This is a Class 1 exam

Lebanon Evangelical School
for Boys and Girls
Loueizeh - Baabda

Stage Exam 04

27MAR2023

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 (9 points)

Two friends, Rami and Chawki, consult a nutritionist. These two friends have the same body mass and age, but Rami works as a mason while Chawki is a salesman in a store. The nutritionist advises both individuals to have a balanced diet.

1. Explain the expression "balanced diet". (1)

Document 1 summarizes the explanation provided by the nutritionist to the two friends to show the importance of energy expenditure that should be provided by the diet.

The energy expenditure of an individual at rest (EER) includes the consumption of energy related to respiratory, cardiac and digestive functions as well as those essential for activities of limited intensities such as sleep, nap or extended rest. This energy expenditure shows significant variations with age, sex, and body mass.

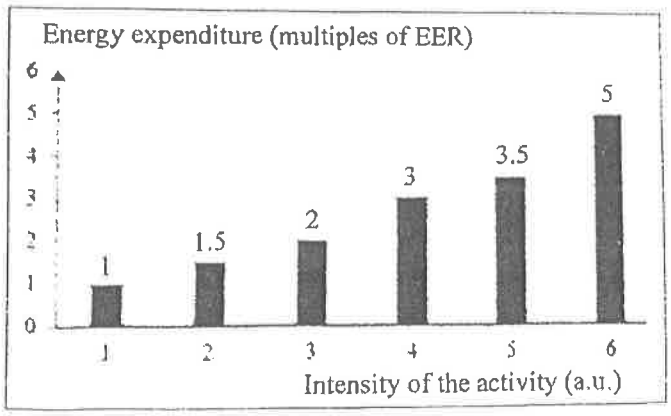
Document 1

2. Pick out, from document 1, the types of activities linked to energy expenditure at rest (EER). (1)
3. Justify the fact that Rami and Chawki have approximatively the same EER. (1.5)

The daily energy intake suggested for Rami is much greater than that suggested for Chawki. In order to justify his choice, the nutritionist said that he has considered the energy expenditure associated with their respective professional activities as a mason or a salesman, according to documents 2 and 3.

Activities	Intensity of the activities (a.u.)
Sleep, extended rest	1
Sitting position (reading, office work ...).	2
Standing position (cooking, selling,...).	3
Moderate activity (walking, gardening, ...).	4
Intense physical activity (masonry, sport...).	5
Very intense activity (competitive sport, ...)	6

Document 2

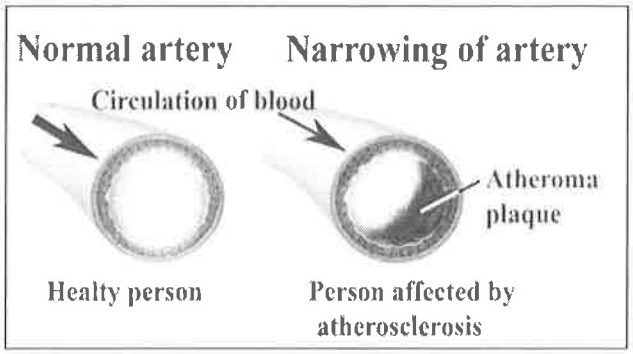


Document 3

4. Pick out the intensity of the professional activity of each of the two friends. (1)
5. Draw a table that represents the results of document 3. (2)
6. Interpret the results of document 3. (1.5)
7. Justify the higher energy intake suggested for Rami. (1)

Exercise 2 (7 points)

A food diet rich in lipids favors an increase in the concentration of cholesterol in blood. Consequently, lipids deposit on the walls of arteries causing the formation of atheroma plaque which is at the origin of atherosclerosis disease.



Document 1

Document 1 shows a cross section of the coronary artery of a healthy person and that of an individual affected by atherosclerosis.

1- Draw out the consequence of the formation of atheroma plaque on blood circulation. (1)

Document 2 represents the results of a study showing the relation between smoking and the risk of atherosclerosis development.

Number of consumed cigarettes per day	0	1 to 9	10 to19	>20
Risk of atherosclerosis (%)	1	1.5	2	2.5

Document 2

2- Draw a bar graph representing the results of document 2. (2)

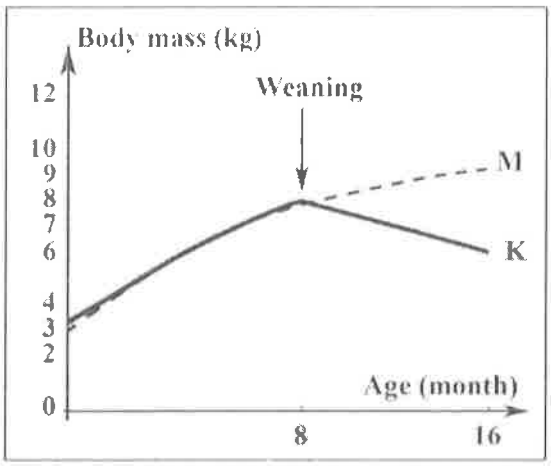
3- a) Analyze the obtained results. (1)

b) Derive a conclusion. (1)

4- Suggest two actions that the government would take to prevent the atherosclerosis development in the population. (2)

Exercise 3 (9 points)

Kwashiorkor is a disease which affects infants post weaning (arrest of breast feeding) in poor countries. Document 1 represents the variation of the body mass of an infant (K) affected by kwashiorkor and that of the normal average mass (M).



Document 1

1.1- Analyze the results in document 1. (2)

1.2- Draw out a symptom associated with this disease. (1)

2- Formulate a hypothesis which explains the origin of this disease. (1)

This disease affects infants which are nourished mainly by sweet potato and manioc, post weaning. Document 2 represents the composition of maternal milk and manioc in organic material.

Value (g per 100 g)	Proteins	Carbohydrates	Lipids
Maternal milk (dry mass)	11	55	30
Manioc	1	86	1

Document 2

3- Indicate, by referring to document 2, the food which is the richest in each of these components: proteins, carbohydrates and lipids. Justify the answer. (3)

4- Explain the variation of the body mass of infant (K) post weaning. (2)

Marking Scheme SE04 12SE

Exercise 1

1. A diet is balanced if it meets all the requirements of our body to ensure its functioning, structure and maintenance of good health. To be balanced, a diet covers quantitative needs (0.5) and it must be varied: it must include nutrients from various sources to cover our qualitative needs. (0.5)
2. The types of activities related to energy expenditure at rest (EER) are respiratory, cardiac and digestive functions as well as those essential for activities of limited intensity such as sleep, naps or extended rest. (1)
3. Rami and Chawki have approximatively the same EER because they have the same age, gender and body mass. (1.5)
4. Intensity of professional activity: Chawki 3 Rami 5 (1)
5. Title: table showing the variation in energy expenditure as a function of the intensity of activities. (2)

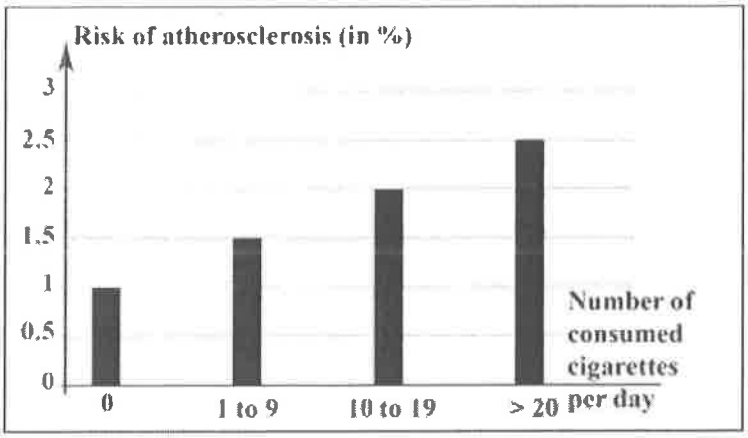
Intensity of the activities (a.u)	1	2	3	4	5	6
Energy expenditure (multiples of EER)	1	1.5	2	3	3.5	5

6. The energy expenditure is 1 multiple of the EER for an activity intensity equal to 1a.u and as the intensity of the activities increases up to 5 multiples of the EER, the energy expenditure increases to 5a.u. (1) This indicates that the intensity of the activities determines the energy expenditure which remains proportional to this intensity. (0.5)
7. The intensity of the professional activity of Rami, a mason, is 5a.u, which is higher than that of Chawki, a salesman, 3a.u. since the energy expenditure are proportional to this intensity, Rami's energy needs are greater than that of Chawki. This is why the energy supply offered to Rami is higher than that offered to Chawki. (1)

Exercise 2

1. Atheroma plaque slows down the blood circulation. (1)

2.



Title: Histogram showing the variation of the risk of atherosclerosis as a function of the number of consumed cigarettes. (2)

3. 1. The risk of atherosclerosis increases from 1% in the absence of smoking to 2.5% when the rate of smoking exceeds 20 cigarettes per day. (1)
   2. Smoking favors the development of atherosclerosis. (1)

4. Anti-smoking taxes: taxes on tobacco, inhibition of smoking in public places, .. And awareness campaigns for sensitizing healthy lifestyle. (2)

Exercise 3

1. 1. Before weaning, the body mass of infant (K), similar to the normal average body mass (M), increases from 3 to 7 kg between 0 and 8 months. Post weaning, the body mass continues increasing in infant (M) to 9 kg at the age of 16 months. However, it decreases from 7 to 6 kg between the 8th and the 16th month in affected infant (K). (2)
   2. Loss of body mass (1)
2. Hypothesis: The origin of this disease is a deficiency in proteins or under- nutrition or malnutrition. (1)
3. The food which is the richest in proteins, is the maternal milk since it contains 11% of proteins, greater than that in manioc (1%) The food which is the richest in carbohydrates is manioc since it contains 86% of carbohydrates, greater than that in maternal milk (55%) The food which is the richest in lipids is maternal milk because it contains 30% of lipids which is greater than in manioc (1%). (3)
4. Since infants, post weaning, are nourished mainly by manioc which is poor in proteins, and since proteins are indispensable for growth, the organism will not show any growth and its body mass decreases. (2)