This is a Class 1 exam

Lebanon Evangelical School for Boys and Girls

Lighting the fires that burn for eternity

Loueizeh - Baabda

Lebanon Evangelical School

for Boys and Girls Loueizeh - Baabda

SE02 Exam

15DEC2025

Do NOT write in this box. Your MARK will be placed here.

Subject :	Biology
Class :	11SE
Teacher :	Christine Khalil
Duration :	1 hour
You are to answer the questions to this exam on : Lined paper	

Your name :		*Time taken to complete exam*
Your Class :		
Exam Room :		
How many sheets, including cover sheet :		

- Do not open this paper until the teacher in charge instructs you to do so.
- The most important thing to remember in taking an exam is NEVER PANIC.
- If you are caught cheating in this exam, you will be awarded zero for ALL exams that are taken on this day.

Exercise 1 (4 points)

Indicate the true statements and correct the false ones.

1. Eosinophils play a role in fighting parasitic infections.
2. The spleen has a role in defending the body against blood-borne pathogens.
3. HLA genes have in total 6 paternal alleles and 6 maternal alleles per person.
4. Adaptive immunity acts rapidly but is not specific to a particular pathogen.

Exercise 2 (7.25 points)

In order to determine the type of cells and the type of immune response responsible for graft rejection, the following experiments were performed. (Document 1)

Experiment	Donor	Recipient	Treatment performed on the recipient before receiving the graft	Results after a few days
1	Rabbit A	Rabbit A1	No treatment	Graft accepted
2	Rabbit A	Rabbit B1	No treatment	Graft rejected
3	Rabbit A	Rabbit B2	Rabbit B2 had his thymus removed since birth	Graft accepted

Document 1

1. Pose the problem studied in this exercise. (1)
2. Name the grafts performed in experiments 1 and 2 and explain the obtained results. (2)
3. a. Analyze experiment 3. (0.75)

   b. What can you conclude? (1)

Certain measurements were done to check the number of mature T lymphocytes in rabbits A and B2. (Document 2)

Rabbit	A	B2
Number of mature T-lymphocytes in the blood	8000	200

Document 2

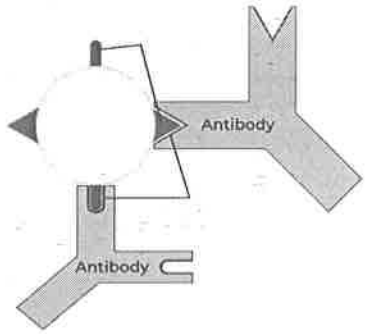
4. a. Compare the number of T lymphocytes in A and B2. (1)

   b. What can you deduce? (1)

5. Based on all what preceded, what is the type of immune response leading to graft rejection? (0.5)

Exercise 3 (4 points)

Farah had a car accident and needed a blood transfusion. Due to an error in the hospital, Farah died shortly after the transfusion. The forensic doctor included the following figure in her death report. (The figure below only shows antigens and antibodies related to the ABO system. The rhesus system is not illustrated.)



1. Based on the figure above, indicate the blood type of Farah and that of the donor. Justify your answer. (1.5)
2. Name the reaction observed in the figure above. (0.5)
3. Explain the reason (s) behind Farah's death. (1.5)
4. Antibodies are produced by B lymphocytes. Name the type of immune response that took place. (0.5)

Exercise 4 (4.75 points)

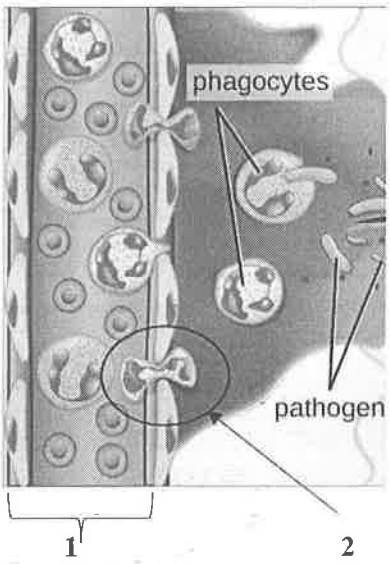
In order to study the role of the cilia at the level of the respiratory tract in the defense against pathogens, the following experiments were done. (Document 1)

Mice	Conditions	Treatment	Observation
A	Control	Inhale a spray containing bacteria	Mice remain healthy
B	Treatment reducing cilia movement	Inhale a spray containing bacteria	Mice become sick

Document 1

1. Interpret the results of these experiments. (1.5)
2. Smokers are more susceptible to colds and respiratory infections. Based on what preceded, formulate a hypothesis to explain the reason behind their recurrent infections. (1)

Document 2 shows a process occurring at the level of the lungs of mice B.



Document 2

3. Name:
   a. The process in document 2. (0.25)
   b. The type of immune response involved. (0.25)
   c. The phagocytes. (0.5)
   d. The process occurring at the level of structure 1. (0.25)
   e. The process happening at 2 and define it. (0.75)
   f. The molecule responsible for the processes in d and e. (0.25)

Answer Key for SE02 11SE

Exercise 1 (each true is 1 point, each false is 0.25 and the justification is 0.75)

1. True.
2. True.
3. True.
4. False. Innate immunity.

Exercise 2 (7.25 points)

1. What is the type of cells and the type of immune response responsible for graft rejection? (1)
2. Experiment 1: Isograft. The donor and the recipient are from the same race which means they have identical HLA. Experiment 2: Allograft. The donor and the recipient are from the same species but have different HLA. (2)
3. a. Rabbit B2 had his thymus removed since birth and received a graft from rabbit A. The graft got accepted. (0.75)
   b. The thymus plays a role/ is responsible for graft rejection. (1)
4. a. The number of mature T lymphocytes in the blood of rabbit A is 8000 which is higher than that in the blood of rabbit B2 which is 200. (1)
   b. The thymus is responsible for the maturation of T lymphocytes. (1)
5. Cellular immunity. (0.5)

Exercise 3 (4 points)

1. Farah is the recipient. To identify her blood type, we look at the antibodies she has. She has 2 different types of antibodies which should be anti-A and anti-B. She should be of blood type O. To identify the blood type of the donor, we look at the RBC. It has on its surface 2 different types of antigens which should be A and B. His blood type is AB. (1.5)
2. Agglutination. (0.5)
3. This agglutination will lead to blood clots which will block the blood flow to several organs which leads to organ failure. In addition, agglutination leads to the destruction of RBCs and the release of hemoglobin that becomes toxic when released from the RBCs. (1.5)
4. Humoral immune response. (0.5)

Exercise 4 (4.75 points)

1. The control mice A inhaled a spray containing bacteria and remained healthy. However, mice B, that received a treatment reducing cilia movement, inhaled a spray containing bacteria and become sick. This indicates that cilia prevent the entry of pathogens into the respiratory tract. (1.5)
2. Hypothesis: Smoking reduces the movement of cilia in the respiratory tract. (1)
3. a. Inflammation. (0.25)
   b. Innate immune response. (0.25)
   c. Granulocytes and macrophages. (0.5)
   d. Vasodilation. (0.25)
   e. Diapedesis: WBCs leaving the blood vessels to reach the infected area. (0.75)
   f. Cytokines. (0.25)