This is a Class 1 exam

Lebanon Evangelical School
for Boys and Girls Loueizeh - Baabda

Stage Exam 03
10FEB2026

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

Subject :	Biology	
Class :	12SE	
Teacher :	Christine Khalil	
Duration :	1 hour	
Your name :		*Time taken to complete exam*
Your Class :		
Exam Room :		
How many sheets, Including cover sheet :		

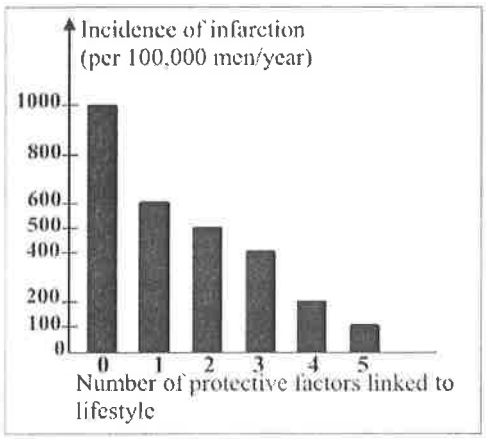
- Do not open this paper until the teacher in charge instructs you to do so.
- The most important thing to remember in taking an exam is NEVER PANIC.
- If you are caught cheating in this exam, you will be awarded zero for ALL exams that are taken on this day.

Exercise 1 (4.5 points)

Cardiovascular diseases are the major cause of death in the world. Arterial hypertension and high level of cholesterol in the blood (hypercholesterolemia) represent two important risk factors for cardiovascular diseases. Treating these two risk factors with effective medications represents a major step forward, but modifying one's lifestyle could also ensure an adequate protection. We could for example have a healthy diet, maintain a normal body weight, practice physical activity and avoid the consumption of tobacco and alcohol.

1. Pick out from the text:
   1.1. Two risk factors for cardiovascular diseases. (0.5)
   1.2. Two ways to prevent these diseases. (0.5)

In order to evaluate the effect of factors linked to lifestyle, a scientific research studies the incidence of infarction as a function of the number of protective factors linked to lifestyle, in a group of healthy men, having normal cholesterol levels and normal arterial blood pressure. (Document 1)

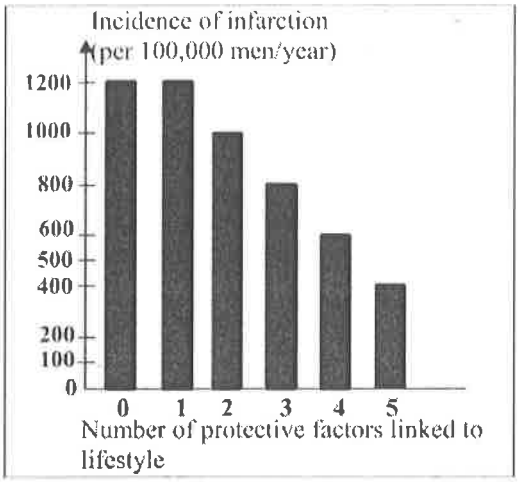


Document 1

2. a. Analyze the obtained results. (1)
   b. What can you conclude? (1)

The same study is repeated, but in a group of men with hypercholesterolemia and arterial hypertension. The results are shown in document 2.

3. Justify the following statement: " Improvement of the lifestyle ensures an effective protection against cardiovascular diseases in men, even if they suffer from hypercholesterolemia and hypertension". (1.5)



Document 2

Exercise 2 (2.75 points)

To show the importance of the vitamins of whole milk among which the vitamins A, B2, B12 and D, we realize the following experiment on two lots of young rats, A and B, of the same age, sex and mass. The rats of lot A are fed by whole fresh natural milk while the rats of lot B receive fresh milk deprived of its vitamins. The growth of the two lots of rats is monitored during 3 weeks. The results are revealed in document 1.

Time (days)	0	6	12	18
Mass of rats of lot A (g)	40	55	65	70
Mass of rats of lot B (g)	40	44	47	50

Document 1

1. Indicate for each of these vitamins if they are hydrosoluble or liposoluble. (0.75)
2. a. Analyze the obtained results. (1)
   b. What can you conclude? (1)

Exercise 3 (5.5 points)

Kwashiorkor is a form of severe malnutrition due to poor quality of food. This disease often occurs in young children, especially during weaning, when natural milk is replaced by low-protein diet such as manioc. The symptoms of kwashiorkor include edema (swelling), weight loss, muscle atrophy, skin disorders and retarded growth.

1. Name another nutritional disease and indicate its cause. (1)

Document 1 represents the components of maternal milk and manioc in proteins and in carbohydrates.

2. a. Compare the protein mass and the carbohydrates mass of the maternal milk to that of manioc. (1.5)
   b. What can you conclude? (1)

	Proteins (in g)	Carbohydrates (in g)
Maternal Milk	1.2	6.6
Manioc	0.5	86

Document 1

Document 2 represents the protein composition in maternal milk and manioc in certain amino acids.

Proteins / Amino acids	Maternal milk	Manioc
Tryptophan (a.u.)	1.2	0.3
Methionine (a.u.)	3.4	0
Lysine (a.u.)	8.2	0

Document 2

3. Show, by referring to document 2, that Kwashiorkor is due to a defect in food quality. (2)

Exercise 4 (7.25 points)

Obesity is generally defined as an excess of body fat. It results from an imbalance between the calory intake and the energy expenditure. This imbalance is evaluated by the body mass index (BMI). If this index is greater than or equal to 30, the individual is considered obese; between 25 and 29, we call it overweight; if above 40, we speak of morbid obesity.

1. a. Calculate the BMI of an individual of 180 cm in height and of mass of 85 kg. (1)
   b. Draw out the category to which this individual belongs. (0.75)
2. List two factors responsible for obesity. (1.5)

Document 1 represents the relation between the excess weight and the increase in mortality.

Excess weight (%)	Increase in mortality (%)
20-25	16
25-30	30
35-40	54

Document 1

3. Construct a histogram showing the results of document 1. (2)
4. a. Analyze the obtained results. (1)
   b. What can you conclude? (1)

Answer Key for SE03 12SE

Exercise 1 (4.5 points)

1.1. Arterial hypertension and high level of cholesterol in the blood. (0.5)
1.2. Healthy diet, having a normal body weight. (0.5)
2. a. The incidence of infarction decreases from 1000 to 100 cases per 100,000 men/year when the number of protective factors linked to lifestyle increases from 0 to 5 factors. (1)
   b. Improving the lifestyle provides an effective protection against developing cardiovascular diseases. (1)
3. The incidence of infarction in men with hypercholesterolemia and arterial hypertension decreases from 1200 to 400 cases per 100,000 men/year when the number of protective factors linked to lifestyle increases from 0 to 5 factors. Therefore, improvement of the lifestyle ensures an effective protection against cardiovascular disease in men, even if they suffer from hypercholesterolemia and hypertension. (1.5)

Exercise 2 (2.75 points)

1. A and D are liposoluble while B is hydrosoluble. (0.75)
2. a. At day 0, the mass of both lots, A and B, is 40g. Between 0 and 18 days, the mass of the rats increases in the 2 lots; from 40g to 50g in lot B where the received milk was deprived from its vitamins; and from 40g to 70g in lot A which received the fresh whole milk. (1)
   b. Milk vitamins promote growth. (1)

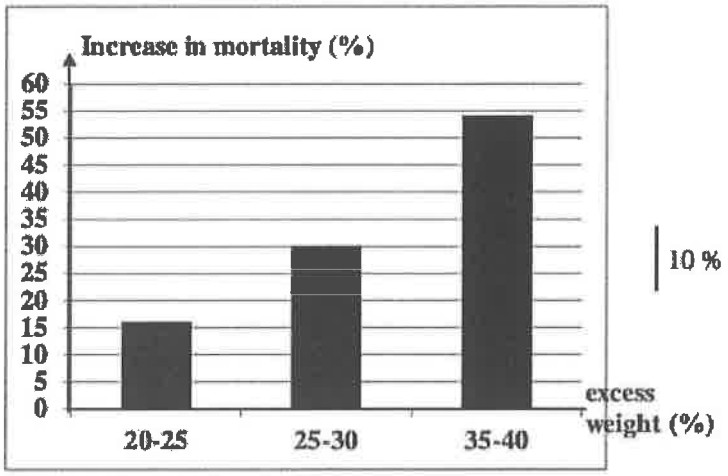
Exercise 3 (5.5 points)

1. Marasmus. Low quantity of food intake. (1)
2. a. The mass of proteins in maternal milk is 1.2 g which is greater than that in manioc which is 0.5g. On the contrary, the mass of carbohydrates in maternal milk is 6.6 g which is less than that in manioc which is 86g. (1)
   b. Maternal milk is rich in protein and poor in carbohydrates. (1)
3. There are 2 amino acids, methionine and lysine in maternal milk proteins (3.4 a.u. and 8.2 a.u. respectively) but absent in manioc proteins. After weaning, the child fed by manioc has a diet deprived of these 2 amino acids. Since kwashiorkor doesn't develop except after replacing maternal milk by a diet poor in proteins such as manioc, then Kwashiorkor is due to a defect in food quality. (2)

Exercise 4 (7.25 points)

1. a. BMI= Mass/Height ^{2}= 85 / $(1.8)^2$ = 26.23 Kg/ m^2 (1)
   b. This person is considered overweight. (0.75)
2. Sedentary lifestyle, diet too rich in fast sugars and fat. (1.5)

3. (2)



A histogram showing the variation in the increase in mortality as a function of excess weight

4. a. When excess weight increases from 20-25 to 35-40%, the increase in mortality increases from 16 to 54%. (1)
   b. Excess weight enhances the chances of death. (1)