

BIOLOGY ENTRANCE EXAM (EXAMPLE)

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

- The plasma membrane is composed of:
 - proteins only
 - carbohydrates only
 - lipids and proteins**
 - lipids and salts
- Ribosomes are the site of:
 - lipid synthesis
 - ATP synthesis
 - protein synthesis**
 - DNA replication
- Lysosomes contain:
 - hormones
 - DNA
 - hydrolytic enzymes**
 - ribosomes
- Amino acids are linked by a:
 - hydrogen bond
 - ionic bond
 - peptide bond**
 - glycosidic bond
- DNA contains the sugar:
 - ribose
 - fructose
 - sucrose
 - deoxyribose**
- Transcription is the synthesis of:
 - DNA
 - proteins
 - RNA**
 - lipids
- A polysome is:
 - a cluster of DNA molecules
 - a cluster of RNA molecules
 - multiple ribosomes on one DNA
 - multiple ribosomes on one mRNA**
- Bacteria contain:
 - nucleus
 - mitochondria
 - Golgi apparatus
 - ribosomes**
- The protein coat of a virus is called:
 - viral DNA

- b) cell wall
 - c) envelope
 - d) **capsid**
10. Vaccines contain:
- a) lymphocytes
 - b) hormones
 - c) **antigens**
 - d) antibodies
11. Bacteriophages usually have:
- a) only RNA
 - b) only envelope
 - c) **head and tail structure**
 - d) only RNA and proteins
12. Meiosis occurs in:
- a) **gametes**
 - b) bacteria
 - c) somatic cells
 - d) tumor cells
13. Crossing-over increases:
- a) mutation rate
 - b) number of chromosomes
 - c) **genetic variation**
 - d) cell division speed
14. The outermost covering of the heart is the:
- a) endocardium
 - b) myocardium
 - c) **pericardium**
 - d) epicardium
15. The pulmonary artery carries:
- a) oxygenated blood
 - b) **deoxygenated blood**
 - c) lymph
 - d) plasma
16. Gas exchange occurs in the:
- a) trachea
 - b) bronchi
 - c) nasal cavity
 - d) **alveoli**
17. Growth hormone is secreted by:
- a) thyroid gland
 - b) adrenal gland
 - c) **pituitary gland**
 - d) pancreas
18. The retina contains:
- a) hormones
 - b) sclera

- c) **photoreceptors**
 - d) muscles
19. Telomeres are located at:
- a) centromeres
 - b) spindle fibers
 - c) **ends of chromosomes**
 - d) cytoplasm
20. G1 phase of interphase is mainly for:
- a) DNA replication
 - b) **cell growth**
 - c) chromosome segregation
 - d) mitosis

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

Correct statements

1. **Plastids contain their own DNA.**
2. **Skeletal muscles have a body and tendons.**
3. **A gene is a segment of DNA that codes for an RNA or a protein.**
4. **During prophase, chromatin condenses into visible chromosomes.**
5. **Polynucleotide chains begin with a free phosphate group at the 5' end.**
6. **Fibrinogen is essential for blood clotting.**
7. **Lipids dissolve well in organic solvents.**
8. **Smooth muscle cells are spindle-shaped.**
9. **Chromatin condensation starts in prophase.**
10. **The pleura covers the outer surface of the lungs.**

Incorrect statements

1. The tympanic cavity opens into the esophagus by the Eustachian tube.
2. The pancreas produces insulin and glycogen.
3. The nephron transmits signals.
4. The nucleus has no membrane.
5. The acrosome stores glycogen for the sperm.
6. Keratin is found in human bones.
7. Telophase precedes metaphase.
8. The biceps extends the elbow.
9. Plastids never contain genetic material.
10. The viral capsid is made of DNA.

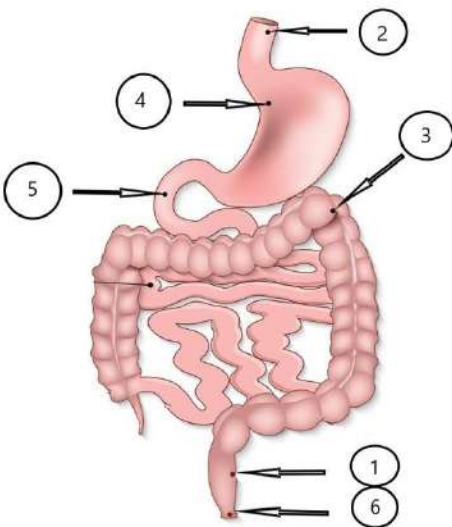
III. Match each definition with its corresponding term.

(max. 6 points)

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

A. prophase; B. acromegaly; C. **diabetes mellitus**; D. somatotropin; E. **arteries**; F. **progesterone**; G. viroids; H. veins; I. **gigantism**; J. **phages**; K. Graves' disease; L. **telophase**

IV. Label the numbered parts of the figure using the given options. *(max. 6 points)*



1. **Rectum**
2. **Esophagus**
3. **Large intestine**
4. **Stomach**
5. **Duodenum**
6. **Anus**
7. Tongue
8. Larynx

9. Pharynx
10. Liver
11. Lungs
12. Spleen

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

Feature / Question	Somatic Cells	Gametes
Has diploid chromosome number	Yes	No
Formed by meiosis	No	Yes
Genetically identical to parent cell	Yes	No
Found in body tissues	Yes	No

VI. Find and correct the 5 errors in the text by using the given options. (*max. 10 points*)

The heart is a muscular organ which pumps blood into the lymphatic vessels. Longitudinally, a septum 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 ectocardium. The heart is surrounded by the myocardium.

- | Option | Replacement |
|---------------|---|
| 1 | lymphatic → blood |
| 2 | tendon → ventricle |
| 3 | two → three |
| 4 | ectocardium → endocardium |
| 5 | myocardium → pericardium |
| 6 | atrium → aorta |
| 7 | simple squamous → cuboidal |
| 8 | muscular → epithelial |
| 9 | longitudinally → transversely |
| 10 | septum → membrane |