BIOLOGY ENTRANCE EXAM – 01

(Note: the right answers are given in **Bold**)

I. Choose the correct answer: *(max. 20 points)*

1. Phages are parasitic viruses in:
a) plants
b) **bacteria**
c) fungi
d) animals

2. The highest arterial blood pressure is registered in:
a) pulmonary arteries
b) **the aorta**
c) the upper vena cava
d) the lower vena cava

3. Trypsin degrades:
a) fats to fatty acids and glycerol
b) carbohydrates to glucose
c) **proteins to amino acids**
d) proteins to nucleotides

4. The prostate is:
a) a muscle
b) **a gland**
c) producing oocytes
d) producing ATP

5. Vocal cords are located in the:
a) pharynx
b) trachea
c) bronchi
d) **larynx**

6. The systemic circulation starts from the:
a) right ventricle
b) **left ventricle**
c) left atrium
d) right atrium

7. The basic structural and functional unit of the kidney is:
a) urethra
b) **nephron**
c) neuron
d) urinary bladder

8. Polypeptide chains are:
a) linear and branched
b) circular
c) **linear and unbranched**
d) circular and unbranched

9. Nitrogen bases in DNA are:
a) adenine, guanine, cytosine, uracil

b) adenine, thymine, uracil, guanine
c) **adenine, guanine, cytosine, thymine**
d) guanine, uracil, cytosine, thymine

10. The cell nucleus:
a) is the smallest organelle
b) **contains DNA**
c) contains lysosomes
d) is a nonmembraneous organelle

11. Albinism is a defect in the synthesis of:
a) hemoglobin
b) **melanin**
c) keratin
d) fibrin

12. Mammals excrete sperm cells only during the process of:
a) fertilization
b) erection
c) spermatogenesis
d) **ejaculation**

13. During meiosis the number of chromosomes is:
a) **reduced**
b) duplicated
c) fused
d) degraded

14. Double membrane organelles are:
a) **plastids**
b) lysosomes
c) peroxisomes
d) mitotic spindles

15. Replication is the synthesis of:
a) glycogen
b) **DNA**
c) proteins
d) ribosomes

16. Blood group A erythrocytes possess:
a) anti-A antibodies
b) antigens A
c) no A and B antigens
d) anti-A and B antibodies

17. The chromatin is a:
a) complex of proteins and RNA
b) bacterial chromosome
c) **complex of proteins and DNA**
d) structure in prokaryotic cells

18. In proteins, amino acids are joined together by:
a) peptide bonds

b) phosphodiester bonds
c) hydrogen bonds
d) weak bonds

19. The endoplasmic reticulum consists of:
a) **flat tube-like tanks and vesicles**
b) cristae and matrix
c) granum and stroma
d) stroma and cisternae

20. Mitochondria:
a) are the smallest organelles
b) **produce energy**
c) contain Goldgi apparatus
d) are nonmembraneous organelles

II. Mark the correct statement. *(max. 10 points)*

1. **The tympanic cavity is connected to the throat via the Eustachian tube.**
2. Accommodation is a process of adaptation of the eye to color perception.
3. **The pancreas is a gland with both external and internal secretion.**
4. The epidermis is rich in blood vessels.
5. **The nephron participates in filtration, reabsorption and secretion**.
6. Amylase is a stomach enzyme that degrades proteins.
7. **The basic muscles participating in respiration are the intercostal muscles and the diaphragm.**
8. Blood transfusion could be performed with any blood type available.
9. Phagocytosis is the transport of droplets inside the cell.
10. Proteins are dissolved in alcohol to form colloidal solutions.
11. Peroxisomes and ribosomes are DNA containing organelles.
12. **The nucleus is divided from the cytoplasm via a double membrane.**
13. **The acrosome contains enzymes facilitating fertilization.**
14. **Keratin is found in the epidermis.**
15. **Telophase follows anaphase**.
16. **The biceps flexes the elbow.**
17. Glycocorticoids regulate the thyroid gland.
18. Uracil is a nitrogenous base found in DNA.
19. **Plastids contain DNA.**
20. There are 36 chromosomes in the human karyotype.

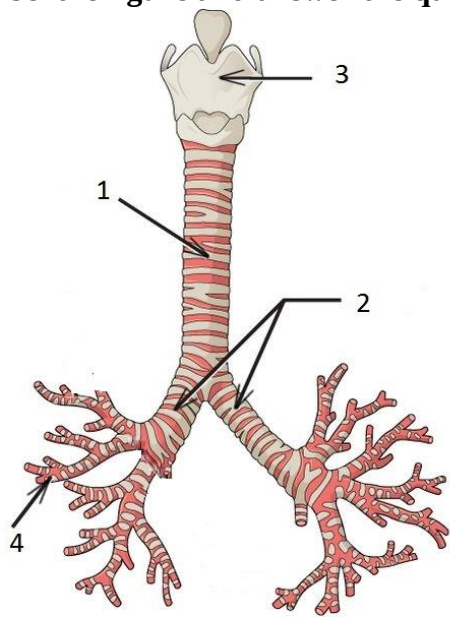
III. Match each definition with its corresponding term. *(max. 6 points)*

1. Decreased secretion of insulin from the pancreas… **C**
2. Vessels which take blood from the heart and bring it to all organs and tissues. … **E**
3. The last phase of mitosis …**L**
4. The hormone produced by the corpus luteum …. **F**
5. Increased production of growth hormone in childhood and adolescence….**I**
6. Parasitic viruses in bacteria ….**J**

A. prophase; B. acromegaly; **C. diabetes mellitus**; D. somatotropin; **E. arteries**; **F. progesterone**; G. viroids; H.

veins; **I. giantism**; **J. phages**; K. Klinefelter syndrome; **L. telophase;**

IV. Label the figure and answer the questions. *(max. 6 points)*



1. **Trachea**
2. **Primary bronchi**
3. **Larynx**
4. **Bronchioli**

Which is the largest cartilage of the larynx? **Thyroid cartilage**

How are the thin-walled sacs called in which bronchioli terminate? **Alveoli**

V. Compare: *(max. 6 points)*

	Prokaryotic cell	Eukaryotic cell
Nucleus	**Missing / NO**	**Has a nucleus / YES**
Genetic material - description	**Nucleoid, large circular DNA molecule and small circular DNA molecules – plasmids**	**Nucleus with double membrane containing a complex of DNA and proteins – chromatin**
Examples	**Bacteria**	**Plant and animal cells**

VI. Read the text and answer the questions. *(max. 12 points)*

The vertebral column consists of 26 vertebrae. It is divided into cervical, thoracic, shoulder and sacral regions. A vertebra has a body, an arc and processes. A joint is formed between the body and the arc. The first and the last vertebrae differ in structure and type of joining.

1. There are 4 false words in the text. Write them in the table and provide their true counterparts.

False	True
1. 26 vertebrae	**1. 24 vertebrae**
2. shoulder	**2. lumbar**
3. joint	**3. opening**
4. last	**4. second**

2. What is the name of the first vertebra? **Atlas**
3. The sternum (breastbone) is a part of which structure? **Rib cage**

BIOLOGY ENTRANCE EXAM – 02

(Note: the right answers are given in **Bold**)

I. Choose the correct answer: *(max. 20 points)*

1. **Kidneys are surrounded by:**

a) connective tissue
b) **adipose tissue**
c) muscular tissue
d) epithelial tissue

2. **Which nitrogen base is not found in DNA?**

a) guanine
b) thymine
c) **uracil**
d) cytosine

3. **The midbrain is involved in:**

a) **vision and hearing**
b) cardiovascular activity
c) sense of smell and taste
d) breathing

4. **Prions are:**

a) eukaryotic cells
b) **infectious particles**
c) lipids
d) bacteria

5. **The final urine does not contain:**

a) water and salts
b) uric acid
c) urea and uric acid
d) **amino acids and glucose**

6. **RNA:**

a) is double stranded
b) is produced during replication
c) contains deoxyribose
d) **is single stranded**

7. **Which cells have the largest nucleus?**

a) phagocytes
b) leukocytes
c) monocytes
d) erythrocytes

8. **The peptide bond is:**

a) covalent
b) hydrogen
c) ionic
d) van der Waals

9. **Progesterone is secreted from the:**

a) mature follicles
b) corpus luteum
c) pituitary gland
d) exocrine glands

10. **Polar bodies are formed in the course of:**

a) sporulation
b) spermatogenesis
c) oogenesis
d) implantation

11. **Pepsin is produced by the:**

a) pancreas
b) liver
c) adrenal gland
d) stomach mucosa

12. **The vein, which enters the liver, is called:**

a) liver vein
b) portal vein
c) inferior vena cava
d) upper vena cava

13. **Duplication is:**

a) an intrachromosomal aberration
b) an interchromosomal aberration
c) a type of polyploidy
d) a type of aneuploidy

14. **The true organ of hearing is the:**

a) stirrup
b) Eustachian tube
c) organ of Corti
d) cochlea

15. **The polysome is a complex of ribosomes and:**

a) tRNA
b) mRNA
c) DNA
d) Lipids

16. **The spinal cord is:**

a) covered with two membranes
b) surrounded by a canal filled with water
c) made up of grey and white matter
d) about 1 cm long

17. **In which of the following molecules is the genetic code stored?**

a) lipids
b) DNA and RNA
c) carbohydrates
d) proteins

18. **The most important event during interphase is:**

a) reverse transcription
b) transcription
c) **cell growth**
d) translation

19. **The biceps:**

a) extends the knee
b) flexes the elbow
c) rotates the ankle
d) extend the wrist

20. **What is not true about the pharynx?**

a) a) its upper part is located behind the nasal cavity
b) it is part of the respiratory system
c) only air passes through its middle part
d) food and air pass through its middle part

II. Mark the correct statement. *(max. 10 points)*

1. The bile activates the enzyme amylase which breaks down carbohydrates
2. The second heart sound is systolic.
3. **The first cervical vertebra is called atlas and connects the spine to the skull.**
4. The sclera of the eyeball has a feeding function.
5. The sweat glands are situated within the muscular tissue.
6. **The epiphysis secretes the hormone melatonin.**
7. **Pinocytosis is the transport of droplets inside the cell.**
8. Amino acids are connected in polynucleotide chains.
9. Red blood cells perform phagocytosis.
10. **Translation takes place in ribosomes.**
11. Insulin is produced by the suprarenal glands.
12. **The most characteristic feature of prokaryotic cells is the lack of nucleus.**
13. **Blood transfusion cannot be performed with any blood type available.**
14. **Ribosomes are RNA containing organelles.**
15. **The ribs are flat bones.**
16. Proteins are produced in lysosomes.
17. **The malpighian bodies are situated in the kidney.**
18. Chromatin is composed of proteins and chromosomes.
19. **Cillia and flagella are built up of microtubules.**
20. Melanin is produced by the brain.

III. Match each definition with its corresponding term. *(max. 6 points)*

1. Key component of all cell membranes…. **G**

2. Grains in cell of the liver and skeletal muscles.....**C**

3. Carbohydrate in the plant cell…**I**

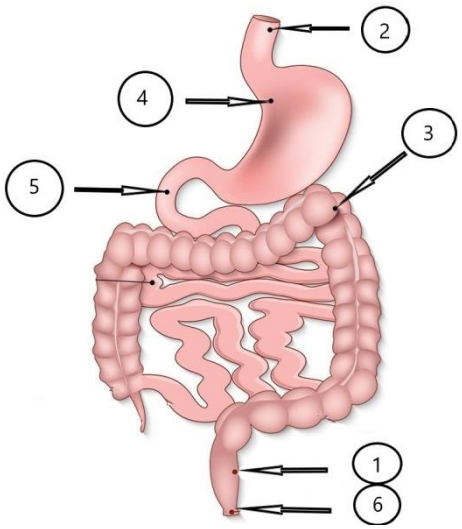
4. Basic cells of the innate immune system... **E**

5. The organ where trypsin in produced … **H**

6. Hemoglobin .....**D**

A. carotenoids; B. glucose; **C. glycogen**; **D**. **iron-containing protein**; **E. macrophages**; F. fats; **G. phospholipids and proteins**; **H. pancreas**; **I. cellulose**; J. performs photosynthesis; K. stomach; L. erythrocytes

IV. Label the figure. *(max. 6 points)*



1. Rectum
2. Esophagus
3. Large intestine
4. Stomach
5. Duodenum
6. Anus

V. Compare: *(max. 8 points)*

	Transcription	Translation
Template	**DNA**	**mRNA**
Building blocks	**Ribonucleotides**	**Amino acids**
Main enzyme	**RNA polymerase**	**Peptidyl-transferase**
End product	**RNA**	**Protein**

VI. Read the text and answer the questions. *(max. 10 points)*

Disease agents consisting of only "naked" RNA are known as viruses. They contain double stranded RNA molecules. They invade animal cells only. Prions are infectious particles that contain only DNA molecules.

1. There are 4 false words in the text. Write them in the table and provide their true counterparts.

False	True

1. viruses	**1. viroids**
2. double stranded	**2. single stranded**
3. animal	**3. plant**
4. DNA	**4. protein**

2. What type of cells are mostly invaded by prions? **Brain cells**
3. Which virus affects human T helper lymphocytes? **HIV**

BIOLOGY ENTRANCE EXAM – 03

(Note: the right answers are given in **Bold**)

I. Choose the correct answer: *(max. 20 points)*

1. The eye lens is:
a) transparent and fluid
b) **is double convex**
c) is double concave
d) nontransparent and fluid

2. The red blood cells are called:
a) thrombocytes
b) **erythrocytes**
c) phagocytes
d) leukocytes

3. The epidermis is:
a) **the outer skin layer**
b) rich in glandular tissue
c) highly vascularized
d) is composed of dead cells only

4. The excretory organ is the:
a) **kidney**
b) nephron
c) Malpighian body
d) Pelvis

5. The myocardial contraction is known as:
a) **systole**
b) diastole
c) pause
d) pulse

6. The only movable bone of the facial skeleton is the:
a) frontal bone
b) ethmoid bone
c) **mandible**
d) maxilla

7. The triceps of the lower limb:
a) **flexes the ankle**
b) flexes the elbow
c) extends the elbow
d) extends the hip

8. The duodenum is the:
a) initial part of the large intestine
b) final part of the large intestine
c) final part of the small intestine
d) **initial part of the small intestine**

9. Ribosomes:
a) **participate in protein synthesis**
b) are single membrane organelles
c) participate in lipid synthesis
d) are double membrane organelles

10. The main function of the Golgi complex is:
a) protein synthesis
b) lipid synthesis
c) **formation of lysosomes**
d) formation of ribosomes

11. The chromatin is a:
a) complex of proteins
b) bacterial chromosome
c) **complex of proteins and DNA**
d) structure in prokaryotic cells

12. Meiosis is typical of:
a) liver cells
b) somatic cells
c) **germ cells**
d) blood cells

13. During metaphase chromosomes:
a) **become clearly visible**
b) are decondensed
c) move to opposite poles of the cell
d) are composed of one chromatid

14. The bonds between amino acids residues in the polypeptide chain are:
a) **peptide**
b) phosphodiester
c) hydrogen
d) glycosylic

15. Transcription is a process of:
a) DNA synthesis
b) protein synthesis
c) cell division
d) **RNA synthesis**

16. Pinocytosis is the process of engulfing:
a) viruses
b) bacteria
c) insoluble molecules
d) **soluble molecules**

17. Which function is typical of the cell membrane?
a) carrier of genetic information
b) production of enzymes
c) degradation of proteins
d) **transport of substances**

18. Vaccines contain:

a) immune cells
b) allergens
c) antibodies
d) **antigens**

19. The organ of Corti is located in the:

a) **inner ear**
b) outer ear
c) middle ear
d) Eustachian tube

20. During mitosis the number of chromosomes is:

a) reduced
b) duplicated
c) fused
d) degraded

II. Mark the correct statements. *(max. 10 points)*

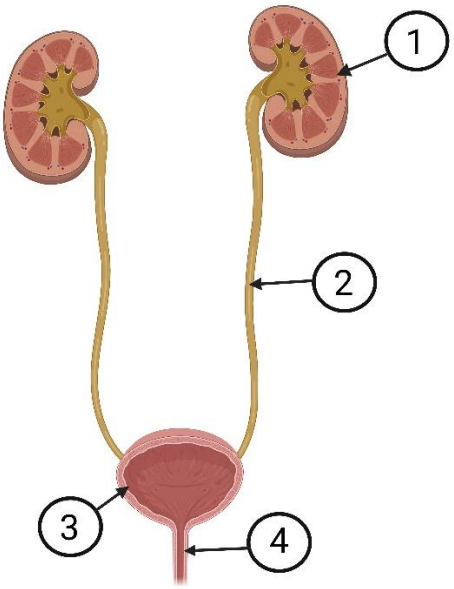
1. Amino acids recognize directly their corresponding codons on mRNA.
2. The human body is built by three basic tissue types.
3. **The viral capsid is a protein structure.**
4. The cell nucleus is surrounded by a single-layered membrane.
5. **The hypofunction of the pancreas results in diabetes mellitus.**
6. Prions are multicellular organisms causing mad cow disease.
7. **The pituitary gland is located in the cavity of the skull.**
8. Bones are the active part of the locomotive system.
9. **The pupil is situated in the central part of the iris.**
10. **The rib cage belongs to the bones of the trunk**
11. Melanin is produced by the kidney.
12. **Excess body fats are stored in the hypodermis.**
13. Proteins are produced in lysosomes.
14. **Plastids contain DNA.**
15. **The hypofunction of the thyroid gland results in myxedema.**
16. Carbohydrates have enzymatic functions.
17. **The ureters are double tubular organs.**
18. The trachea is built up of cartilage rings.
19. If the oocyte is fertilized, ovulation occurs.
20. **mRNA, rRNA and tRNA participate in translation**

III. Match each definition with its corresponding term. *(max. 6 points)*

1. Proteins with catalytic function… **C**
2. Molecules involved in immune response….. **A**
3. The enzyme building phosphodiester bonds during replication ….**H**
4. Chemicals that coordinate growth and development ….**D**
5. Protein with contractile function… **E**
6. Consists of a lipid bilayer ….**F**

A. antibodies; B. receptors; **C. enzymes**; **D. hormones E. myosin**; **F. cell membrane**; G. denaturing; **H. DNA polymerase**; I. keratin; J. carbohydrates; K. RNA polymerase; L. ribosomes

IV. Label the figure and answer the questions. *(max. 6 points)*



1. **Kidney**
2. **Ureter**
3. **Bladder.**
4. **Urethra**

What is the functional unit of the kidney where filtration occurs? **Nephron**

Which blood vessels carry blood to the kidneys for filtration? **Renal arteries**

V. Compare: *(max. 6 points)*

	DNA	RNA
Pentose	**Deoxyribose**	**Ribose**
Nitrogen bases	**A, G, C, T**	**A, G, C, U**
Structure	**Double stranded**	**Single stranded**

VI. Read the text and answer the questions. *(max. 12 points)*

Arteries are blood vessels that carry blood to the heart. They have small diameter and elastic walls. They branch into narrower vessels called venules which branch further to capillaries. The blood is pumped out of the heart under pressure into the aorta and the cardiac artery.

1. There are 4 false words in the text. Write them in the table and provide their true counterparts.

False	True
1. to the heart	**1. out of the heart**
2. small	**2. large**
3. venules	**3. arterioles**
4. cardiac	**4. pulmonary**

2. From which blood vessel does the systemic circulation start? **Aorta**
3. What is the term for the cardiac relaxation? **Diastole**

BIOLOGY ENTRANCE EXAM – 04

(Note: the right answers are given in **Bold**)

I. Choose the correct answer: *(max. 20 points)*

1. The ear ossicles are located in the:
a) **middle ear**
b) external ear
c) inner ear
d) anterior ear

2. The ovaries produce:
a) testosterone
b) cortisone
c) progesterone
d) growth hormone

3. The upper epidermal layer consists of:
a) live nucleated cells
b) dead nucleated cells
c) live non nucleated cells
d) dead non nucleated cells

4. A person from blood group AB has:
a) A antigens
b) A and B antigens
c) B antigens
d) no antigens

5. The temporal bones are part of the:
a) rib cage
b) trunk
c) limbs
d) cranium

6. The sphincter is a:
a) **muscle**
b) bone
c) ligament
d) gland

7. Hormones are secreted in the:
a) blood
b) muscles
c) saliva
d) sweat

8. The floating ribs are:
a) pairs 8, 9 and 10
b) the first two pairs
c) pairs 7, 8 and 9
d) the last two pairs

9. Which events take place in prophase?
a) the nuclear volume decreases
b) the chromatin is coiled into chromosomes
c) chromosomes are situated in cell poles
d) chromosomes are paired

10. Translation is a process of:
a) DNA synthesis
b) RNA synthesis
c) protein synthesis
d) nucleotide synthesis

11. No nucleus is present in:
a) neutrophils
b) eosinophils
c) erythrocytes
d) leukocytes

12. Starch is a food reserve in the cells of:
a) **plants**
b) animals
c) bacteria
d) fungi

13. The intracellular digestion is performed by:
a) peroxisomes
b) plastids
c) mitochondria
d) lysosomes

14. The extracellular form of the virus is known as:
a) viroid
b) prion
c) virion
d) capsid

15. Duplication is:
a) an intrachromosomal aberration
b) a type of polyploidy
c) an interchromosomal aberration
d) a type of aneuploidy

16. The pituitary gland produces:
a) mineralcorticoids
b) glycocorticoids
c) growth hormone
d) progesterone

17. Blood is a type of:
a) epithelial tissue
b) muscle tissue
c) connective tissue
d) nervous tissue

18. The last part of the large intestine is called:
a) rectum
b) duodenum
c) ventricle
d) appendix
e)

19. The basic structural and functional unit of the kidney is the:
a) urethra
b) bile
c) urinary bladder
d) nephron

20. The photoreceptors responsible for white and black vision are:
a) rods
b) cones
c) iris
d) sclera

II. Mark the correct statements. (max. 10 points)

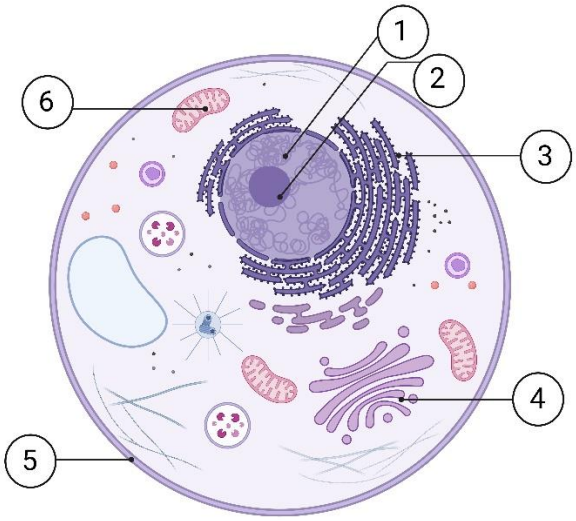
1. **Amino acids recognize their corresponding codons on mRNA via tRNAs.**
2. **The bones of the trunk make up the vertebral column and the rib cage.**
3. The viral capsid is a lipid structure.
4. Ribosomes are situated in the nucleus.
5. **The iris is situated behind the sclera and contains pigments.**
6. The codon is a triplet located within a molecule of tRNA.
7. **The pituitary gland produces somatotropin.**
8. The vestibular system is responsible for the body temperature.
9. **Muscles are the active part of the locomotive system.**
10. The central nervous system includes the spinal cord and the pituitary gland.
11. **The Eustachian tube connects the middle ear with the pharynx.**
12. The suprarenal glands are located in the cavity of the skull.
13. The systemic circulation starts with the capillaries.
14. **The Malpighian bodies are situated in the kidney.**
15. **The rib cage belongs to the bones of the trunk.**
16. Melanin is produced by the pancreas.
17. **Progesterone controls pregnancy.**
18. Corpus callosum is situated in the midbrain.
19. Conditioned reflexes are inherited.
20. **Peroxisomes are small vesicles containing many enzymes.**

III. Match each definition with its corresponding term. *(max. 6 points)*

1) Contains linear DNA … **C**
2) Synthesize phospholipids …. **B**
3) Protein synthesis factories in the cell … **F**
4) Produce energy ….**K**
5) The organ in which the primary urinary is produced… **E**
6) Cell organelle that is responsible for transporting and packaging proteins and lipids …. **H**

A. estrogens; **B. smooth endoplasmic reticulum; C. cell nucleus**; D. prions; **E. kidney**; **F. ribosoms**; G. RNA polymerase; **H. Golgi apparatus;** I. urinary bladder; J. centromeres; **K. mitochondria**; L. mitosis;

IV. Label the figure *(max. 6 points)*



1. **Nucleus**
2. **Nucleolus**
3. **Rough endoplasmic reticulum**
4. **Golgi apparatus**
5. **Plasma membrane**
6. **Mitochondrion**

V. Compare: *(max. 6 points)*

	Interphase	Metaphase
Mitotic spindle	**Not present**	**Present**
Appearance (structure) of chromosomes	**Decondensed and uncoiled**	**Highly condensed and supercoiled**
Cellular localization of chromosomes	**Irregularly scattered**	**Aligned in the equator of the spindle**

VI. Read the text and answer the questions. *(max. 12 points)*

Innate immunity is the first line of defense. Its protective barrier function is carried out by the liver. Its cells are able to engulf and destroy bacteria. Innate immunity provides specific defense against bacteria and viruses. It is evolutionary, the youngest defense system of the body. The basic cells involved in innate immunity able of engulfing pathogens are lymphocytes.

1. There are 4 false words in the text. Write them in the table and provide their true counterparts.

False	True
1. liver	**1. skin**
2. specific	**2. nonspecific**

3. the youngest	**3. the oldest**
4. lymphocytes	**4. macrophages / phagocytes**

2. Which process involves injection of serum containing ready-made antibodies to certain pathogens? **Immunization**

3. Which process involves injection of weakened or dead pathogens? **Vaccination**

4. Which molecules, produced by the immune system, can bind, and neutralize a particular antigen? **Antibodies**

5. How is called the specific immunity appearing during individual development? **Acquired**

BIOLOGY ENTRANCE EXAM – 05

(Note: the right answers are given in **Bold**)

I. Choose the correct answer: *(max. 20 points)*

1. The retina contains:
a. pigments
b) sclera
c) photoreceptors
d) hormones

2. The trachea is built up of:
a. smooth muscles
b) ring vessels
c) cartilage semirings
d) cartilage rings

3. Insulin is primarily responsible for:
a. increasing blood sugar levels
b) decreasing blood sugar levels
c) breaking down proteins
d) stimulating red blood cell production

4. The cardiac contraction is known as:
a. pulse
b) systole
c) diastole
d) pause

5. The parietal bones are part of the:
a. limbs
b) trunk
c) sternum
d) cranium

6. What is produced during replication?
a. **DNA**
b) tRNA
c) mRNA
d) protein

7. Phages are:
a) viruses
b) bacteria
c) prions
d) plants

8. Secretions are produced by:
a. smooth muscles
b) connective tissue
c) surface epithelium
b) **glandular epithelium**

9. The monomers of proteins are:
a) **amino acids**
b) nucleotides
c) nitrogen bases
d) monosaccharides

10. The main function of the Golgi complex is:
a) protein synthesis
b) lipid synthesis
c) formation of lysosomes
d) formation of ribosomes

11. Globular proteins:
a) are soluble in water
b) result from primary structure
c) result from tertiary structure
d) are positively charged

12. Bacteria are:
a) organelles
b) prokaryotic cells
c) eukaryotic cells
d) circular chromosomes

13. A person with blood group A has on his erythrocytes:
a) antigens A and B
b) antigen B
c) no antigens
d) antigen A

14. The vein, which enters the liver is called:
a) liver vein
b) inferior vena cava
c) portal vein
d) upper vena cava

15. During metaphase chromosomes:
a) move to opposite poles of the cell
b) are decondensed
c) are aligned along the equator of the cell
d) are composed of one chromatid

16. The coordination of movements and equilibrium is controlled by the:
a) cerebrum
b) cerebellum
c) mesencephalon
d) diencephalon

17. Crossing-over occurs during:
a) anaphase I
b) telophase I
c) metaphase I
d) prophase I

18. The centriole participates in:
a) transcription
b) cell division
c) cell differentiation
d) translation

19. Nonmembrane-bound organelles are:
a) **ribosomes**
b) nuclei
c) mitochondria
d) chloroplasts

20. Prions are:
a) **infectious particles**
b) eukaryotic cells
c) lipids
d) bacteria

II. Mark the correct statements. *(max. 10 points)*

1. Chromatin is composed of amino acids and chloroplasts.
2. **Adrenalin is produced by the suprarenal glands.**
3. The bacterial wall is a lipid structure.
4. **Mitochondria and plastids contain DNA.**
5. The sclera is a pigmented layer of the eye ball.
6. **The skeletal muscles have a body and a tendon.**
7. Proteins are produced as a result of transcription.
8. **Cilia and flagella are built up of microtubules.**
9. **The gene is a portion of DNA responsible for the synthesis of either an RNA or a protein molecule.**
10. Hairs and nails are structures of the connective tissue.
11. **The prophase is characterized by coiling of chromatin fibers.**
12. tRNA transports ribosomes to the nucleus.
13. **Polynucleotide chains have at their beginning a free phosphate group.**
14. The primary structure of proteins is maintained by H-bonds.
15. Fertilization in humans occurs in the vagina.
16. **Amino acids recognize their corresponding codons on mRNA by the help of tRNA.**
17. The human body is built up of three basic tissue types.
18. **The viral capsid is a protein structure.**
19. Cell nucleus could function independently of the cytoplasm.
20. **The hypofunction of the pancreas results in diabetes mellitus.**

III. Match each definition with its corresponding term. *(max. 6 points)*

1) An enzyme present in saliva …… **B**

2) Part of the throat behind the mouth and nasal cavity ……. **F**

3) A muscular ring that opens to allow food to pass from the stomach to the top of the small intestine. …… **H**

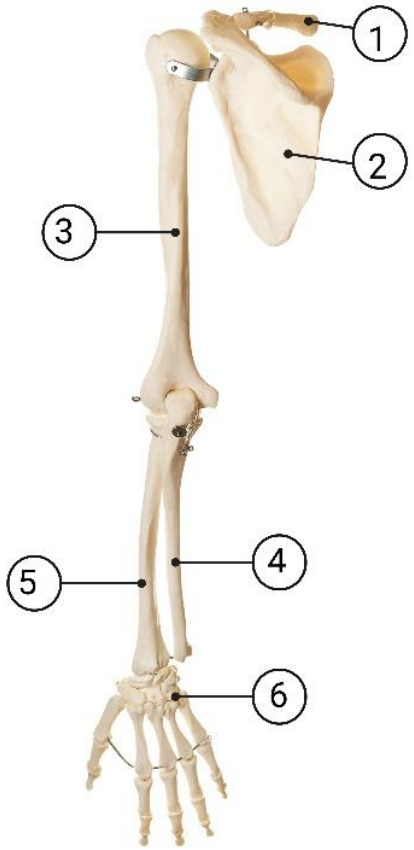
4) An enzyme in gastric juice that digests proteins ……. **A**

5) The longest part of the digestive tract……. **G**

6) An organ that produces bile ……... **C**

A. pepsin; B. amylase; C. liver; D. pancreas; E. rectum; **F. pharynx**; **G. small intestine**; **H. pyloric sphincter**; I. large intestine; J. trachea; K. trypsin; L. gallbladder

V. Label the figure. *(max. 6 points)*



1. **Clavicle**
2. **Scapula/Shoulder blade**
3. **Humerus/ Upper arm bone**
4. **Ulna**
5. **Radius**
6. **Wrist**

IV. Compare: *(max. 6 points)*

	Mitosis	Meiosis
Which cells is this typical of?	**Somatic cells**	**Germ cells**
Number of divisions	**One**	**Two**
Genetic characteristics of the new cells	**Identical to the parental cells**	**Different from the parental cells**

VI. Read the text and answer the questions. *(max. 12 points)*

Sex glands produce gametes and sex enzymes. The male reproductive organs include sperm ducts,

seminal vacuoles and the prostate gland. The female organs are oval glands, uterus and vagina. The process of fertilization of the egg and sperm takes place in the uterus.

1. There are 4 false words in the text. Write them in the table and provide their true counterparts.

False	True
1. enzymes	**1. enzymes**
2. hormones	**2. hormones**
3. vacuoles	**3. vacuoles**
4. vesicles	**4. vesicles**

2. Which process ends with the release of the mature egg? **Ovulation**
3. Which process occurs if the egg is not fertilized? **Menstruation**

BIOLOGY ENTRANCE EXAM – 06

(Note: the right answers are given in **Bold**)

I. Choose the correct answer: *(max. 20 points)*

1. The plasmid is:
a) infectious particle
b) cytoplasmic organelle
c) nuclear part
d) **circular DNA molecule**

2. The flow of genetic information runs in the following direction:
a) **DNA – RNA - Protein**
b) RNA – Protein - DNA
c) Protein – RNA - DNA
d) RNA – DNA – Protein

3. At the end of the first meiotic division each chromosome consists of:
a) **two chromatids**
b) one DNA molecule
c) four chromatids
d) four DNA molecules

4. Urine production takes place in the:
a) urinary bladder
b) **nephron**
c) ureter
d) urethra

5. Energy is provided in the cell by:
a) anabolic processes
b) **catabolic processes**
c) carboxylation
d) translation

6. Mineralocorticoids are produced in the:
a) cortex of the pituitary gland
b) medulla of the thymus
c) cortex of the pancreas
d) **cortex of suprarenal glands**

7. Ribosomes are found in:
a) smooth endoplasmic reticulum
b) endosomes
c) **rough endoplasmic reticulum**
d) exosomes

8. The zygote is:
a) **a diploid cell**
b) a haploid cell
c) formed in the uterus
d) formed in the vagina

9. Which function is not typical of proteins?

a) transport
b) protective
c) catalytic
d) **coding**

10. Amylase dissociates:
a) proteins to peptides
b) **starch to glucose**
c) proteins to amino acids
d) starch to amylose

11. Progesterone is secreted from the:
a. mature follicles
b. corpus luteum
c. pituitary gland
d. exocrine glands

12. Which is the outermost layer of the heart?
a) myocardium
b) pericardium
c) **epicardium**
d) endocardium

13. A person with blood group type B has:
a) anti-B antibodies
b) **B antigens**
c) A and B antigens
d) no antibodies

14. Double membrane organelles are:
a) **plastids**
b) flagella
c) peroxisomes
d) mitotic spindles

15. The cell membrane is built up of:
a) lipids and carbohydrates
b) proteins and salts
c) proteins and carbohydrates
d) **lipids and proteins**

16. Antigens are:
a) foreign molecules
b) immune cells
c) phagocytes
d) body fluids

17. Which organelles are responsible for locomotion?
a) nuclei
b) ribosomes
c) mitochondria
d) cilia

18. Lysosomes contain:

a) hydrolytic enzymes
b) glycolytic enzymes
c) histamin
d) adrenalin

19. **The urethra:**
a) removes urine from the kidneys
b) **removes urine from the bladder**
c) is a double organ
d) has no muscles

20. **What is not true for glial cells?**
a) **are less in number than neurons**
b) serve as mechanical support for neurons
c) absorb substances from the extracellular space
d) build up the myelin sheats

II. Mark the correct statements. *(max. 10 points)*

1. **Fibrinogen plays a major role in blood clotting.**
2. **Lipids are dissolved in organic solutions.**
3. There are 14 pairs of ribs in the human body.
4. Smooth muscle cells are oval in shape.
5. The nephron is part of the digestive system.
6. **The acrosome contains enzymes facilitating fertilization.**
7. Bacteria are eukaryotic cells.
8. Hairs and nails are connective tissue structures.
9. Phagocytosis is the transport of particles outside the cell.
10. **Chromatin condensation starts in the prophase of cell division.**
11. Bones may be long, short and fat.
12. **The pleura covers the outer side of the lungs.**
13. **The viral capsid is a protein structure.**
14. Cell nucleus could function independently of the cytoplasm.
15. **The hypofunction of the pancreas results in diabetes mellitus.**
16. Prions are multicellular organisms causing mad cow disease.
17. **Proteins are produced in ribosomes.**
18. Bones are the active part of the locomotive system.
19. **The pupil is situated in the central part of the iris.**
20. **The pituitary gland is located in the cavity of the skull.**

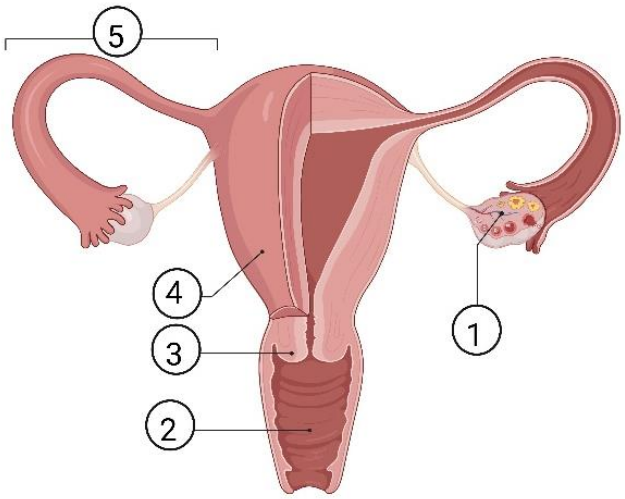
III. Match each definition with its corresponding term. *(max. 6 points)*

1) Major enzyme of replication……..**D**
2) Process of DNA duplication…….**E**
3) Major enzyme of transcription …….**A**
4) The template for the synthesis of a new DNA molecule …….. **B**
5) An enzyme that participates in translation…….. **C**
6) Process of RNA synthesis …….. **H**

A. RNA polymerase; **B. single-stranded DNA**; **C. peptidyltransferase**; **D. DNA polymerase**; **E. replication**; F.

synthesize proteins; G. RNA polymerase; **H. transcription**; I. helicase; J. proteins; K. translation; L. helicase

IV. Label the figure. *(max. 6 points)*



7. **Ovary**
8. **Vagina**
9. **Cervix**
10. **Uterus**
11. **Uterine tube**

During which process the egg is released from the ovary? **Ovulation**

V. Fill in the table: *(max. 6 points)*

	Transcription	Translation
Template	**DNA**	**mRNA**
Location	**Nucleus**	**Cytosol**
Main enzyme	**RNA polymerase**	**Peptidyl transferase**
End product	**RNA**	**Protein**

VI. Read the text and answer the questions. *(max. 12 points)*

The digestive system in humans is closed. Its major organs are the oral cavity, the pharynx, the stomach and the intestines. The saliva causes the mechanical digestion of food. The tongue is an epithelial organ that moves voluntarily. It forms and moves the bolus and participates in speaking. The tasting of food is due to receptors in the oesophagus.

1. There are 4 false words in the text. Write them in the table and provide their true counterparts.

False	True
1. closed	**1. open**
2. mechanical	**2. chemical**
3. epithelial	**3. muscular**
4. oesophagus	**4. tongue**

2. Which are the most important organs for mechanical digestion of the food? **Teeth**
3. Which process moves the food down along the intestines? **Peristalsis**

BIOLOGY ENTRANCE EXAM – 07

(Note: the right answers are given in **Bold**)

I. Choose the correct answer: *(max. 20 points)*

1. The striated muscle tissue forms:
a) the brain
b) **the skeletal muscles**
c) the heart wall
d) the bladder

2. Blood is a type of:
a) epithelial tissue
b) muscle tissue
c) **connective tissue**
d) nervous tissue

3. The last part of the large intestine is called:
a) **rectum**
b) duodenum
c) ventricle
d) appendix

4. The basic structural and functional unit of the kidney is:
a) urethra
b) bile
c) urinary bladder
d) **nephron**

5. The hormone produced by the testes is:
a) **testosterone**
b) oestrogen
c) thyroxin
d) oxytocin

6. The *substantia nigra* is located in the:
a) pons
b) cerebellum
c) **mesencephalon**
d) diencephalon

7. The photoreceptors responsible for white and dark vision are:
a) **rods**
b) cones
c) iris
d) sclera

8. The organ of Corti is situated in the:
a) middle ear
b) **cochlea**
c) Eustachian tube
d) external ear

9. The process of RNA synthesis is:

a) replication
b) translation
c) **transcription**
d) duplication

10.Crossing-over is performed during:
a) anaphase I
b) telophase I
c) metaphase I
d) **prophase I**

11.The centriole participates in:
a) transcription
b) **cell division**
c) cell differentiation
d) translation

12.Non-membrane organelles are:
a) **ribosomes**
b) vacuoles
c) mitochondria
d) chloroplasts

13.Prions are:
a) **proteins**
b) prokaryotic cells
c) lipids
d) bacteria

14.Antigens are mainly recognized by:
a) red blood cells
b) **antibodies**
c) platelets
d) enzymes

15.The polysome is a complex of ribosomes and:
a) tRNA
b) DNA
c) **mRNA**
d) lipids

16. Polynucleotide chains are:
a) linear and branched
b) ending with a free phosphate group
c) **linear and unbranched**
d) starting with a free OH group

17.The trachea is built up of:
a) smooth muscles
b) ring vessels
c) **cartilage semirings**
d) cartilage rings

18.Pepsin breaks down:
a) carbohydrates

b) lipids
c) mucus
d) **proteins**

19. Which of the following is not a facial bone?
a) maxilla
b) nasal bone
c) mandible
d) **occipital bone**

20. Urine production takes place in the:
a) urinary bladder
b) **nephron**
c) ureter
d) urethra

II. Mark the correct statements. *(max. 10 points)*

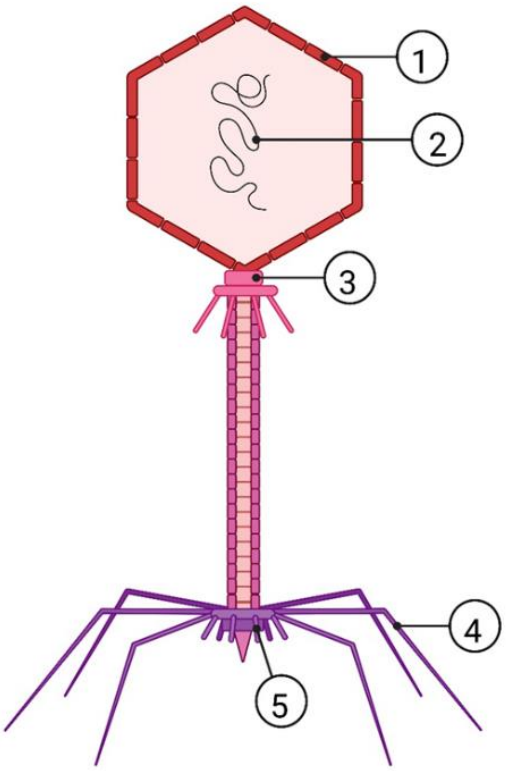
1. **The skeletal muscles have a body and tendons.**
2. Bones are light, solid and fragile.
3. **Neurons transmit information, initiated by different stimuli.**
4. **There are no antibodies against the Rh factor in human blood plasma.**
5. The cerebellum is situated above the occipital parts of the cerebrum.
6. **Efferent nerve bundles transmit nerve impulses from the brain to the skeletal muscles.**
7. The viral particle, when out of the cell, is called prion.
8. A major role in secretion is played by the centrioles.
9. **The chromatin consists of DNA and proteins.**
10. **Telophase is followed by cytokinesis.**
11. The cell mechanism that controls the reduction of chromosomes is called mitosis.
12. The process, in which the DNA of the cell is doubled, is called translation.
13. The rib cage does not belong to the bones of the trunk.
14. Melanin is produced by the kidney.
15. **Glucagon is released by the pancreatic gland.**
16. **Muscles are part of the locomotive system.**
17. Proteins are degraded in nucleus.
18. Pepsin is produced in the liver.
19. **Chromosomes are built up of DNA and proteins.**
20. **Crossing-over occurs during spermatogenesis.**

III. Match each definition with its corresponding term. *(max. 6 points)*

1) The basic cellular process in gametogenesis …….. **A**
2) Individual bones that make up the spine ……. **C**
3) The end parts of metaphase chromosomes …… **F**
4) The hormone produced by the corpus luteum …….. **B**
5) Strong and flexible connective tissue that protects your joints and bones. … **G**
6) The enzyme building phosphodiester bonds during replication …….. **H**

A. meiosis; **B. progesterone**; **C. vertebrae**; D. centromeres; E. kidney; **F. telomeres**; **G. cartilage; H. DNA polymerase**; I. somatotropin; J. phosphodiesterase; K. mitosis; L. flat bones.

IV. Label the parts on the figure and answer the question. *(max. 4 points)*



12. Capsid head
13. Nucleic acid
14. Collar
15. Tail fibers
16. Spikes
What is presented?
Bacteriophage

V. Fill in the table: *(max. 8 points)*

Blood groups	Antigens on erythrocyte membranes	Antibodies in blood plasma
A	**A**	**β**
B	**B**	**α**
AB	**AB**	-
0	-	**α, β**

VI. Read the text and answer the question. *(max. 10 points)*

Proteins are composed of 30 different types of amino acids. Therefore, proteins are heteropolymers. The covalent bond, formed between amino acids, is called phosphodiester bond. Polypeptide chains are straight and branched. The folding of the polypeptide chain into a uniform spiral or into a beta sheet shape is recognized as the tertiary structure of proteins.

a. There are 4 false words in the text. Write them in the table and provide their true counterparts.

False	True

1. 30	**1. 20**
2. phosphodiester	**2. peptide**
3. branched	**3. unbranched**
4. tertiary	**4. secondary**

b. How many levels of protein structure are known? **4**
c. Which structure determines the properties and the biological functions of proteins? **Primary structure**

BIOLOGY ENTRANCE EXAM – 08

(Note: the right answers are given in **Bold**)

I. Choose the correct answer: *(max. 20 points)*

1. The nervous tissue forms the:
a) **brain and the spinal cord**
b) heart wall
c) bones
d) glands

2. A person from blood group O has:
a) A antigens
b) B antigens
c) A and B antigens
d) **no antigens**

3. Blood moves in one direction due to the:
a) trachea
b) nerve impulses
c) **cardiac valves**
d) arteries

4. The enzyme trypsin breaks down:
a) lipids
b) **proteins**
c) carbohydrates
d) nucleic acids

5. Urine filtration happens in the:
a) urethra
b) **Malpighian body**
c) liver
d) large intestine

6. The gas exchange takes place in the:
a) trachea
b) nasal cavity
c) **alveoli**
d) vocal gap

7. Thyroxin is secreted by the:
a) pituitary gland
b) **thyroid gland**
c) testes
d) ovary

8. Translation takes place in:
a) nucleus
b) **cytoplasm**
c) lysosomes
d) nuclear membrane

9. In which phase are chromosomes aligned in the equator?
a) anaphase
b) prophase
c) **metaphase**
d) telophase

10. DNA polymerase participates in:
a) osmosis
b) **replication**
c) translation
d) transcription

11. How many chromosomes are there in the human karyotype?
a) 40
b) 23
c) 45
d) **46**

12. Chromatids are connected by a:
a) **centromere**
b) telomere
c) kinetochore
d) centriole

13. Lysosomes are involved in:
a) division
b) movement
c) **digestion**
d) secretion

14. The portion of DNA responsible for a polypeptide chain is called:
a) **gene**
b) karyotype
c) chromatin
d) virion

15. Amino acids are bound by:
a) non-covalent bond
b) **peptide bonds**
c) phosphodiester
d) N-glycosidic bond

16. Which one is not a type of connective tissue?
a) blood tissue
b) bone tissue
c) cartilaginous tissue
d) **glandular tissue**

17. HIV affects:
a) **lymphocytes**
b) erythrocytes
c) myocytes
d) hepatocytes

18. The main function of the Golgi complex is:
a) protein synthesis
b) lipid synthesis
c) **formation of lysosomes**
d) formation of ribosomes

19. The larynx is situated in the:
a) back part of the neck
b) **front part of the neck**
c) behind the nasal cavity
d) above the nasal cavity

20. The polysome is a complex of ribosomes and:
a) tRNA
b) DNA
c) **mRNA**
d) lipids

II. Mark the correct statements. *(max. 10 points)*

1. The sensory organ is made up of various receptor neurons.
2. The white matter consists of the neuron bodies.
3. There are 31 pairs of spinal nerves.
4. Urine production takes place in the ureters.
5. Mineralocorticoids regulate metabolism of mineral salts.
6. The larynx is the upper, wider part of the trachea.
7. Pancreatic juice is produced by the liver.
8. The process of recording DNA in RNA is called transcription.
9. The tertiary structure of proteins is presented by the spiral or the beta sheet shape.
10. HIV is an RNA virus.
11. Cell organelles are embedded in a liquid medium called nucleoid.
12. The prostate is a muscle.
13. The midbrain isn't a continuation of the pons.
14. Bones are the active part of the locomotive system.
15. The vestibular system is responsible for the body temperature.
16. The teeth are hard and solid structures arranged on the upper and the lower jaw.
17. Arteries collect blood from all organs and bring it to the heart.
18. The trunk muscles are subdivided into chest, abdominal and back muscles.
19. Filtration, reabsorbtion and secretion take place in the nephron.
20. Behind the iris is situated the cornea.

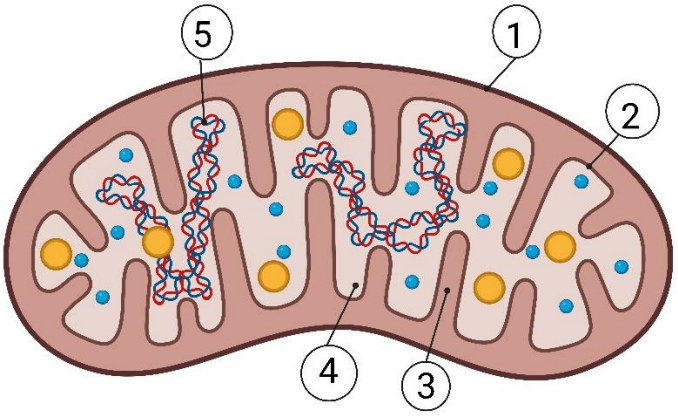
III. Match each definition with its corresponding term. *(max. 6 points)*

1) Carry out intracellular digestion …… **B**
2) Network of membranes through which proteins and other molecules move ……**E**
3) Participate in the neutralization of hydrogen peroxide …….**A**
4) Carries genetic information …… **D**
5) Provide energy to the cell …… **F**
6) Forms lysosomes …. **G**

A. peroxisomes; **B. lysosomes**; C. Nuclear membrane; **D. DNA**; **E. endoplasmic reticulum**; **F.**

mitochondria; **G. Golgi apparatus;** H. spindle; I. cell wall; J. chloroplasts; K. Proteins; L. Carbohydrates.

IV. Label the parts on the figure and answer the question. *(max. 6 points)*



17. Outer membrane
18. Inner membrane
19. Cristae
20. Matrix
21. DNA
What is presented?
Mitochondrion

V. Compare: *(max. 6 points)*

	Nucleic acids	Proteins
Monomers	**Nucleotides**	**Amino acids**
Chemical bonds between monomers	**Phosphodiester**	**Peptide**
Biological properties	**Main hereditary molecule**	**Structural, regulatory, transport, protective, catalytic**

VI. Read the text and answer the question. *(max. 12 points)*

The heart is a muscular organ which pumps blood into the lymphatic vessels. Longitudinally, a wall divides the heart into right and left parts. In each part there is an atrium and a tendon. The heart walls are built up of two layers. The inner layer of the heart wall is made up of a simple squamous epithelium and is called myocardium.

a. There are 4 false words in the text. Write them in the table and provide their true counterparts.

False	True
1. lymphatic	**1. blood**
2. tendon	**2. ventricle**

3. two	**3. three**
4. myocardium	**4. endocardium**

b. Which is the outermost layer of the heart wall? **Epicardium**

c. Which major blood vessel starts from the left ventricle? **Aorta**

BIOLOGY ENTRANCE EXAM – 09

(Note: the right answers are given in **Bold**)

I. Choose the correct answer: *(max. 20 points)*

1. Blood group B erythrocytes contain:
a) antibodies β
b) **antigens B**
c) antibodies α, β
d) antigens A

2. Trypsin brakes down:
a) carbohydrates
b) lipids
c) water
d) **proteins**

3. Which one is a limb muscle?
a) trapezius
b) latissimus dorsi
c) **biceps**
d) large pectoral muscle

4. Which bone is not a part of the skeleton of the free upper limb?
a) humerus
b) ulna
c) radius
d) **shoulder blade**

5. Which one is not a type of connective tissue?
a) blood tissue
b) bone tissue
c) **glandular tissue**
d) cartilaginous tissue

6. The basic structural and functional unit of the kidney is:
a) renal capsule
b) **nephron**
c) Malpighian body
d) Glomerulus

7. The ear ossicles are located in the:
a) external ear
b) inner ear
c) **middle ear**
d) organ of Corti

8. The iris is situated behind the:
a) **sclera**
b) retina
c) pupil
d) cornea

9. The process of protein synthesis is:
a) replication
b) **translation**
c) transcription
d) duplication

10. HIV is:
a) **virus**
b) bacteria
c) protozoa
d) hepatocytes

11. The primary protein structure is not determined by amino acid residues':
a) number
b) **folding**
c) type
d) arrangement

12. Prokaryotes are:
a) **eubacteria and cyanobacteria**
b) viruses and prions
c) cyanobacteria and phages
d) viruses and eubacteria

13. The nitrogen bases in DNA are:
a) A, T, U, C
b) **T, A, G, C**
c) A, U, T, G
d) G, C, U, T

14. The Golgi complex consists of:
a) **cisternae and vesicles**
b) cristae and matrix
c) granum and stroma
d) stroma and cisternae

15. The DNA molecules are:
a) composed of amino acids
b) single stranded
c) **double stranded**
d) adaptable

16. Which function is not typical for the skin?
a) **contractile**
b) thermoregulative
c) protective
d) excretory

17. Eukaryotes are:
a) **plant and animal cells**
b) eubacteria and cyanobacteria
c) viruses and prions
d) cyanobacteria and phages

18. Glucocorticoids:
a) are produced by the thyroid gland
b) stimulate body growth
c) regulate the metabolism of mineral salts
d) **are produced by the suprarenal glands**

19. Polar bodies are formed in the course of:
a) sporulation
b) spermatogenesis
c) **oogenesis**
d) implantation

20. What is not true for phages?
a) infect bacterial cells
b) consist of head, tail, and fibers
c) contain a double stranded DNA
d) **attack eukaryotic cells**

II. Mark the correct statements. *(max. 10 points)*

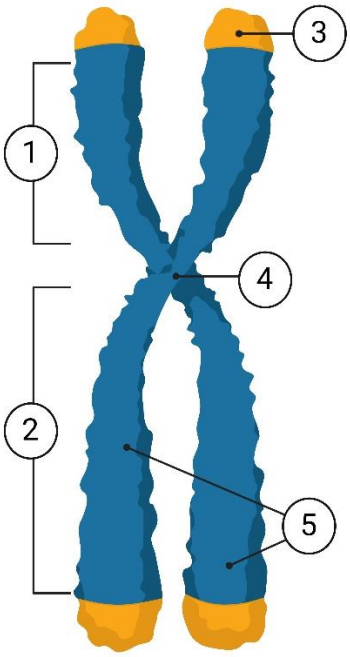
1. Polypeptide chains consist of nucleotides.
2. **The tertiary structure of the proteins is the folding of the chain in space.**
3. Peroxisomes are nonmembrane-bound organelles.
4. **The chromatin is a complex of DNA and proteins.**
5. Replication is the process of RNA production.
6. **Meiosis is a process of cell division in which haploid cells are produced.**
7. **The epidermal cells are restored through the division of living cells in the deeper layers.**
8. Erythrocytes are cells with a nucleus in the shape of biconcave discs.
9. **Carbohydrates are the basic source of energy for the cells.**
10. The exchange of oxygen and carbon dioxide takes place through the trachea.
11. **The zygote is a diploid cell.**
12. Hairs and nails are structures of the connective tissue.
13. **A major role in secretion is played by lysosomes.**
14. Chromatids are connected by centrioles.
15. Meiosis is followed by mitosis.
16. **First two months of pregnancy the developing organism is called embryo.**
17. Blood group B has B antibodies in the plasma and A antigens on the erythrocytes.
18. The triplet in a DNA molecule coding for one amino acid is called a gene.
19. **Pancreas is a with a mixed function.**
20. **The pressure that blood exerts on the walls of blood vessels is called blood pressure.**

III. Match each definition with its corresponding term: *(max. 6 points)*

1) A type of cell division that produces haploid cells … **C**
2) The end parts of metaphase chromosomes…. **B**
3) Structure in a chromosome that holds together the two chromatids … **F**
4) The enzyme building phosphodiester bonds during transcription….**K**
5) The molecule that serves as a template in the translation process.… **E**
6) The enzyme building phosphodiester bonds during transcription …. **G**

A. haploid; **B. telomeres**; **C. meiosis**; D. DNA; **E. mRNA**; **F. centromere**; **G. RNA polymerase**; H. rRNA; I. helicase; J. peptidyltransferase; **K. RNA polymerase**; L. mitosis.

1. **Label the parts on the figure.** *(max. 6 points)*



22. Short arm
23. Long arm
24. Telomere
25. Centromere
26. Sister chromatids
What is presented?
Chromosome

2. **Fill in the table:** *(max. 8 points)*

Criteria	Replication	Transcription
Template	**DNA**	**DNA**
Substrates	**Deoxyribonucleotides**	**Ribonucleotides**
Main enzyme	**DNA polymerase**	**RNA polymerase**
Final product	**DNA**	**RNA**

3. **Read the text and answer the question.** *(max. 10 points)*

The sequence of cell growth, its preparation for division and the division of two daughter cells is called mitosis. The most important process in preparation for mitosis is the doubling of genetic material - production of RNA. During interphase the cell decreases in mass by synthesis of diverse proteins. In result of mitosis from one diploid mother cell 4 daughter cells are formed.

4. There are 4 false words in the text. Write them in the table and provide their true

counterparts.

False	True
1. Mitosis	**1. Cell cycle**
2. RNA	**2. DNA**
3. Decreases	**3. Increases**
4. 4	**4. 2**

5. How is called the division of the cytoplasm? **Cytokinesis**

6. During which phase of mitosis does the nucleus disappear? **Prophase**

BIOLOGY ENTRANCE EXAM – 10

(Note: the right answers are given in **Bold**)

I. Choose the correct answer: *(max. 20 points)*

1. Blood group A erythrocytes possess:
a) antibodies α
b) antigens B
c) antibodies α, β
d) **antigens A**

2. Pepsin brakes down:
a) carbohydrates
b) lipids
c) mucus
d) **proteins**

3. Which function is not typical for the skin?
a) protective
b) thermoregulative
c) **contractile**
d) excretory

4. Lumbar vertebrae are:
a) **largest in size**
b) triangular in shape
c) smallest in size
d) 12

5. The biceps:
a) extends the elbow
b) **flexes the elbow**
c) flexes the foot in the ankle
d) extends the foot in the ankle

6. Erythrocytes:
a) have a protective function
b) are several types
c) participate in blood clotting
d) **are without nuclei**

7. Glucocorticoids:
a) are produced by the thyroid gland
b) stimulate body growth
c) regulate metabolism of mineral salts
d) **regulate metabolism of organic compounds**

8. The spinal cord is:
a) covered with two membranes
b) surrounded by a canal filled with liquid
c) **made up of grey and white matter**
d) about 1 cm long

9. The mitochondria:
a) are enclosed by one membrane
b) consist of granum and stroma
c) **consist of cristae and matrix**
d) use the light energy source

10. The viroids are:
a) viruses
b) bacteria
c) phages
d) **single stranded RNA molecules**

11. During anaphase, the chromosomes:
a) **move to the cell poles**
b) are decondensed
c) consist of DNA and not proteins
d) are aligned in the equatorial plane

12. Eukaryotes:
a) are eubacteria and cyanobacteria
b) **have nucleus**
c) have single circular chromosome
d) contain plasmids

13. In which of the following the genetic code is written?
a) lipids
b) **nucleus acids**
c) carbohydrates
d) proteins

14. The endoplasmic reticulum consists of:
a) **flat tube-like tanks and vesicles**
b) cristae and matrix
c) granum and stroma
d) stroma and cisternae

15. The most important event during interphase is:
a) reverse transcription
b) transcription
c) **DNA-replication**
d) Translation

16. The nitrogen bases in RNA are:
a) **A, G, U, C**
b) T, A, G, C
c) A, U, T, G
d) G, C, U, T

18. The hormone that lowers blood glucose level is:
a) melatonin
b) testosterone
c) glucagone
d) **insulin**

19. The cerebellum is a part of the:
a) spleen
b) peripheral nervous system
c) liver
d) **central nervous system**

20. Kidneys are surrounded by:
a) **adipose tissue**
b) connective tissue
c) muscular tissue
d) epithelial tissue

21. The vein, which enters the liver, is called:
a) liver vein
b) **portal vein**
c) inferior vena cava
d) upper vena cava

II. Mark the correct statements. *(max. 10 points)*

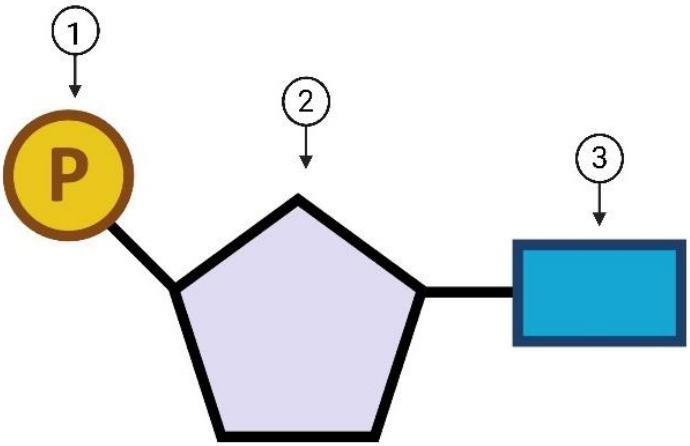
1. Lysosomes are membrane-bound organelles.
2. The polysome is a structure consisting of an RNA molecule connected to several ribosomes.
3. The triplet in a DNA molecule coding for one amino acid is called genom.
4. Denaturation shows that the folding of the polypeptide chain is determined by the primary structure.
5. Transcription is the process of RNA production.
6. Mitosis is a type of cell division which is the basis of asexual reproduction.
7. The smooth muscle tissue forms the skeletal muscles.
8. The bones are long, short and flat.
9. Urine production takes place in the nephrons.
10. Systemic circulation starts with the pulmonary artery.
11. The inner side of the lungs is covered with the pleura.
12. The suprarenal glands have both exocrine and endocrine secretion.
13. The vestibular system is responsible for the body temperature.
14. The viral capsid is a protein structure.
15. Erythrocytes are cells without a nucleus in the shape of biconcave discs.
16. RNA is made by deoxyribonucleotides.
17. Chromatids are connected by centromeres.
18. The basic muscles participating in respiration are the intercostal muscles and the diaphragm.
19. Hairs and nails are structures of the connective tissue.
20. A major role in secretion is played by mitochondria.

III. Match each definition with its corresponding term: *(max. 6 points)*

1) Structures composed of DNA and proteins. … **C**
2) The continuation of medulla oblongata … **A**
3) The last phase of mitosis….**H**
4) Prokaryotic cells ….**J**
5) Vessels which take blood from the heart and bring it to all organs and tissues … **E**
6) The basic repetitive units of DNA and RNA ….**F**

A. **pons**; B. veins; **C. chromosomes**; D. centromeres; **E. arteries**; **F. nucleotides**; G. interphase; **H. telophase**; I. prions; **J. bacteria**; K. nucleosides; L. strenum.

IV. Label the parts on the figure. *(max. 4 points)*



27. Phosphate group
28. Pentose sugar
29. Nitrogenous base
What is this structure?
Nucleotide

V. Fill in the table: *(max. 8 points)*

	Somatotropin	Adrenaline
Organ of production	**Anterior part of the pituitary gland / hypophysis**	**Stimulates body growth and accelerates protein production in the cells**
Effects	**Medullar part of suprarenal glands**	**Affects conditions of stress and adaptation**

VI. Read the text and answer the question. *(max. 10 points)*

The process of RNA synthesis is called replication. There are three types of RNA present in every cell - messenger (mRNA), transfer (tRNA) and ribosomal (rRNA). rRNA is a double stranded molecule that builds up the ribosomes. tRNA binds the amino acid and transfers it to the corresponding anticodon on mRNA. Amino acids are bound to each other by phosphodiester bonds.

1. There are 4 false words in the text. Write them in the table and provide their true counterparts.

False	True
1. replication	**1. transcription**
2. double	**2. single**

3. anticodon	**3. codon**
4. phosphodiester	**4. peptide**

2. How is called the process of protein synthesis? **Translation**
3. In which cellular compartment does it occur? **Cytoplasm**