وزارة التربية والتعليم العالي المديرية العامة للتربية دائرة الامتحانات	امتحانات الشهادة الثانوية العامة فرع الاداب والانسانيات	دورة سنة ٢٠٠٦ الاكمالية الاستثنائية

مسابقة في الثقافة العلمية مادة "علوم الحياة" المدة : ساعة	الاسم : الرقم :

Answer the following questions.

Question I (3 pts)

Document 1 reveals the foods consumed by a person in one day, document 2 reveals the distribution of the energy supply by these foods, and document 3 reveals the distribution of energy supply recommended by dietitians.

- **Breakfast: tea, cake, cereals, orange juice.**
- **Lunch: half an avocado, pasta, lamb meat, fresh pineapple, water.**
- **4 O'clock snack: two biscuits, apple, water.**
- **Dinner: fish, carrots, potatoes, yoghurt, orange, bread, water.**

Document 1

Breakfast:	**20%**
Lunch:	**40%**
4 O'clock snack:	**10%**
Dinner:	**30%**

Document 2

Breakfast:	**25%**
Lunch:	**30%**
4 O'clock snack:	**15%**
Dinner:	**30%**

Document 3

a- Compare the distribution of energy supply of the foods consumed by this person to that recommended by dietitians.

b- Propose modifications in the foods consumed by this person so that the distribution of the energy supply is balanced.

Question II (6 pts)

The document below reveals the source and the daily needs of certain vitamins.

Vitamins	Source of vitamins	Daily need
B1	Yeast, cereals, eggs, meat, fish, and milk products	1.5 mg
K	Vegetables, liver, meat, and eggs	1.5 mg
A	Cod liver oil, egg yolk, butter, vegetables, and fruits	0.8 mg
E	Vegetable oil, liver, vegetables, eggs, milk, and butter	12 mg

a- Construct a histogram showing the daily needs of these vitamins.

b- Classify these vitamins into liposoluble vitamins and hydrosoluble vitamins.

c- Draw out from the table, two foods, each is a source of three vitamins. Name these vitamins.

d- Specify the role of each of vitamin B1 and K.

Question III (5 pts)

For determining the effects of tobacco at the social level, studies were done and their results are shown in the following documents.

Nicotine dissolves easily in saliva. It crosses the mucous membranes and passes into the blood, which transports it quickly throughout the body.
Reaching the cerebrum, nicotine produces exciting effects and accelerates the liberation of natural euphoriant substances. In addition to the exciting effect of tobacco, there is a feeling of relaxation.
These effects lead to the repeated consumption of tobacco, without obvious inconveniences. But at a certain stage, stopping tobacco leads to troubles: the person is not able to give it up and must increase the dose to get the wanted effect.

Document 1

a- Pick-up from the text the effect of nicotine on the cerebrum.
b- Justify, in reference to the text and the acquired knowledge, that nicotine is a drug.

Document 2 shows the results of studies done on the risk of lung cancer and asthma in non-smoker women, as a function of the number of cigarettes consumed by their husbands.

c- Analyze the obtained results. Draw out the effect of tobacco at the social level.

Diseases	**Relative risk (in %) as a function of the number of cigarettes consumed by the husbands**		
	Non-smokers	**1-19 cigarettes per day**	**> 20 cigarettes per day**
Lung cancer	**1**	**1.61**	**2.1**
Asthma	**1**	**1.29**	**1.49**

Document 2

Question IV (6 pts)

Document 1 shows the variation of the speed of conduction of a nervous message as a function of the diameter and the nature of the nerve fiber.

a- Construct a table that includes the different values shown in document 1.
b- Analyze the graph. What can you conclude?
c- Specify the chemical nature of myelin and its location at the level of a neuron.

Document 2 reveals the relation between the diameter and the speed of conduction of the nervous message in two different nerve fibers: one from a squid and the other from a cat.

Nerve fiber	**Diameter (in µm)**	**Speed of conduction (in a.u)**
Squid	**650**	**24**
Cat	**4**	**26**

Document 2

d- Formulate a hypothesis that explains the obtained results.

Document 1

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مسابقة في الثقافة العلمية
مادة "علوم الحياة"
أسس التصحيح

الاسم :
الرقم :

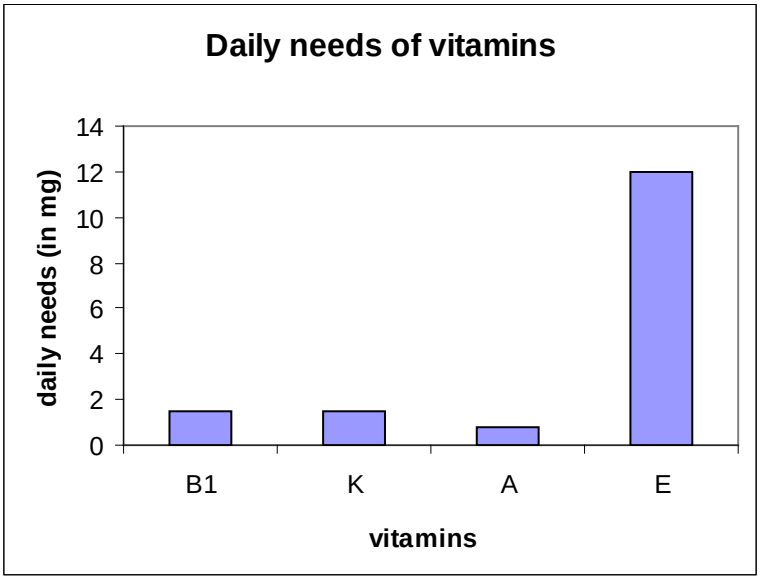
Question I (3 pts)

a- The energy supply from breakfast in this person is 20%.This percentage is less than the one recommended by dietitians, which is 25%. On the contrary, the energy supply from lunch is more in this person (40%) than that recommended by dietitians (30%). The energy supply from 4 O'clock snack (10%) is less than recommended (15%), and the energy supply from dinner (30%) is the same as the recommended. **(1pt)**

b- The proposed modifications: Add to the breakfast an energy food or replace one food by another of higher energy **(1 pt),** and for lunch exclude a certain food or replace one food by another of a lower energy, **(1 pts)**

Question II (6 pts)

a- **(2 pts)**



b- Liposoluble vitamins: A, K, and E **(¾ pt)**, hydrosoluble vitamin: B_1. **(¼ pt)**

c- Liver **(¼ pt)**. It contains vitamins K, A and E. **(¼ pt)**
Eggs **(¼ pt).** It contains vitamins B1, K, A and D. **(¼ pt)**
Vegetables **(¼ pt)**. Contain vitamins K, A, and E

d- Vitamin B1: Transmission of the nerve impulses, anti-beriberi, breakdown of carbohydrates, necessary for the proper functioning of cells **(1pt)**

a- Vitamin K: Essential for blood clotting **(1 pt)**

Question III (5 pts)

a- Nicotine produces an exciting effect and accelerates the liberation of natural euphoriant substances. **(1 pt)**

b- A substance is qualified as a drug when it causes dependence and tolerance. In fact, nicotine produces an exciting effect and relaxation, which leads to increased consumption of tobacco by the consumer without obvious inconveniences, and since the person needs to increase the dose to get the wanted effects (tolerance) and stopping tobacco causes troubles (dependence), we can say that nicotine is a drug. **(2 pts)**

c- The risks for lung cancer and asthma in women whose husbands are nonsmokers are 1%. These risks increase when the husband consume 1 to 19 cigarettes per day to become 1.61% for cancer and 1.29% for the asthma, and they continue to increase with the increase of the cigarette consumption (> 20 cigarettes) to become 2.1% for lung cancer and 1.49% for asthma. **(1 ½ pts)**

From the preceding, we can say that tobacco increases the incidence of lung cancer and asthma in passive smokers, therefore one can say that it is harmful at the social level. **(½ pt)**

Question IV (6pts)

a- **(1pt)**

Diameter of the nerve fiber (in µm) / **Speed of conduction of the nervous message (in a.u)**	**1**	**2**	**3**	**4**
Myelinated nerve fiber	**1**	**5**	**8**	**15**
Non-myelinated nerve fiber	**0.1**	**0.5**	**1**	**1.5**

Variations of the speed of conduction of the nervous message as a function of the diameter and the nature of the nerve fiber

b- In a myelinated nerve fiber, the speed of conduction of the nervous message is 1 a.u for a diameter of 1µm. This speed increases quickly with the increase in the diameter of the nerve fiber to become 15 a.u for a diameter of 4 µm. Similarly, in the non-myelinated nerve fiber the speed of conduction of the nervous message increases but slowly from 0.1 a.u for a diameter of 1µm to become 1.5 a.u for a diameter of 4µm. **(1 pt)**

This implies that the speed of conduction of the nervous message increases with the increase in the diameter of the nerve fiber, and this increase is greater in a myelinated nerve fiber than that of a non-myelinated nerve fiber. We conclude that the speed of conduction depends on the diameter and the nature of the nerve fiber. **(1pt)**

c- Myelin is a lipid substance **(1pt)** that surrounds the axon of a neuron. **(1pt)**

d- Hypothesis: The nerve fiber of the cat is myelinated and the nerve fiber of the squid is non-myelinated. **(1pt)**