

Biology

Questions and Analysis of Scientific Research in the Core Topic Areas Questions on Topics of In-Depth Study

Instructions for examinees

א. Duration of the exam: Three hours

ב. Exam structure and breakdown of points:

This exam has four parts.

Part One — 32 points

Part Two — 35 points

Part Three — 18 points

Part Four — 15 points

Total — 100 points

ג. Material that may be used during the exam:

A Hebrew-foreign language/foreign language-Hebrew dictionary

ד. Special instructions:

Mark your answers to Part One on the answer sheet provided at the end of the answer booklet (page 19).

Answer the questions in Part Two, Part Three and Part Four in the answer booklet.

Write in the answer booklet only.

Write the word "טייטה" at the top of each of draft page.

If you write any draft material on paper outside the answer booklet, your exam may be disqualified.

Good Luck!

ביולוגיה

שאלות וניתוח מחקר מדעי בנושאי הליבה שאלות בנושאי ההעמקה

הוראות לנבחן

א. משך הבחינה: שלוש שעות.

ב. מבנה השאלון ומפתח ההערכה:

בשאלון זה ארבעה פרקים.

פרק ראשון — 32 נקודות

פרק שני — 35 נקודות

פרק שלישי — 18 נקודות

פרק רביעי — 15 נקודות

סה"כ — 100 נקודות

ג. חומר עזר מותר בשימוש:

מילון עברי-לועזי / לועזי-עברי.

ד. הוראות מיוחדות:

את תשובותיך על השאלות בפרק הראשון סמן בתשובון שבסוף מחברת הבחינה (עמוד 19).

את תשובותיך על השאלות בפרק השני, בפרק השלישי ובפרק הרביעי כתוב במחברת הבחינה.

כתוב במחברת הבחינה בלבד. רשום "טייטה" בראש כל עמוד טייטה. כתיבת טייטה בדפים שאינם במחברת הבחינה עלול לגרום לפסילת הבחינה.

בהצלחה!

Questions

Part One (32 points)

There are 20 questions, 1-20, in this part.

You must answer all of the questions. If you answer at least 17 questions correctly, you will receive all 32 points.

Four possible answers are presented for each question. Choose the most appropriate answer.

- * Mark the answer you have chosen on the answer sheet at the end of the answer booklet (page 19).
- * For each question, draw an ✕ in pen in the box under the letter (א-ד) that represents the answer you chose.

Example:

47. Which disease is carried by mosquitoes?

- א. jaundice
- ב. rubella
- ג. malaria
- ד. whooping cough

In this case, you would mark your answer on the answer sheet as follows:

ד	ג	ב	א	.47
☐	☒	☐	☐	

- * Draw only one ✕ for each question.
- * To erase an answer, fill in the entire box like this: ■ .
- * You **may not** use White-Out to erase answers.

Note: In order to limit the need to erase answers on the answer sheet, we recommend that you first mark the correct answers inside this booklet and only later enter them into the answer sheet.

Answer all of the questions 1 to 20.

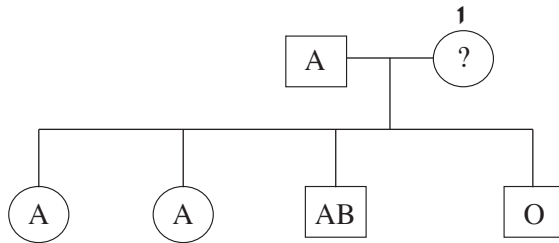
1. What does a procaryote cell not have?
 - א. a cell membrane
 - ב. a cytoplasm
 - ג. a nucleus membrane
 - ד. enzymes

2. Which of the following sentences is correct?
 - א. Motor neurons have a long axon.
 - ב. Muscle cells have few mitochondria.
 - ג. Reproductive cells (gametes) are diploid cells.
 - ד. White blood cells lack a cell nucleus.

3. The direct cause of air entering the lungs when inhaling is:
 - א. the need to take in the oxygen needed for cellular respiration
 - ב. the need to expel carbon dioxide so that homeostasis is maintained
 - ג. the difference in oxygen concentration between the outside air and the lung alveoli [נאדיות הריאה]
 - ד. the difference in pressure between the outside air and the air in the lung alveoli

4. What can excess CO_2 in the air cause?
 - א. inhibition of photosynthesis
 - ב. increased humidity in the air
 - ג. increased greenhouse effect
 - ד. enlargement of the ozone hole

5. The following family tree describes the blood types of several individuals in a certain family.



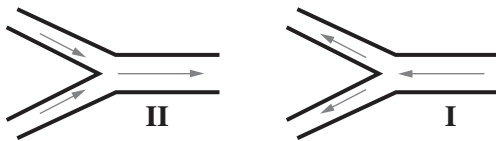
Which statement is correct for Individual 1?

- א. Blood type is B, heterozygous.
 - ב. Blood type is B, homozygous.
 - ג. Blood type is A, heterozygous.
 - ד. Blood type is AB, heterozygous.
6. Meningitis [דלקת קרום המוח] can be caused by bacteria or by a virus. The current recommendation is to vaccinate all babies so that they do not contract meningitis caused by HIB bacteria. Which statement regarding this vaccine is correct?
- א. This vaccine is effective in preventing meningitis caused either by bacteria or by a virus.
 - ב. This vaccine is effective against different species of bacteria that cause meningitis.
 - ג. This vaccine does not protect from meningitis caused by a virus.
 - ד. This is a passive vaccine because this is a dangerous disease.
7. In the sea there are tiny algae which can reproduce both asexually and sexually. When resources in the environment are limited, more algae reproduce sexually. What is the advantage of breeding sexually when the amount of resources in the environment is reduced?
- א. The offspring of sexual reproduction are smaller, so they have more resources available for survival.
 - ב. Sexual reproduction requires more resources, so the offspring are more resilient.
 - ג. Genetic variation in sexual reproduction is smaller, so only the adapted genotypes survive.
 - ד. Genetic variation in sexual reproduction is greater, so the population has a better chance of surviving.

8. Usually, the greater a substance's solubility in fat, the faster it can penetrate into cells.
What is the explanation for this?

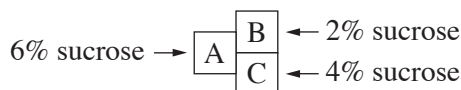
- א. There are proteins embedded in the cell membrane.
- ב. The cell membrane is composed mainly of phospholipids.
- ג. The cell membrane is arranged in a bilayer.
- ד. There are specialized carriers in the cell membrane.

9. The following diagram describes blood flow in certain blood vessels. The direction of blood flow is marked with arrows.



Which statement about the blood vessels I and II is correct?

- א. Vessels I and II carry blood to the heart.
 - ב. Vessel I is a vein. It is not possible to determine whether Vessel II is an artery or a vein.
 - ג. Vessel I is an artery and Vessel II is a vein.
 - ד. Vessel I carries oxygen-rich blood and Vessel II carries oxygen-poor blood.
10. Starch in the potato tuber is made up of sugar. Where is this sugar produced?
- א. in the soil where the potato plant develops
 - ב. in the root of the potato plant
 - ג. in the tuber of the potato plant
 - ד. in the leaf of the potato plant
11. The following diagram describes three artificial cells — A, B, C — that are enclosed in a membrane with properties similar to those of a cell membrane.
Each cell contains a solution with a different concentration of sucrose (disaccharide [דו-סוכר]). Sucrose cannot pass through the membrane.



After the cells are placed one against the other, where will the largest amount of water pass?

- א. from Cell A to Cell C
- ב. from Cell C to Cell A
- ג. from Cell A to Cell B
- ד. from Cell B to Cell A

12. The following statements relate to the nervous system. Which statement is correct?

- א. The right hemisphere in the cerebrum [המוח הגדול] controls the right side of the body.
- ב. There is a control center in the brainstem [גזע המוח] which controls activity of the lungs.
- ג. The body's temperature control center is located in the cortex [קליפת המוח].
- ד. Thought and memory processes take place in the autonomic nervous system.

13. Sharks feed on sea turtles. Sea turtles feed on seagrass. Fish lay eggs in seagrass where the eggs will be protected.

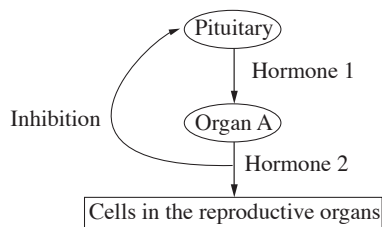
What can we expect to happen in this ecosystem if sharks are fished more intensively?

- א. There will be more sea turtles and fewer fish.
- ב. There will be fewer sea turtles and less seagrass.
- ג. There will be more seagrass and more fish.
- ד. There will be more sea turtles and more seagrass.

14. An albino corn plant is a plant that is missing the gene for chlorophyll production, so it does not perform photosynthesis. This plant does not develop into an adult plant, but despite this there are a few albino corn plants in every generation. What is the explanation for the occurrence of albino plants in every generation?

- א. Albino plants turn green in sunlight.
- ב. The albino allele is dominant.
- ג. The fitness of green plants is lower than the fitness of albino plants.
- ד. Some of the green plants have an albino allele.

15. Which statement regarding the feedback loop described below is correct?



- א. Hormone 1 inhibits the secretion of Hormone 2.
- ב. Hormone 1 is LH.
- ג. In Organ A, no reproductive cells (gametes) are formed.
- ד. Hormone 2 is FSH.

16. What would be the result of removing all bacteria and fungi from an ecosystem?
- Production of organic materials by living organisms would increase.
 - Decomposition of organic materials in the soil would be disrupted.
 - Plants would produce a larger amount of oxygen.
 - Plants would absorb organic materials from the soil.
17. In what process do blood platelets [טסיות] play a role?
- regulating antibody levels in the blood
 - maintaining blood volume in case of injury
 - swallowing bacteria that have penetrated the blood
 - carrying oxygen to a site of infection
18. Not every change in DNA nucleotide sequence results in a change in amino acid sequence in the protein that is synthesized.
What is the reason for this?
- A single codon encodes a single amino acid.
 - A single codon encodes several amino acids.
 - Several codons encode a single amino acid.
 - A single transfer RNA (tRNA) molecule can transport different amino acids.
19. Which of the following pathways that the blood travels is the longest?
- from the left ventricle to the left atrium
 - from the right atrium to the right ventricle
 - from the right ventricle to the left atrium
 - from the left ventricle to the right atrium
20. Natural selection affects the frequency of only certain traits. What are these traits?
- traits that are expressed in the adult organism
 - hereditary traits
 - traits that are acquired for survival
 - traits that are expressed in a dense population

(Note: Mark your answers on the answer sheet at the end of the answer booklet on page 19.)

Part Two (35 points)

There are seven questions, 21-27, in this part.

Choose five questions and write your answers in the **answer booklet** (each question — 7 points).

21. A coral reef is a marine habitat in which various species of coral (animals) and algae (plants) live.

Certain species of coral have unicellular algae in their cells.

א. The biological interaction between the coral and the algae is classified as mutualism. List one potential way the **coral** benefits the algae. (3 points)

ב. With the climate crisis, the average water temperature in various areas in the world has risen in recent years by 2-3 degrees Celsius. This change has caused the algae to separate from the coral and as a result the coral has been turning white.

In many cases, the white coral dies after a short while.

Explain why, in most cases, without the algae this coral does not survive.

(4 points)

22. The 2019 Nobel Prize for medicine was awarded to three researchers for their discoveries about the mechanisms that allow our bodies to adapt to low oxygen (hypoxia).

א. Low oxygen in muscle cells causes increased production of glycolysis enzymes.

Explain one **advantage** and one **disadvantage** of using glycolysis to produce energy, compared with using aerobic respiration to produce energy. (3 points)

ב. (1) Low oxygen in the body also causes an increase in production of the hormone erythropoietin.

Explain the benefit of increasing production of erythropoietin under these conditions.

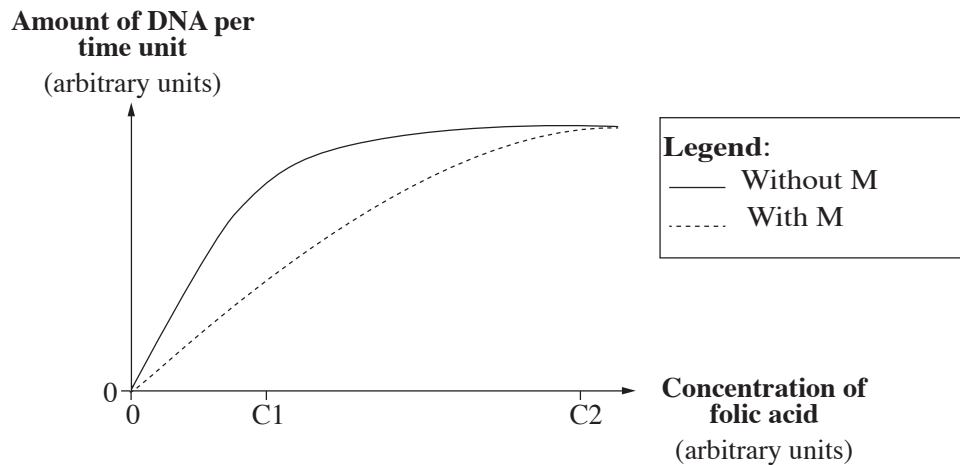
(2) In recent years, there have been cases of Olympic athletes using erythropoietin.

Do you think that athletes should be allowed to use erythropoietin before competitions? Provide one argument in support of your opinion.

(4 points)

23. Folic acid is the substrate of a certain enzyme which plays a role in DNA synthesis. The Substance M molecule has a similar structure to that of folic acid, and like folic acid is able to bind to the active site of this enzyme.

Researchers examined the effect of folic acid concentration on the rate of DNA synthesis, with and without a fixed quantity of Substance M. The results of this test are shown in the graph below.



- א. (1) At folic acid concentration C1, the rate of DNA synthesis in the presence of Substance M is **different** from the rate of DNA synthesis in the absence of Substance M. Explain why.
- (2) At folic acid concentration C2, the rate of DNA synthesis in the presence of Substance M is **similar** to the rate of DNA synthesis in the absence of Substance M. Explain why.

(5 points)

- ב. Substance M damages cancer cells.

Explain why the effect of Substance M on cancer cells, which multiply rapidly, is greater than its effect on body cells that multiply more slowly.

(2 points)

24. Down syndrome is a common genetic syndrome.

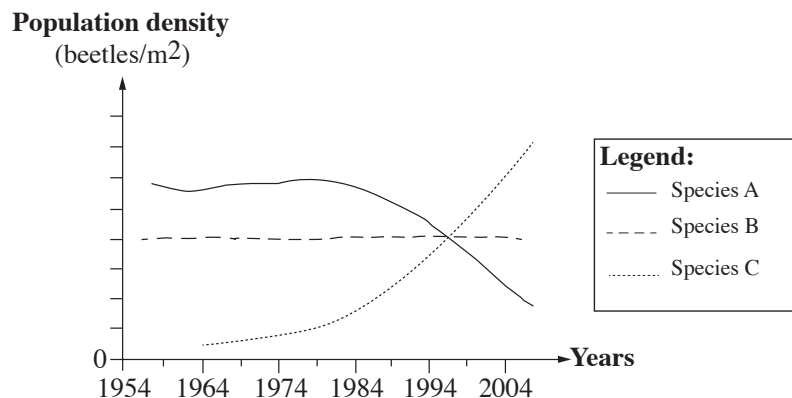
- א. Some of the effects of Down syndrome are caused by excessive amounts of the protein SOD1. The gene for this protein is located on Chromosome 21. Explain why there is excessive production of the protein SOD1 in Down syndrome. (3 points)
- ב. A couple had a baby with Down syndrome, but the baby had a normal amount of SOD1 protein. A genetic test of the father showed that of his two Chromosomes 21, one carries a flawed gene encoding the SOD1 protein, so the gene is not expressed. The Down syndrome in this baby could have been caused by an error in meiosis either in the mother **or** in the father. Choose one of the two possible errors (in the mother or in the father). State what the error is, and explain how the baby has normal levels of SOD1 protein despite the error. You may use a diagram in your answer. (4 points)

25. Two species of beetles that feed only on leaves — Species A and Species B — inhabited an isolated island for many years.

In 1964 a ship came to the island and brought on board a third species of beetle — Species C — which also only feeds on leaves.

The following chart shows density data (number of beetles per unit area) for these three populations during the years 1954-2004.

Density of beetle populations A, B, and C over the years



(Note: This question continues on the following page.)

- א. (1) Suggest an explanation for the effect of Species C beetles on the population density of Species A beetles. Base your answer on the data shown in the chart.
- (2) Is there a biological interaction between Species B and C? Explain your answer based on the chart.

(4.5 points)

- ב. Several years later, the population of Species C on the island was greater than its population in its country of origin. Suggest one reason for this. (2.5 points)

26. When a person switches from a resting state to physical exertion, changes occur in the body due to activity of the communication systems in the body.

- א. When shifting to physical exertion, a greater amount of the hormone adrenalin is secreted into the blood.

This increase causes changes such as dilation of the airways (bronchi) [הסימפונות] and increased heart rate.

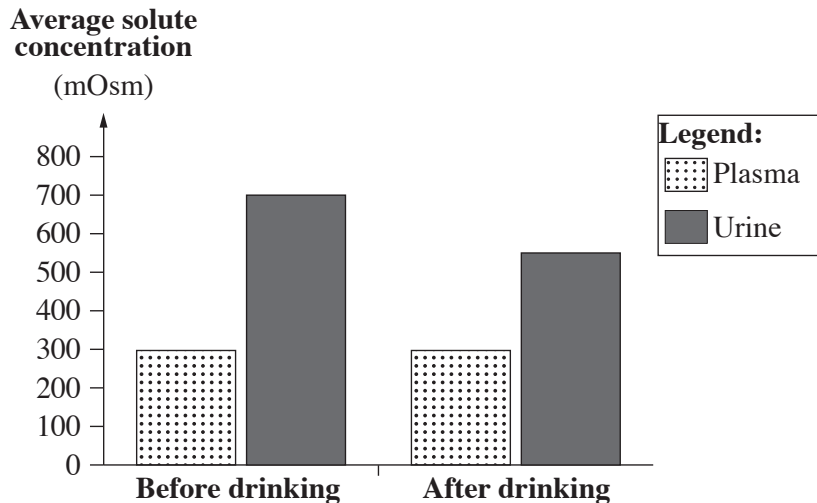
Explain how each of these two changes facilitates increased muscle activity during exertion. (5 points)

- ב. Heart activity is also regulated by the nervous system.

Describe one difference between hormonal communication and neural communication in the body. (2 points)

27. The concentration of solutes in the plasma [נוזל הדם] and urine in a group of healthy people was tested before and after they drank water. The results of these tests are shown in the diagram below.

Concentration of solutes in the plasma and urine before and after drinking



- א. Explain how drinking water causes the change in solute concentration in urine that is shown in the diagram. In your answer, also discuss the effect of the hormone ADH. (4.5 points)
- ב. Explain how the data shown in the diagram are evidence of homeostasis. (2.5 points)

Part Three (18 points)

There are three questions, 28-30, in this part.

Read the description of a research study below, and answer all of the questions 28-30.

The link between the immune system and lipids

(Based on: C. Petersen et al, "T cell — mediated regulation of the microbiota protects against obesity". **Science**, 26 July 2019)

Obesity is one of the problems facing public health care in the western world. There are many studies of the relationship between this phenomenon and processes in different body systems.

- 28.** After we eat, the fats in the food are processed in the body until they become part of the body's fat tissue. In the gut fats are processed in two steps: first by mechanical digestion which changes large droplets of fat into small droplets of fat, and second by chemical digestion in which the small droplets are broken down into their structural units — fatty acids and glycerol.
- א.** Explain why it is important for food to be mechanically digested **before** it is chemically digested. (2.5 points)
 - ב.** Explain why chemical digestion is important. (2.5 points)

Many factors cause obesity. One recently investigated factor is the composition of bacterial populations (**microbiome**) in the gut.

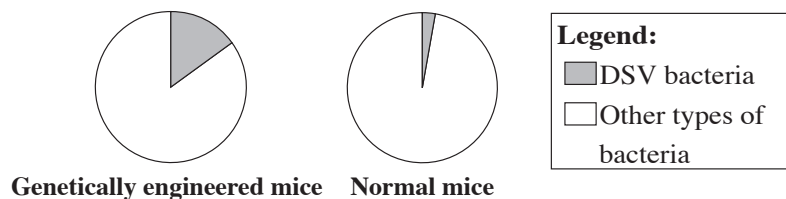
Scientists from the University of Utah in the United States tested the association between immune system activity and gut microbiome composition and the association between microbiome composition and obesity in mice.

The scientists studied two strains of mice: normal mice and genetically engineered mice. The digestive tracts of normal mice contain a type of lymphocyte which causes secretion of antibodies against certain bacteria. The genetically engineered mice have had a defect placed in their immune system so they produce fewer of these lymphocytes.

Both mouse strains were kept under identical conditions and given fat-rich food. Three weeks from the start of the experiment the scientists measured the size of bacterial populations in the mice's guts and calculated the proportion of each type of bacteria. One of the tested bacteria species was DSV (*Desulfovibrio*).

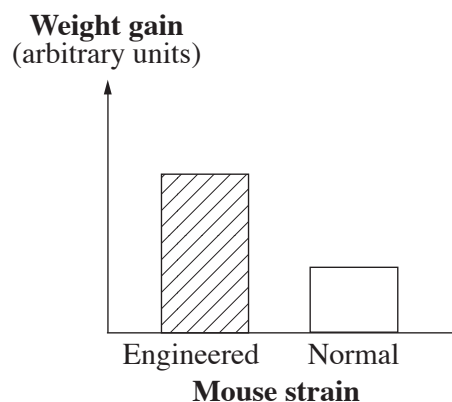
The results after three weeks are shown in Diagram 1.

Diagram 1: Proportion of DSV bacteria in the gut of genetically engineered and normal mice



The scientists weighed the mice at the start of the experiment and weighed them again after three weeks. The change in mouse weight is shown in Diagram 2, below.

Diagram 2: Change in weight in genetically engineered and normal mice

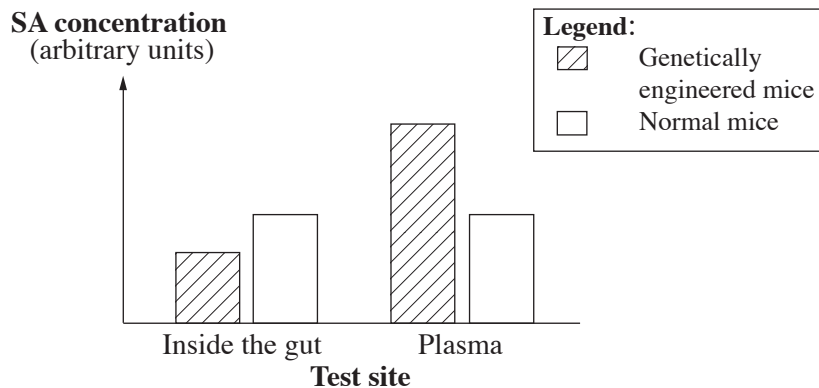


29. א. Based on the results shown in both diagrams (Diagram 1 and Diagram 2), describe the relationship between the proportion of DSV bacteria in the gut and mouse weight gain. (3 points)

In a subsequent experiment, the scientists checked concentrations of the fatty acid SA in the gut and plasma of the normal and genetically engineered mice. Fatty acids are the building blocks of fat in the body.

Their findings are shown in Diagram 3, below.

Diagram 3: Concentration of the fatty acid SA in the gut and plasma of genetically engineered and normal mice



- ב. Which of the two mouse strains absorbed a larger amount of the fatty acid SA in its gut? Explain your answer using Diagram 3. (3 points)
30. א. Based on **all** of the information in **Part 3**, explain how a defect in the mice's immune system could have caused them to be obese. (4 points)
- ב. The composition of the gut microbiome in people who are obese was found to be similar to the composition of the microbiome of the genetically engineered mice. In your opinion, should people with obesity be offered a treatment in which bacteria that compete with DSV bacteria are inserted into their digestive tract? Give one **biological** reason in support of your answer. (3 points)

Part Four (15 points)

There are three topics in this part:

Topic I: Regulation of Gene Expression and Genetic Engineering pages 16-18

Topic II: Developmental Comparative Physiology pages 19-20

Topic III: Bacteria and Viruses in the Human Body pages 21-22

Choose one topic and answer **two** questions on that topic, according to the directions given for the topic you chose.

Topic I — Regulation of Gene Expression and Genetic Engineering

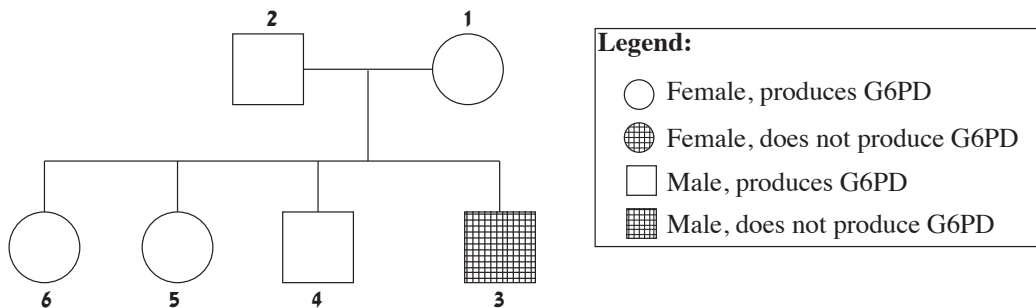
Answer two questions: Question 31 (required) and one of the questions 32-33.

Answer Question 31 (**required**).

31. The enzyme G6PD is active in body cells and is critical to normal metabolism.

Figure 1 below describes a family in which the body cells of one of the sons do not produce the enzyme G6PD.

Figure 1



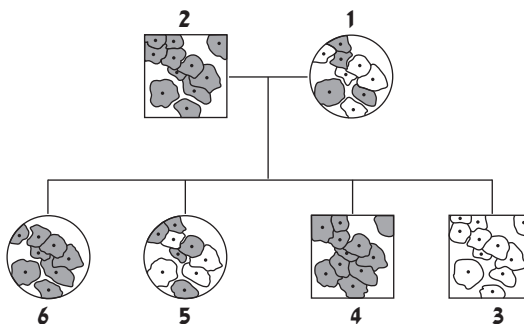
א. The gene encoding the enzyme G6PD is linked to the X chromosome. Write the genotypes of **all** the individuals (1-6) **in your answer booklet**.

If there are two possible genotypes for an individual, write down both. Use the characters G and g to label the alleles. (3.5 points)

ב. It is possible to check in the lab whether the enzyme G6PD is active in cells or not. The test is done by staining cell samples. Cells with active enzyme get stained darkly and cells with no enzyme activity do not get stained at all.

Figure 2 below describes the results of staining samples from all members of this family.

Figure 2



Based on the additional information in Figure 2, determine the genotype of each of the individuals for which you listed two genotype options in Item א. (2.5 points)

- ג. The results of staining the mother's sample (Individual 1) show that some cells were stained and some were not stained at all.

A certain process takes place in one of the chromosomes in the body cells of females only.

Name this process and explain why as a result of this process, some of the mother's cells were not stained. (3 points)

Answer one of the questions 32-33.

32. In a certain plant the gene G encodes the protein GR, which is a protein that catalyzes production of petals in flowers.

Protein T regulates the expression of the gene G by a negative regulation mechanism.

א. Today we are able to make genetic changes at exact sites on the genome.

Below are two examples of changes that can be made in the genome of a fertilized ovum (zygote) of this plant:

- i. a change in the gene encoding protein T so that the protein T that is produced is inactive
- ii a change in the gene encoding protein T so that protein T binds more strongly to the promoter of gene G

Which of the two changes, i or ii, will produce a plant whose flowers have more petals? Explain your answer. (3 points)

ב. Determine whether it is possible to find gene G and messenger RNA (mRNA) for the protein GR in the root cells of this plant. Explain both answers. (3 points)

33. Genetic engineering can be used to induce plants to express genes originating in bacteria, and induce bacteria to express genes originating in plants.

א. A certain bacteria contains the enzyme A, which catalyzes the production of a purple substance.

To produce purple flowers, investigators inserted a vector [נשא] containing the following three components into the cells of a plant:

- a control region for initiating transcription
- a structural gene encoding enzyme A
- a control region for ending transcription

For each component of the vector, determine whether it is of bacterial or of plant origin. Explain your answers. (4 points)

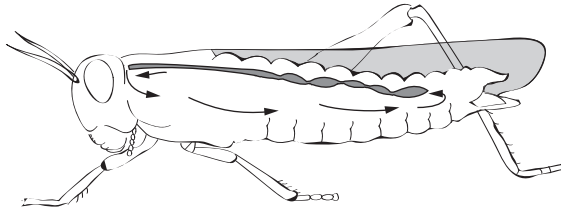
ב. Researchers wanted to insert carrot genes into bacteria so that the bacteria would produce an orange-colored substance. Explain why they must use cDNA and not the original carrot cell genes. (2 points)

Topic II — Developmental Comparative Physiology

Answer two questions: Question 34 (required) and one of the questions 35-36.

Answer Question 34 (**required**).

34. The following figure shows part of the transportation system [מערכת ההובלה] in a grasshopper (an insect).



- א. This system has a tube with wider areas along its length that perform some of the functions of a heart.
List one **function** of this tube in a grasshopper that is similar to the function of the heart in mammals. (2 points)
- ב. (1) List one **structural** difference between an open circulatory system [מערכת דם פתוחה] and a closed circulatory system [מערכת דם סגורה].
(2) Only small creatures such as insects have an open circulatory system. Why can't large creatures survive with an open circulatory system? Suggest one explanation. (4 points)
- ג. In insects oxygen is not transported in the plasma. Explain how, despite this, they are able to produce energy in their cells. (2 points)

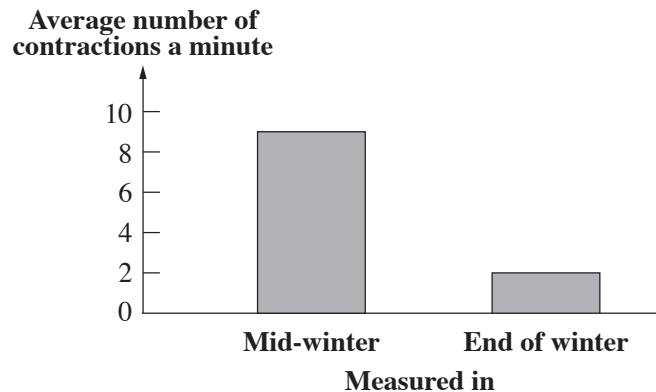
Answer one of the questions 35-36.

35. An amoeba is a unicellular organism that inhabits vernal pools [שלוליות חורף].

- א. In a certain vernal pool activity of amoebas' contractile vacuole [בועית מתכווצת] was measured twice: in the middle of the winter when there was a lot of water in the pool, and at the end of the winter when the pool started to dry out and its mineral concentration was high.

The following diagram shows the results of these measurements.

Activity level of amoeba contractile vacuole measured at two times



Explain the difference between the two measurements. (3.5 points)

- ב. Amoebas excrete the nitrogenous waste ammonia. A substance that interferes with the amoebas' cellular respiration was added to the water in the pool. Explain why the contractile vacuole stopped working after this, but excretion of ammonia by the amoebas was not affected. (3.5 points)

36. א. Fertilization takes place in a moist environment in both fish and mammals.

- (1) For most species of fish and mammals there is a difference in type of fertilization between fish and mammals. What is this difference?
(2) Explain one reason why a moist environment is critical to the fertilization process. (3.5 points)

- ב. Developing fetuses in fish and mammals have similar needs, such as a moist environment.

List two **additional** requirements that are critical to the development of both a fish fetus and a mammalian fetus.

For each of the requirements you listed, describe how it is provided to fish fetuses and how it is provided to mammalian fetuses. (3.5 points)

Topic III: Bacteria and Viruses in the Human Body

Answer two questions: Question 37 (required) and one of the questions 38-39.

Answer Question 37 (**required**).

37. Scientists cultured two strains of a certain species of bacteria - Strain A and Strain B.

Each strain was cultured in two test tubes, one with penicillin in the medium and one without penicillin.

The scientists collected a sample of bacteria from each of the four test tubes and added distilled water to each sample. Some time later they checked under a microscope whether the bacteria cells were intact.

The experimental setup and its results are described in the following table.

Bacteria strain	Penicillin in medium	Sample	Distilled water added	Result
A	Yes	A1	+	Cell debris
	No	A2	+	Intact cells
B	Yes	B1	+	Intact cells
	No	B2	+	Intact cells

א. (1) Explain the difference in results between sample A1 and sample A2. Your explanation must also address the mechanism of action of penicillin.

(2) Explain the difference in results between sample A1 and sample B1.

(4 points)

Tetanus bacteria are prevalent in the human environment and endanger people who are not vaccinated against lockjaw (tetanus).

ב. Describe how tetanus bacteria harm the human body. (3 points)

ג. A person received a deep cut in the leg. The wound could get infected and symptoms of tetanus may appear as a result.

Explain why an antibiotic that harms the tetanus bacteria will not prevent disease

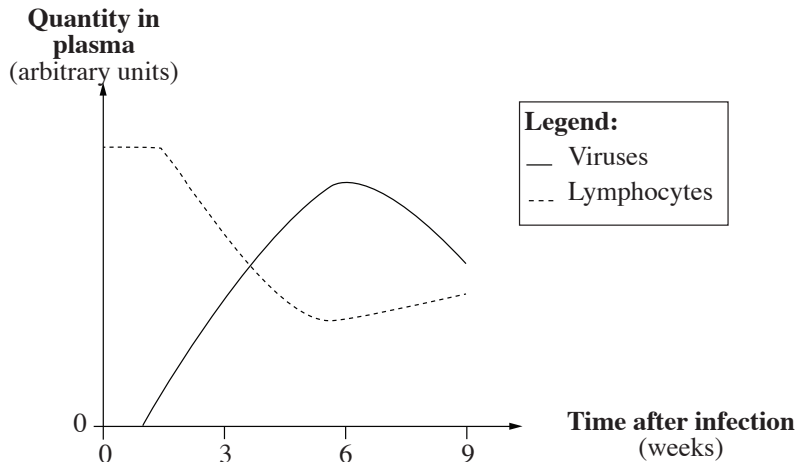
symptoms in this person.

(2 points)

Answer one of the questions 38-39.

38. א. People who caught the HIV virus were monitored during the primary stage of infection for the quantity of HIV virus and lymphocytes in their plasma [נוזל הדם]. The findings are shown in the graph below.

Quantity of HIV virus and lymphocytes during the primary stage of infection



- (1) Explain the rise in quantity of HIV viruses and the decline in quantity of lymphocytes in the plasma during weeks 0-6 after infection.
- (2) Explain the change in the quantity of HIV viruses in the plasma during weeks 6-9 after infection.

(4 points)

- א. One of the medicines for AIDS is the substance AZT (azidothymidine). This substance disrupts the synthesis of DNA molecules.
Explain how AZT disrupts production of HIV viral proteins, even though HIV is an RNA virus. (2 points)

39. א. A scientific journal published a paper which discussed the question "Are viruses living organisms?".

Provide one argument that supports the claim that viruses are living organisms and one argument that supports the claim that viruses are **not** living organisms. (2.5 points)

- א. Scientists wanted to investigate the effect of certain viruses on the production of protein and energy in human cells. They cultured pancreas cells in the lab and infected them with the virus. Several hours after infection, the rate of insulin production in the cells **dropped**, but the rate of energy production in the cells **did not change**.

Explain both findings. (3.5 points)

Good Luck!

בהצלחה!