BIOLÓGIA
ANGOL NYELVEN
KÖZÉPSZINTŰ
ÍRÁSBELI VIZSGA
2009. október 29. 14:00

Az írásbeli vizsga időtartama: 120 perc

Pótlapok száma
| Tisztázati | Piszkozati |

OKTATÁSI ÉS KULTURÁLIS
MINISZTÉRIUM
Important information

Read this information sheet before you start working.

You have 120 minutes to complete the intermediate level examination. The following assignments are multiple choice or open-ended questions.

When answering **multiple choice questions** one or more CAPITAL LETTERS should be written into the empty boxes. These are the codes for the right answer(s). Make sure that your letters are unambiguous, because uncertain answers will not be accepted. In case of correction you are asked TO CROSS OUT the wrong letter clearly and TO WRITE THE CODE FOR THE RIGHT ONE BESIDE.

![Correct/Acceptable/Wrong example]

When answering **open-ended questions** technical terms, short answers of 1-or-2 words, a sentence or several sentences should be created. Take care of GRAMMATICAL CORRECTNESS. Grammatically ambiguous or unintelligible answers (e.g. uncertain subject in a sentence) will not be accepted even if the right answer is included.

Every correct answer is awarded by 1 point, only the different point values are shown.

**Use black or blue ink.**

Don’t write into the grey-coloured boxes.

We wish you a good work.
I. Grouping of living organisms  

Put the numbers of the listed organisms in the appropriate circles.

1. The **pork tapeworm** lives in mammal’s intestines and absorbs nutrients from there.  
2. The **red-footed falcon** mostly feeds on insects.  
3. The pathogenic agent of **leprosy** is a very small bacterium.  
4. The green leaf-carpet of the aquatic fern named **floating watermoss** sometimes covers the surface of stagnant waters.  
5. The number of **oil-digesting bacteria** quickly increases in the polluted water after oil tanker disasters.  
6. In the presence of moisture the different **species of Penicillium (mould)** break down fats into ketones, which is responsible for the rancid taste of fats.  
7. The hyphae of **Peronospore** destroy many crops every year.  
8. Our highly protected plant rarity, the **Hungarian saffron (crocus)** was represented on the 2-forints coin. In mild winters, this plant is already green and bursts into bloom in January.  
9. The **bacterium species Bacillus macerans** produces the mixture of alcohol and acetone on a carbohydrate medium.  
10. The **Sunda tiger** is on the verge of extinction, because its habitat decreases.

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pork tapeworm = horgasfejű galandféreg  
red-footed falcon = kékvércse  
floating watermoss = rucaöröm  
Penicillium = ecsetpenész  
Hungarian saffron = magyar kikerics
II. The vertical layering of a rain forest 11 points

The figure shows five canopy layers of a rain forest. Graphs on the right-hand side represent the changes of three typical environmental factors: the continuous line refers to light intensity (100% represents the light that reaches the crown of the giant trees), the broken line shows relative humidity and the dotted line shows the degree of transpiration of leaves per unit of time (100% equals to the transpiration of top leaves of the giant trees).

Fill the empty cells of the table on the basis of the graph. (3 points)

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<th>height (m)</th>
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4. On the basis of the graph, what relationship can you recognise between leaf transpiration and the relative humidity of air? Explain the relationship. (2 points)

5. Most of the decomposers and parasites live in the first canopy layer or below it. Which environmental factor can explain this fact and how? (2 points)
6. The epiphytic (tree-dwelling) but not parasitic species of bromeliads and orchids are common in the fourth canopy layer. Structure of their leaves often resembles that of the desert plants.

- Which environmental factors can explain this similarity?
- What are the possible structural adaptations of a leaf to these environmental factors?

(3 points)

7. One of the outcomes of deforestation in tropical rain forests is the seriously damaged water-balance of the affected area. On the grounds of the graph, explain why the area dries out in the lack of vegetation.

III. A harmless heraldic animal

The Rosalia longicorn* is perhaps the most beautiful representative of the Longicorn family in Hungary. In contrast to its Hungarian name (“Alpine”) it also occurs in our medium mountains.

The adult Rosalia longicorn is a large, 16 to 38 mm long insect. The antennae can be up to twice as long as the rest of the body in males. The adults are active from June to August, mainly in beech forests. It is not easy to notice its colours in its natural habitat, e.g. on the grey bark of the European beech. Imagos** survive only for several weeks, during this time the fertilised females lay their eggs into the cracks in the bark of a dead beech. The hatching larvae “chew themselves” into the wood, digging tunnels in it while feeding on wood. The larva stage lasts for about 3 years. Although they have many natural enemies (woodpeckers for instance) human activity has been the major reason for the decreasing population. Most of the dead wood is usually removed from our forests, thus reducing the habitat of longicorns. This is why the females of this species have to lay their eggs into the lumbered and temporarily stored timber in the forest. The larvae hatched there usually finish their short lives in a sawmill or a stove. The Rosalia longicorn is a rare and endangered species in many European countries, a protected species in Hungary and the heraldic (symbolic) animal of the Duna-Ipoly National Park.

*Rosalia longicorn= havasi cincér   **imago=adult insect

Locsmándi Csaba
1. Which characteristic represented on the photo helps us to identify this animal as an Insect?

The text above describes this less than 4 cm long insect as "large". Besides other reasons, insects cannot grow a meter long due to their respiratory mechanism.

2. Which type of respiration is typical of insects? **Put the letter of the correct answer in the empty box.**

A. Respiration through the integumentum  
B. Respiration with lungs that originate from the integumentum  
C. Respiration by means of tracheae  
D. Respiration with lungs that originate from the pharynx  
E. Respiration by means of gills

3. Which statement is true for this type of respiration?

A. The respiration is carried out through the body surface.  
B. The respiratory system carries respiratory gases almost to the cells.  
C. There is no ventilation movement.  
D. The respiratory surface area is not larger than the animal’s body surface.  
E. The respiratory organ has rich blood supply.

4. Considering its nutrition, what role does the larva of Rosalia longicorn play in the ecosystem of a beech forest?

A. Parasite  
B. Producer  
C. Primary consumer  
D. Secondary consumer  
E. Saprophyte

According to the excerpt, it is not easy to notice the animal’s colours in its natural habitat.

5. Name this phenomenon.

6. In which months is protection of the Rosalia longicorn’s habitat important?

A. From December to February  
B. From June to August  
C. From June until the first frosty days  
D. From March to June  
E. All year round

7. Explain your answer by a citation from the text.
8. How can Rosalia longicorn be protected the most efficiently?

A. To protect the imagos.
B. To eliminate their natural enemies.
C. To maintain natural forests: dead wood must not be removed from the forest.
D. New forests must be planted in the place of forests that have been cut.
E. The cut wood must be left in the forest for several months.

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IV. **The Pasteur effect**

10 points

The French bacteriologist, Louis Pasteur investigated such yeast species that were able to reproduce both in the presence and in the lack of oxygen. When glucose was given as nutrient to them the breakdown of glucose happened at quite different rate in oxygen than without it in a N₂ atmosphere. The results are represented in the following simplified graph.

What conclusions can you draw from the result of this experiment? *Put a letter "T" in the empty cell after a true statement and a letter "F" after a false one.*

1. The fungi increased the breakdown of glucose in the lack of oxygen compared to the breakdown in oxygen-rich environment. [T]
2. In the lack of oxygen the fungi probably require more energy, ATP. [T]
3. In the lack of oxygen no ATP could be produced in the mitochondria of the fungi. [F]
4. The fungi greatly reduced their life-functions in the presence of oxygen. [F]
5. In the lack of oxygen fungi probably produced energy by fermentation. [T]
6. In oxygen-rich atmosphere fungi show autotrophic way of life, while in the lack of oxygen they behave as heterotrophs. [T]
7. When no oxygen was available fungi used nitrogen as energy source. [F]
8. Let us suppose that the total amount of the utilized glucose was used for energy production by the fungi. In a oxygen-free atmosphere which molecules could the carbon atoms of glucose get into?

9. In O₂-rich atmosphere which molecules could the hydrogen atoms of glucose get into?

10. By using a microscope we can easily identify them as unicellular fungi, not as bacteria. Name one characteristic that helps you distinguish between these two groups of living organisms.

V. Medicine through a straw

If the stomach cannot produce enough gastric juice pepsin, the only digestive enzyme of stomach, can be replaced with a medicine.

1. What nutrients does pepsin digest? Write the letter for the correct answer in the empty box.

   A. Carbohydrates
   B. Fats
   C. Proteins
   D. Starch
   E. Lipids

2. The breaking of which bonds does pepsin catalyse?

   A. The bonds between sugar molecules
   B. The bonds between nucleotides
   C. Hydrogen bonds
   D. Peptide bonds
   E. The bonds of glycerol

3. Which group of molecules does pepsin belong to?

   A. Carbohydrates
   B. Fats
   C. Proteins
   D. Starch
   E. Lipids
4. The other component of this medicine is hydrochloric acid. Why is hydrochloric acid given with pepsin?
A. Because hydrochloric acid protects the mucous membrane of the stomach.
B. Because pepsin’s activity is the best in an acidic environment.
C. Because the pH of hydrochloric acid is identical to the pH of the entire digestive canal.
D. Because hydrochloric acid digests carbohydrates.
E. Because the pH optimum of every enzyme is acidic.

5. Besides the effect mentioned in the previous question, hydrochloric acid destroys most proteins (coagulation). Outline in a sentence what happens to proteins during this process.

6. The combination of pepsin and hydrochloric acid is suggested to be taken through a straw in order to protect teeth. Outline in a sentence why the contact between the medicine and teeth is harmful to teeth.

7. Write the name and the code (letter) of the two glands shown on this figure producing digestive juices that are released into the section below the stomach.

8. Write the letter of the gland in the box that produces a juice able to digest all kinds of nutrients.

9. The described process is regulated by the autonomic (vegetative) nervous system. What is the general name of the effect that stimulates this process?

10. Gland “C” produces a slightly alkaline juice. Its activity is controlled by a hormone, which is released from the wall of the duodenum when food and gastric juice are present. Does this hormone stimulate or inhibit the work of gland “C”? Explain your answer.
VI. Protective blood groups 12 points

The first and best-known blood group system was the AB0 system. Landsteiner, the Viennese scientist discovered it in 1900 and he gave the names still widely used: A, B, AB and 0.

How could these blood groups develop if they are invisible and neutral? Is it a mere accident that Native Americans landed only with blood group 0? Now we do know that blood groups are not as neutral as they seem to be. There must be a reason for this. In the late 1980s scientist discovered that people with blood group 0 are more susceptible to cholera infections. People with blood group AB are the most resistant, followed by blood group A and then by blood group B. All of these blood groups show much greater resistance than blood group 0. Resistance of blood group AB is so strong that they are practically immune to cholera. We cannot state that these people could drink safely from a sewer in Calcutta, but they were free from diarrhoea even if the pathogenic Vibrio bacterium infected them and dwelt in their stomach.

Matt Ridley

Based on the above-mentioned fact a question arises: Why don’t all people have blood group AB if it is so favourable?

1. On the basis of your former studies in genetics, write the genotype of a person with blood group AB by using the usual (learnt) symbols.

2. Let’s suppose that two people with blood group AB get married. Determine the possible blood groups of their children and the probabilities of these. (2 points)

| The possible blood groups of their children-to-be: |  |  |
| The probabilities of blood groups of their children-to-be: |

3. On the basis of these facts, explain why populations consisting of people with blood group AB only cannot develop.

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4. Determine the possible blood groups of the children if the mother has blood group A and is heterozygous for this trait and the father has blood group B and he is also heterozygous. (No mutation happens)  
(3 points)

Genotypes of parents
Genotype of mother:……………………………………………………………………………………………..
Genotype of father:…………………………………………………………………………………………………

Possible blood group genotypes of their children:

5. Put the possible blood groups of the children in order of their resistance to cholera.

……..>……….>……….>………..

Fill the gaps in the following text with the appropriate terms.

If no other factor influenced the frequency of blood groups, people with blood group 6 ……… would have higher chance to die of cholera in an infected area than people with other different blood groups. Thus they would leave 7…………. offspring and the frequency of 8…………. blood group allele would decrease from generation to generation within the population. This process is known as 9……………………. natural selection against a blood group allele.

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The figure represents the skulls of a human being and an ape, a gorilla. Study the figure and compare the two skulls.

1. Name the bone whose part is the bony ridge marked "A".

2. Explain the difference between the shapes of part “A” on the two skulls.

3. Name the bone whose part is the structure marked “B”.

4. Explain the characteristic shape of “B” in humans.

5. Name the bone in which the root of tooth “C” is embedded.

6. What explains the difference in tooth “C” between the two skulls?

7. Under the structure “A” a large opening is found on the skull, the foramen magnum. What is the biological role of this opening?

8. What is the main difference in the position of foramen magnum between the two skulls?

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VIII. The menstrual cycle

The attached figure shows the main events of the female sexual cycle. Study the figure and answer the following questions.

Abbreviations:
LH = Luteinizing hormone
FSH = Follicle-stimulating hormone

1. Name the hormones indicated with letter “C” and “D”. (2 points)
   C: ………………………………..
   D: ……………………………….

Write the appropriate letters after the statements. Use only one letter in your answer.

2. Production of the ovarian hormones.
3. Hormone production of the pituitary gland.
5. This structure produces hormone “D”.
6. Ovulation.
7. During this period sexual life is not suggested due to hygienic reasons.
8. Name the event of this cycle which is usually followed by a 0.5 ºC rise in body temperature (in a healthy woman).

…………………………………………………………………………………………………..

9. Decide how old the woman whose body functions are represented on the studied figure can be and in what physiological state she is.
   A. an 8-year-old girl
   B. a 25-year-old non-pregnant woman
   C. a 25-year-old pregnant woman
   D. a 65-year-old woman
   E. it may represent the body-functions of any woman

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2009. október 29.
Biológia angol nyelven — középszint  
Név: ............................................................... osztály:......
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III. A harmless heraldic animal 8
IV. The Pasteur effect 10
V. Medicine through a straw 11
VI. Protective blood groups 12
VII. Skulls 8
VIII. The menstrual cycle 10

Total 80

Score for the written exam (achieved score · 1.25) 80 · 1.25 = 100

________________________
correcting teacher

Date: ……………………………

________________________
correcting teacher/javító tanár

________________________
Registrar of the Board of Examiners /jegyző

Date/Dátum: ……………………………

irásbeli vizsga 0911 16 / 16 2009. október 29.