of the left ventricle
B. It is normally measured at the radial artery at wrist level
C. It can be measured at all the branches of the carotid artery
D. It has the same rate as the heart rate, an average of 70 – 75 beats/minute
E. Pulse becomes stronger as the blood gets farther from the heart

20. Choose the correct statement(s) about the portal hepatic system:
A. It carries blood from the gastrointestinal tract and spleen to the liver
B. Hepatic portal circulation takes place in two opposite directions
C. It carries nutrients to the liver in order to be processed, the main vessel being the portal vein
D. It carries low-oxygen blood as it has supplied the gastrointestinal tract
E. After passing through the liver, the blood leaves it through the hepatic arteries, branches of the coeliac trunk

CHAPTER 8 ▸ The respiratory system. The urinary system

1. The following statement(s) is/are true about the airways:
A. The bronchi are the smallest branches of the airways
B. The smallest branches of the respiratory zone end in areolae
C. The smallest branches of the respiratory system airways end in alveoli
D. The smallest branches of the respiratory system conducting zone end in alveoli
E. The airways include, in descending order, the bronchi, the bronchioles, the trachea and the larynx

2. The following statement(s) is/are true about the gas exchange in the respiratory system:
A. It takes place in the airways, between the bronchi and the bronchioles
B. It takes place in the alveoli (microscopic air sacs)
C. It takes place in the alveoli which provide a large exchange surface
D. It takes place in the alveoli which consist of the visceral pleura membrane and are covered with an extensive capillary network
E. It takes place in the alveoli consisting of thin membranes, covered with the extensive capillary network of the pulmonary circulation

3. The following statement(s) referring to the nose is/are true:
A. It belongs to the conducting zone of the respiratory system
B. It has an external part consisting of cartilage and skin
C. It is adapted to filter, cool and dry air
D. It has two internal parts called nasal cavities
E. It represents the normal entry way of air in the respiratory system

4. The following statement(s) referring to the nasal cavities is/are true:
A. They represent the internal part of the nose
B. They communicate with the external environment through the nostrils
C. They are also associated with the sense of taste
D. They are subdivided into airways through the superior, middle and inferior sphenoid conchae
E. They are lined by a mucosa whose inflammation is called rhinitis

5. Choose the correct answers from below:
A. The nasal cavity is associated with the olfactory sense
B. The part of the mucosa lining the nasal cavities, responsible for the sense of smell, forms the respiratory area
C. The olfactory region is situated in the upper wall of the nasal cavities
D. The nose is not adapted to warm up air, only to cool it down
E. The blood vessels in the nasal mucosa warm up cold air

6. The pharynx has three parts:
A. The nasopharynx, located posterior to the nasal cavities and inferior to the palate veil
B. The oropharynx, situated posterior to the oral cavity
C. The oropharynx where the digestive and respiratory tracts meet
D. The laryngopharynx, situated posterior to the larynx
E. The nasopharynx, situated posterior to the nasal cavities

7. Choose the true statement(s) referring to the larynx:
A. It belongs to the airways and it has a cartilaginous structure
B. It is the passageway of food to the oesophagus
C. It is a passageway of air from the pharynx to the trachea
D. It can be described as having cartilaginous structures arranged similarly to a sphere
E. It is involved in the production of sounds

8. Choose the correct associations:
A. Larynx – thyroid cartilage – signet ring

B. Larynx – shorter vocal cords – children
C. Larynx – women – higher-pitched voice
D. Larynx – thyroid cartilage – posterior of the neck
E. Larynx – thyroid cartilage – more visible in men

9. Choose the correct statement(s) referring to the trachea:
A. It is a semi-rigid tube, approximately10 – 12 millimetre long
B. It branches in two main bronchi
C. It continues the larynx
D. It is lined with ciliary cells which filter air before it enters the bronchi
E. It is a passageway for air and it houses the vocal cords

10. The following statement(s) referring to the pulmonary alveoli is/are true:
A. They are microscopic air sacs, approximately 300 million for each lung
B. They are the site where pulmonary gas exchange takes place (O_2 is eliminated and exchanged for CO_2)
C. In the alveoli, O_2 from the air is exchanged for CO_2 from the blood by a passive diffusion process
D. The respiratory membrane of alveoli forms an extremely thin barrier which allows the passage of respiratory gases
E. The alveoli receive oxygenated blood from a branch of the pulmonary artery

11. In the lungs:
A. Oxygen passes from the alveoli into the bloodstream, to be transported to the cells
B. Oxygen passes from the bloodstream into the alveoli, to be expelled by breathing
C. Carbon dioxide passes from the alveoli into the bloodstream
D. Carbon dioxide passes from the bloodstream to the alveoli, to be expelled by breathing
E. Both oxygen and carbon dioxide can move bilaterally between the bloodstream and alveoli

12. The urinary system consists of:
A. Two kidneys, situated retroperitoneal in the abdominal cavity
B. Two kidneys, situated in the pelvic cavity
C. Accessory organs (ureters, urinary bladder, urethra)
D. The adrenal glands
E. The urethra (a tube that is responsible for eliminating urine from the bladder during micturition)

13. The following statement(s) referring to the kidneys is/are true:
A. They are hollow organs located in the abdominal cavity
B. They are located on the posterior abdominal wall
C. They are located on the anterior abdominal wall
D. They lie retroperitoneally (behind the peritoneum)
E. They lie intraperitoneally (behind the peritoneum)

14. Choose the correct statement(s) referring to the kidneys:
A. There are two kidneys, situated retroperitoneally
B. They lie laterally to the spinal column
C. They lie medially to the spinal column
D. Superiorly, they are in contact with the adrenal glands
E. They are supported by fatty and connective tissue

15. In relation to the diaphragm, the kidneys lie:
A. Superior to the diaphragm, in the abdominal cavity
B. Inferior to the diaphragm, in the abdominal cavity
C. The upper extremity is higher (close to the diaphragm), in the left kidney
D. The upper extremity is higher (close to the diaphragm), in the right kidney
E. The upper extremity is higher (close to the diaphragm), in both kidneys

16. The kidneys consist of the following structures:
A. Two distinct areas, cortical and medullary
B. The renal cortex, inside the kidney
C. The renal medulla, at the periphery of the kidney
D. A deep area, the renal medulla, represented by the renal pyramids
E. An external area, called cortex, containing renal glomeruli, parts of the nephron tubules and blood vessels

17. The nephron consists of the following structures:
A. The glomerulus, a capillary network resulting from the branching of the afferent arteriole
B. The glomerular capsule, a macroscopic network of capillaries
C. The glomerulus, capillary network which join together forming the efferent arteriole
D. The proximal convoluted tubule and the distal convoluted tubule
E. The collecting duct, which collects urine from a single nephron

18. The filtration process:
A. Recovers nutrients, salts and water from fluid of the proximal and distal tubules
B. Is represented by the passage of fluid from blood plasma into the glomerular capsule through submicroscopic apertures
C. It excretes the molecules from the peritubular capillaries into the nephron tubules
D. It pushes water and small plasma molecules out of the glomerular capillaries and into Bowman's capsule
E. It transports urine to the ureters, and from there to the bladder, the urethra and out of the body

19. The following processes take place in the distal convoluted tubules:
A. The selective reabsorption of ions by active transport
B. The reabsorption of water under the influence of ADH
C. Glucose and potassium secretion
D. Secretion of certain medicines and certain hormones
E. Filtration of blood plasma

20. The following structures are accessories of the urinary system:
A. The ureter, a tubular organ
B. The urinary bladder, a distensible sac
C. The urinary bladder, situated anterior to the pubic symphysis
D. The urethra, whose external opening is the external urethral orifice
E. The convoluted seminiferous tubules in males

CHAPTER 9 ▸ The reproductive system

1. Choose the common characteristics of the male and female reproductive systems:
A. They produce reproductive cells called gametes
B. They contains ducts which receive and transport gametes
C. They contain glands and accessory organs which secrete fluids (subsequently carried through the ducts)
D. In the adult, for both genders, gonads are situated retroperitoneally
E. They include external genitalia (such as the vulva in women or the penis in men)

2. Choose the true statement(s) referring to the male reproductive system:
A. It is responsible for producing, storing, maintaining and transporting spermatozoa
B. It is responsible for producing, storing, maintaining and transporting male gametes
C. It does not include androgen-hormone producing cells (secreted only by the adrenal gland)
D. Have several structures similar to those of the female reproductive system: gonads, ducts, glands and accessory organs of the reproductive process
E. External genitalia are called gonads in men and vulva in women

3. Choose the true statement(s) referring to the male reproductive system:
A. Its reproductive cells are called gametes
B. Testicles are paired organs which secrete oestrogens and progesterone, but do not secrete testosterone
C. It is responsible for producing, storing, maintaining and transporting gametes
D. Testicles are also called male gametes or gonads
E. It consists of glands and accessory organs (the prostate, seminal vesicles)

4. Choose the true statement(s) referring to the testicle:
A. It lies in the scrotum, a sac-like structure suspended under the perineum
B. It is a spherical organ, flattened superoinferiorly
C. It is an oval, flattened organ
D. Its function is to produce protein hormones, oestrogens and testosterone
E. Its function is to produce sex hormones (testosterone) and reproductive cells (spermatozoa)

5. Choose the true statements referring to the scrotum:
A. It is a structure with multistratified walls which houses the testicles
B. It is divided into two compartments separated by a thickened ridge
C. The two compartments are delimited by the perineal raphe
D. The deep layers of the scrotum wall contain the perineal raphe, a smooth, rather thick, muscle
E. The dartos muscle in the deep layers of the scrotum is the site of spermatogenesis

6. Choose the correct associations from below:
A. Testicle – oval shape – situated in the pelvis
B. Scrotum – two compartment – the dartos muscle
C. Scrotum – one compartment for each testicle – perineal raphe
D. Inguinal canal – high resistance point of the anterior abdominal wall – abdominal hernia
E. Inguinal canal – low resistance point of the anterior abdominal wall – inguinal hernia

7. The following statement(s) is/are true about the accessory organs of the male reproductive system:
A. They consist of organs that secrete fluids necessary for urine formation
B. They are organs that participate in sperm transportation during copulation
C. The seminal vesicle is a paired organ and secretes prostaglandins (hormonal substances)
D. The prostate, also called prostate gland, is an unpaired organ which secretes an alkaline fluid
E. The prostate contains striated muscle fibres which support it and surround the urethra

8. Choose the true statements referring to primary spermatocytes:
A. They result from the mitotic division of spermatogonia

B. They are diploid cells (2n), their nucleus containing 46 chromosomes per cell
C. They are haploid cells (n), their nucleus containing 23 chromosomes per cell
D. They are diploid cells (2n), their nucleus containing 23 chromosomes per cell
E. They develop in the convoluted seminiferous tubules and they are moved to the inner regions of the latter

9. Choose the effects of testosterone:
A. It stimulates the metabolic processes that increase muscle mass
B. It controls the development of the male secondary sexual characteristics in the intrauterine period
C. It ensures the proper functioning of the male reproductive system after puberty
D. It inhibits the development of the male secondary sexual characteristics after puberty
E. It stimulates the development of male secondary sexual characteristics after puberty

10. Which of the following statements are *false*?
A. The urethra runs from the urinary bladder to the tip of the penis and has three parts
B. Accessory organs such as seminal vesicles or bulbourethral glands secrete sperm-forming fluids
C. During erection, the prostate's erectile tissue is filled with blood
D. The prostate secretes approximately 30% of the seminal fluid
E. The membranous urethra passes through the middle of the prostate and receives its secretions

11. Choose the true statements referring to the female reproductive system:
A. It produces and stores the female reproductive cells
B. It transports female gametes
C. The gametes produced by the female reproductive system are diploid cells
D. It includes accessory glands and organs
E. It includes the reproductive organs – the ova – also called gonads

12. The female reproductive system includes:
A. The external genitalia (the vulva)
B. Ducts, which receive and transport gametes (fallopian tubes, the uterus, the vagina)
C. The bulbourethral glands and the accessory organs, which secrete the ova
D. Gonads, responsible for producing gametes
E. Ovaries, responsible for producing sex hormones

13. Choose the true statements referring to the ovaries:
A. They are paired organs which produce ova
B. They secrete female sex hormones (progesterone and oestrogen)
C. They are situated in the abdominal cavity, intraperitoneally
D. They are small and almond-shaped
E. Also called gonads, they produce the egg cell or zygote, which will be expelled into the fallopian tubes

14. Referring to the uterus, which of the following statements are true?
A. It is a pear-shaped hollow organ, except during pregnancy when it shrinks considerably
B. It is situated medially, in the posterior part of the pelvic cavity, above the vagina and the urinary bladder
C. It is situated in the anterior part of the pelvic cavity, above the vagina and the urinary bladder
D. Its roles consist of ensuring the protection and the nutrients for the development of the embryo and the foetus
E. It is pear-shaped, except during pregnancy when it enlarges considerably

15. Choose the true statements referring to the menstrual cycle:
A. It consists exclusively of the structural alterations of the female reproductive system
B. It occurs as a response to the alterations in the blood levels of the hormones secreted by the ovary
C. It lasts approximately 28 days
D. Oogenesis occurs in the middle of the cycle
E. Ovulation normally occurs in the middle of the cycle

16. Which of the following effects is induced by oestrogen hormones?
A. The stimulation of uterine contractions during birth

B. Inhibiting the development of female sexual characteristics
C. Stimulating the development of female sexual characteristics
D. Stimulating milk secretion in mammary glands
E. Milk ejection from the mammary glands during breastfeeding

17. Choose the correct statements referring to fertilisation:
A. It represents the union of gametes during sexual reproduction
B. It usually occurs in the fallopian tubes, by the union of a spermatozoon with an ovum
C. It usually occurs in the uterine cavity, by the union of two spermatozoa with an ovum
D. The result of this process leads to the production of a fertilised ovum (zygote or egg-cell)
E. The result of this process leads to the production of the primary oocyte, also called an egg-cell

18. Choose the correct statements about the foetal membranes:
A. At the end of foetal development, the vitelline membrane develops, delimiting the amnion
B. During its development, the embryo is surrounded by several membranes
C. The chorion is the origin of the chorionic villi
D. The allantois is a part of the umbilical cord
E. The allantois is situated in the fallopian tubes, between the embryo and the vitelline sac

19. Which of the following associations are correct?
A. Ectoderm – nervous system – the epidermis and its accessories (nails, hair)
B. Mesoderm – excretory system – digestive tract mucosa
C. Mesoderm – circulatory system – skeleton – cardiac muscle
D. Endoderm – hypophysis – dermis – respiratory system
E. Endoderm – digestive tract mucosa – respiratory tract mucosa

20. Choose the correct associations about parturition:
A. The end of labour – an increase of prostaglandin secretion
B. The onset of labour – a decrease of progesterone secretion in the placenta
C. Oxytocin – stimulation of strong uterine contractions
D. Amnion rupture – preventing the release of amniotic fluid
E. Contractions of the abdominal wall – induced by uterine contractions via spinal cord reflexes

CHAPTER 10 ▸ The endocrine glands

1. Choose the true statements referring to the endocrine system:
A. It consists of endocrine glands whose products are released into the blood in order to maintain homeostasis
B. It consists of endocrine glands whose products are released into the lymph where they perform their function
C. It consists of all the glands whose products are released into the blood or into the lymph where they perform their function
D. It also comprises endocrine cells arranged diffusely in certain tissues
E. Blood transports hormones to the target cells, where they induce biochemical and physiological alterations

2. Choose the true statements referring to hormones:
A. They are transported by blood to the target cells where they perform their function (biochemical and physiological alterations)
B. In the target cells, they bind only to the receptors found inside the cell
C. Cortisol does not influence the growth and development of the body
D. Some of the hormones facilitate water and sodium retention in the body
E. They increase or decrease the level of blood glucose (the hormones secreted by the islets of Langerhans)

3. The following statement(s) about hormones is/are true:
A. Steroid hormones are represented by ADH, oxytocin, insulin and prolactin
B. Peptide hormones are represented by ADH and oxytocin, while protein hormones by insulin, STH and prolactin
C. Some non-steroid hormones (noradrenalin and adrenalin) contain amine groups in their structure
D. Non-steroid hormones may also contain lipoproteins in their structure (VLDL, LDL and HDL)
E. Thyroxine and calcitonin are lipid hormones, being cholesterol-derived hormones

4. Choose the true statements referring to the hypophysis:
A. It is situated in the lower part of the encephalon
B. It is situated right behind the optic chiasm
C. It is also called pineal gland
D. Also called pituitary gland, it consists of two lobes (anterior and posterior)
E. Also called adenohypophysis, it consists of two lobes (superior and inferior)

5. The neurohypophysis:
A. Represents the anterior lobe of the hypophysis
B. Represents the posterior lobe of the hypophysis
C. It is an endocrine gland proper which secretes peptide hormones
D. It temporarily stores the neurohormones synthesized in the hypothalamus
E. It releases hormones as a response to stimuli coming from the hypothalamic neurons

6. Choose the true statements referring to the adenohypophysis:
A. It is the posterior lobe of the hypophysis and secretes ADH and oxytocin
B. It is controlled by the hypothalamus which secretes stimulating and inhibiting hormones
C. It secretes tropic hormones which control other endocrine glands
D. It is considered the „conductor" gland of the endocrine system
E. It secretes lipid-derived tropic hormones (steroid or non-steroid)

7. Which of the following statement(s) referring to thyroid hormones is/are true?
A. T_3 is also called thriiodothyroxine
B. T_3 is also called thriiodothyronine
C. T_3 is also called tetraiodothyronine
D. T_4 is also called thyroxine
E. T_4 is also called tetraiodothyroxine

8. What happens in the absence of food iodine?
A. The thyroid atrophies (decreases in size)

B. Goitre develops (enlargement of the thyroid)
C. The thyroid cannot produce T_3 and T_4
D. Nothing happens, the body synthesizing iodine from precursors
E. Graves disease develops (exophthalmic goitre)

9. Choose the effects of parathormone (PTH) on bones:
A. It inhibits osteoclast activity
B. It stimulates osteoclast activity
C. It increases bone calcium resorption
D. It decreases calcium resorption in the renal tubules
E. It decreases calcium resorption in the intestinal mucosa

10. The following statement(s) referring to the pancreas is/are true:
A. It is the largest endocrine gland, divided into two equal lobes
B. It is a large, flattened, glandular organ
C. It lies in the abdominal cavity, posterior to the stomach and peritoneum
D. It lies in the abdominal cavity, anterior to the stomach and peritoneum
E. It has a double function, digestive and endocrine

11. Choose the correct statement(s) referring to insulin:
A. It is secreted by the β (beta) cells in the islets of Langerhans
B. It is secreted after food ingestion
C. It is secreted in the absence of food intake
D. It is a protein hormone with the molecule consisting in 51 amino acids arranged in two chains
E. It is secreted when the level of blood glucose is low

12. Choose the correct statement(s) referring to the suprarenal (adrenal) glands:
A. They are paired glands, located at the bottom of the kidneys
B. They are in number of two, located at the bottom of the kidneys
C. They have a cortical (inner) part and a medullar (outer) part
D. They have a cortical (outer) part and a medullar (inner) part
E. They have a cortical part, which has an endocrine function, and a medullar part, which has an exocrine function

13. The following statement(s) is/are true about the thymus:
A. It is located in the inferior mediastinum
B. It is situated behind the sternum
C. It secretes thymosin
D. It develops with age
E. It contributes to B lymphocyte maturation

14. Choose the true statement(s) referring to melatonin:
A. It is a steroid hormone (steroid)
B. It is secreted by the pineal gland
C. It is believed to regulate the secretion of other hormones
D. Together with melanin, they form an enzyme system
E. It influences the circadian rhythm (the day – night cycle)

15. The following statement(s) is/are true about the location of the endocrine glands:
A. The thyroid is situated anterior and superior to the pharynx
B. The epiphysis is situated in the mesencephalon, on the superior wall of ventricle III
C. The parathyroid is located on the anterior surface of the thyroid gland
D. The hypophysis is situated in the lower part of the encephalon
E. The pancreas is located in the abdominal cavity, posterior to the stomach

16. Choose the true statement(s) about hormones:
A. Adrenaline and noradrenaline are involved in emergency situations („fight or flight")
B. Calcitonin regulates osteoclast activity and increases blood calcium concentration

C. Mineralocorticoids regulate lipid and carbohydrate metabolism
D. Glucocorticoids regulate protein and carbohydrate metabolism
E. Melatonin can influence the reproductive organs, especially the ovaries

17. Choose the *incorrect* associations from below:
A. High number of insulin receptors – type 2 diabetes mellitus
B. Low number of insulin receptors - type 2 diabetes mellitus
C. Frequent urination and excessive thirst – insulin hyposecretion
D. Cretinism – defective growth, normal intellect
E. Parotid tumour – parathormone hypersecretion

18. The symptoms of diabetes mellitus include:
A. An overall lack of energy in the entire body
B. Excessive thirst
C. The excretion of excessive blood glucose through urine
D. Increased quantity of water excreted by the kidneys and, implicitly, increased urine volume
E. Decreased quantity of water excreted by the kidneys and, implicitly, decreased urine volume

19. Addison's disease occurs as a result of:
A. Glucocorticoid hyposecretion
B. Glucocorticoid hypersecretion
C. Mineralocorticoid hyposecretion
D. Mineralocorticoid hypersecretion
E. Catecholamine hyposecretion

20. Referring to Cushing syndrome, it is true that:
A. It occurs as a consequence of glucocorticoid hypersecretion
B. It occurs as a consequence of glucocorticoid hyposecretion
C. It is accompanied by facial plethora and high blood pressure
D. It is accompanied by darkened skin
E. It is accompanied by generalized weak muscle tone

ANSWERS

CHAPTER 1 ▸ Introduction to anatomy and physiology. Cells and cell physiology

1.BCD; 2.AC; 3.ABDE; 4.AE; 5.ACE; 6.CDE; 7.BD; 8.ACD; 9.ACD; 10.ACE; 11.ABE; 12.BCD; 13.ACE; 14.ACE; 15.BE; 16.ABE; 17.ABD; 18.ACD; 19.BCE; 20.ACE.

CHAPTER 2 ▸ The nervous tissue. Organisation of the nervous tissue

1.BDE; 2.BCE; 3.BCD; 4.ABD; 5.BDE; 6.ACE; 7.BDE; 8.CDE; 9.ABD; 10.ADE; 11.BCE; 12.BC; 13.ABDE; 14.ACE; 15.ADE; 16.BDE; 17.ABD; 18.ABCE; 19.ABE; 20.ABD.

CHAPTER 3 ▸ Sense organs

1.BDE; 2.BCE; 3.ACE; 4.BCE; 5.ACE; 6.ACD; 7.BCE; 8.CD; 9.ACD; 10.ABCE; 11.ACD; 12.ACE; 13.ABD; 14.BCE; 15.ACD; 16.ACE; 17.ABC; 18.BD; 19.ABE; 20.BDE.

CHAPTER 4 ▸ The bone tissue

1.ABD; 2.ADE; 3.BCE; 4.BCD; 5.BD; 6.AC; 7.ACE; 8.D; 9.ACD; 10.ACD; 11.ACD; 12.BC; 13.D; 14.ADE; 15.CD; 16.ACE; 17.ACD; 18.ABDE; 19.BCE; 20.ADE.

CHAPTER 5 ▸ The muscular system

1.BD; 2.AB; 3.CD; 4.ACE; 5.ABCD; 6.ABD; 7.BD; 8.BCE; 9.ABE; 10.CDE; 11.AC; 12.ACD; 13.AC; 14.AD; 15.ABC; 16.CD; 17.BC; 18.BCD; 19.AB; 20.BCD.

CHAPTER 6 ▸ The digestive system

1.ACE; 2.ABD; 3.ABE; 4.ABDE; 5.BCE; 6.ACE; 7.BCE; 8.BCE; 9.ABD; 10.ACE; 11.ABE; 12.DE; 13.BCE; 14.ABD; 15.BCD; 16.BDE; 17.ABC; 18.ABE; 19.BCD; 20.BDE.

CHAPTER 7 ▸ Blood and the cardiovascular system

1.ACDE; 2.ABC; 3.BCD; 4.ADE; 5.AD; 6.BDE; 7.BE; 8.BDE; 9.ACE; 10.BDE; 11.ABE; 12.ABE; 13.BDE; 14.BCD; 15.ABD; 16.ABD; 17.BDE; 18.ACE; 19.ABD; 20.ACD.

CHAPTER 8 ▸ The respiratory system. The urinary system

1.CD; 2.BCE; 3.ABDE; 4.ABE; 5.ACE; 6.BCDE; 7.ACE; 8.BCE; 9.BCD; 10.ACD; 11.AD; 12.ACE; 13.BD; 14.ABDE; 15.BC; 16.ADE; 17.ACD; 18.BD; 19.ABD; 20.ABD.

CHAPTER 9 ▸ The reproductive system

1.ABCE; 2.ABD; 3.ACE; 4.ACE; 5.ABC; 6.BCE; 7.BCD; 8.ABE; 9.ACE; 10.CE; 11.ABD; 12.ABDE; 13.ABD; 14.CDE; 15.BCE; 16.C; 17.ABD; 18.BCD; 19.ACE; 20.BCE.

CHAPTER 10 ▸ The endocrine glands

1.ADE; 2.ADE; 3.BC; 4.ABD; 5.BDE; 6.BCD; 7.BD; 8.BC; 9.BC; 10.BCE; 11.ABD; 12.BD; 13.BC; 14.BCE; 15.BDE; 16.ADE; 17.ADE; 18.ABCD; 19.AC; 20.ACE.

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