

**Biology ticket sample for applicants,
taking the exam in English.**

PART 1

Task 1. In the provided text, insert the required term. Write it down as an answer.

Both deficiency and excess of metabolic disorders of macro- and microelements lead to the development of various diseases. In particular, the lack of calcium and phosphorus cause the development of _____.

Answer: rickets.

Task 2. The experimenter investigated the vital activity of the begonia plant in different conditions. How will the intensity of respiration and photosynthesis of begonias change when placed in a dark room? For each quantity, determine the nature of its change:

1) will increase 2) will decrease 3) will not change

Write down the selected numbers for each value in the table. Numbers in the answer may be repeated.

Respiration rate	Photosynthesis rate

Answer: 32

Task 3. When completing the task, set the correct sequence of systematic groups, starting with the highest rank. In response, write down the corresponding sequence of numbers.

1) Maryannik oak

2) Norichnikovye

3) Mariannik

4) Dicotyledons

5) Plants

6) Angiosperms

Answer: 564231

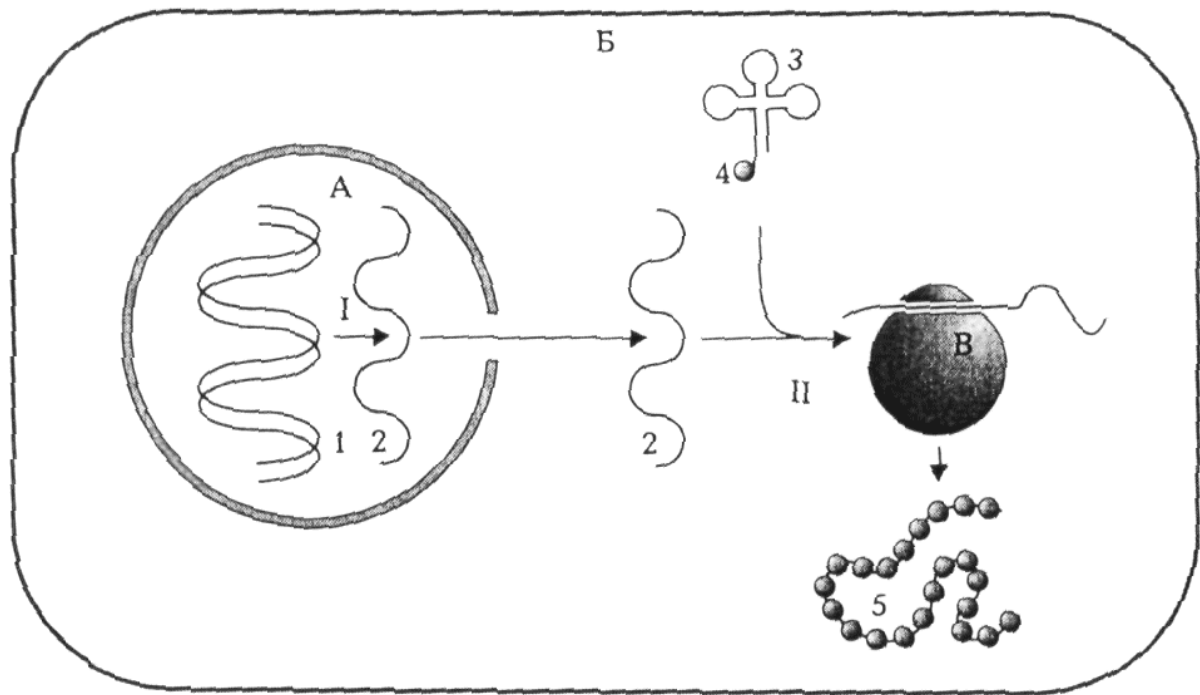
Task 4. How many different phenotypes of offspring are formed in an analyzing cross of a heterozygous pea plant with yellow seeds? In your answer, write down only the number of phenotypes.

Answer: 2

Task 5.

In the figure below, define the following structures:

i-RNA, protein, nucleus. In the answer, write down the numbers or letters in the correct sequence, according to the listed structures.



Answer: 25A

Task 6. Correlate the signs of mutation and modification variability.

Signs of variability Types of variability

A) group B) Directional B) spasmodic D) hereditary D) non-hereditary E) Causes both beneficial and harmful changes	1) Mutational 2) Modification variability
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Answer: 221121

Task 7. Identify three organisms that fall out of the general list, and write down in response the numbers under which they are indicated, in ascending order.

Determine which three, of all presented, do not belong to the type of Protozoa

- 1) infusoria shoe
- 2) trypanosoma
- 3) covid-19
- 4) malarial plasmodium
- 5) chlorella
- 6) bacteriophage

Answer: 356

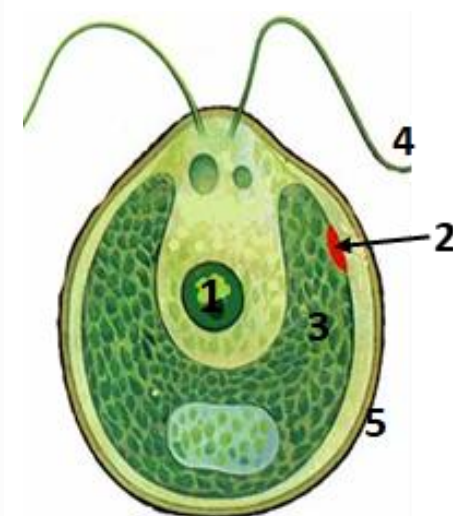
Task 8. When completing the task, establish the correct sequence of biological processes and phenomena. In response, write down the corresponding sequence of numbers.

Arrange the structures of the mitochondrial structure in sequence, starting from the outer surface.

- 1) cristae
- 2) inner membrane
- 3) outer membrane
- 4) matrix

Answer: 3214

Task 9. Consider the presented picture and in your answer indicate the name of the structures indicated by the numbers 1, 2, 3. What organism is shown in the picture.



Answer: 1 - nucleus, 2 - stigma, 3 - chromatophore.

Task 10.

Match the characteristics of the first and second columns. For each position in the first column, select the corresponding position from the second column. Write down only the selected numbers in your answer.

CHARACTERISTIC CELL TYPES

- | | |
|---------------------------------------|----------------|
| A) oxidation in mitochondria | 1) eukaryotic |
| B) lack of membrane organelles | 2) prokaryotic |
| C) the presence of linear chromosomes | |
| D) the ability to meiosis | |
| D) the presence of a nucleoid | |
| E) sensitive to antibiotics | |

Answer: 121122

PART 2

Task 11.

The experimenter decided to establish the dependence of the amount of chlorophyll in the leaves of a plant on the degree of illumination under which the plant grows. He planted plants of one kind of clover in pots and placed them in dark rooms with a single source of light. At the end of the experiment, it was estimated how dark green the leaves have. All light sources had different intensities. Which parameter in this experiment was set by the experimenter (independent variable), and which parameter changed depending on this (dependent variable)? Guess. what dependence did the experimenter find? Explain. Why is there such an addiction?

Task 12.

Why does cockroach breathing increase with increasing temperature? Guess what happens to the amount of accumulated carbon dioxide when the temperature rises more strongly. Explain the answer.

Task 13.

The somatic cell of an animal is characterized by a diploid set of chromosomes.

Answer the following questions:

- 1) Determine the chromosome set (n) and the number of DNA molecules (c) in the cell during gametogenesis in metaphase II of meiosis

2) Determine the chromosome set (n) and the number of DNA molecules (c) in the cell during gametogenesis in anaphase II of meiosis.

3) Explain your results.

Task 14.

It is known that complementary chains of nucleic acids are antiparallel (the end in one chain corresponds to the 3' end of the other chain). Nucleic acid synthesis starts from the 5' end. The ribosome moves along the mRNA

in the direction from 5'- to 3'- end. All types of RNA are synthesized on a DNA template. A fragment of a DNA molecule, on which a section of the central loop of t-RNA is synthesized, has the following sequence of nucleotides (the lower chain is a template):

5'-CGAAGGTGACAATGT-3'
3'-GCTTCCACTGTTACA-5'

1) Establish the nucleotide sequence of the t-RNA region that is synthesized on this fragment;

2) Determine the amino acid that this t-RNA will carry during protein biosynthesis if the third triplet from the 5' end corresponds to the t-RNA anticodon.

3) Explain your answer.

To solve the problem, use the table of the genetic code. When writing nucleic acids, indicate the direction of the chain.

Genetic code (iRNA)

First Foundation	Second Foundation				Third Foundation
	U	C	A	G	
U	Phe F Phe F Leu L Leu L	Ser S Ser S Ser S Ser S	Tyr Y Tyr Y - -	Cys C Cys C - Trp W	U C A G
C	Leu L Leu L Leu l Leu L	Pro P Pro P Pro P Pro P	His H His H Gln Q Gln Q	Arg R Arg R Arg R Arg R	U C A G
A	Ile I Ile I Ile I Met M	Thr T Thr T Thr T Thr t	Asn N Asn N Lys K Lys K	Ser S Ser S Arg R Arg R	U C A G
G	Val V Val V Val V Val V	Ala A Ala A Ala A Ala A	Asp D Asp D Glu E Glu E	Gly G Gly G Gly G Gly G	U C A G

Rules for using the table

The first nucleotide in the triplet is taken from the left vertical row; the second from the top horizontal row and the third from the right vertical row. Where the lines coming from all three nucleotides intersect, the desired amino acid is located.

Task 15.

In humans, a hooked nose (A) is dominant, while a straight nose is recessive. Full lips (B) are dominant and thin lips are recessive. The genes for both traits are on different chromosomes. A man with a hooked nose and thin lips, whose mother had a straight nose and full lips, married a woman with a straight nose and thin lips. Define:

- 1) genotypes of parents;
- 2) possible genotypes and phenotypes of offspring;
- 3) what is the probability that children with full lips can be born in this family?
- 4) in accordance with what law does the inheritance of these traits occur?