

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

Answer the following exercises :

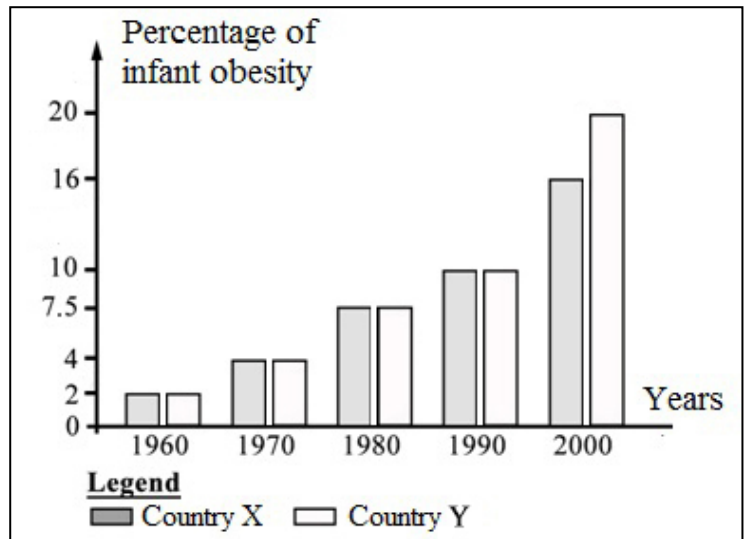
Exercise 1 (7 points)

Obesity in Infants

Obesity may be a risk factor for certain diseases. While studying the progression of obesity in infants in certain countries, we realize that obesity is becoming “epidemic”.

The document below reveals the variation of the percentage of obesity in infants ranging between 5 and 11 years in two different countries X and Y.

- 1- Draw a table showing the variation of the percentage of infant obesity as a function of the years in both countries X and Y.
- 2- Justify the following statement: “Obesity in infants is becoming more and more alarming.”
- 3- Formulate a hypothesis explaining the difference in the observed results in year 2000 in the two countries.
- 4- State 2 diseases triggered by obesity.



Exercise 2 (6 points)

Alcohol and the Brain

In Lebanon, the laws related to road safety, which have been applied since April 2015, impose sanctions that vary between a penalty of 350 000 LL for an alcoholemia of 0.3g/L, up to the withdrawal of the driving license. Alcoholemia is the amount of alcohol in blood.

The consumption of alcohol affects the person at the physical, psychological and even physiological level. Alcohol consumed in high doses attenuates hearing and attention and it provokes vision troubles.

- 1- Pick out from the text:
 - 1-1- Two effects of alcohol consumption in high doses.
 - 1-2- The sanction imposed by the Lebanese laws.

Alcohol acts at the level of inhibitory GABA synapses, and this inhibits the transmission of the nervous message. Studies performed on car drivers who consumed alcohol showed that their capacity to stop the car when facing a danger decreases, and the car can only be stopped at a later time at a distance of 100 meters ahead.

- 2- List the steps of the transmission of the nervous message at the level of a synapse.
- 3- Pick out the statement that shows that alcohol slows down reflexes.
- 4- Justify the measures taken by the government to limit car accidents.

Exercise 3 (7 points)

Multiple Sclerosis

Multiple sclerosis is a disease manifested by vision troubles and difficulties in movement. It is characterized by the appearance of plaques around the nerve fibers.

Researchers measure the speed of conduction of the nervous message along the myelinated nerve fibers of the optic nerve, in a healthy individual and in another one suffering from multiple sclerosis. The results are shown in document 1.

Fibers of the optic nerve	Speed of the conduction of the nervous message (in m/s)
Healthy Individual	100
Individual suffering from sclerosis	1

Document 1

They also measure the speed of conduction of nervous message in different types of fibers. Document 2 shows the conditions and the obtained results.

Nerve fibers of mammals	Diameter of the fiber (in μm)	Speed of the conduction of the nervous message (in m/s)
Fibers with myelin	2	12
Fibers without myelin	2	2

Document 2

- 1- What can you draw out from document 1?
- 2-1- Analyze the results shown in document 2.
- 2-2- What can you conclude?
- 3- Indicate the chemical nature of myelin and its location at the level of a neuron.
- 4- Justify, based on what precedes, the following statement: “The cause of multiple sclerosis is the destruction of myelin sheath”.
- 5- Name two other diseases that affect the nervous system.

Part of the ex	Exercise 1 obesity	Mark 7 pts																		
1	Table showing the evolution of the percentage of infant obesity as a function of time. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">year</th> <th>1960</th> <th>1970</th> <th>1980</th> <th>1990</th> <th>2000</th> </tr> </thead> <tbody> <tr> <td>Percentage of infant obesity in country X</td> <td>2</td> <td>4</td> <td>7.5</td> <td>10</td> <td>16</td> </tr> <tr> <td>in country Y</td> <td>2</td> <td>4</td> <td>7.5</td> <td>10</td> <td>20</td> </tr> </tbody> </table>	year	1960	1970	1980	1990	2000	Percentage of infant obesity in country X	2	4	7.5	10	16	in country Y	2	4	7.5	10	20	3
year	1960	1970	1980	1990	2000															
Percentage of infant obesity in country X	2	4	7.5	10	16															
in country Y	2	4	7.5	10	20															
2	Infant obesity becomes more and more alarming because the percentage of infant obesity in both countries X and Y increases from 2% in 1960 up to 16% in country X and 20% (more than 16%) in country Y in year 2000.	11/2																		
3	Hypothesis: The food diet adopted in country Y is richer in lipids and/or carbohydrates than that in country X. OR The amount of food taken by the citizens in country Y is higher than that in country X and higher than the recommended one. OR Citizens of country Y lead a more sedentary life than those of country X.	1																		
4	Cardiovascular diseases, diabetes.	1 1/2																		

Part of the ex	Exercise 2 Alcohol and Brain	Mark 6 pts
1-1	Alcohol consumed in high doses attenuates hearing and attention and it provokes vision troubles.	1
1-2	The sanction varies from a penalty of 350 000 LL for an alcohol blood level of 0.3g/L, up to the withdrawal of the driving license.	1
2	<ul style="list-style-type: none"> - The afferent nervous message (AP) arrives at the level of the terminal buds of the presynaptic neuron. - This provokes the liberation of neurotransmitters by exocytosis into the synaptic cleft. - The liberated neurotransmitters bind to receptors on the postsynaptic membrane. - This fixation leads to post-synaptic membrane potential. - The liberated neurotransmitters are either degraded and/or recaptured by the presynaptic membrane. 	11/4
3	Alcohol acts at the level of inhibitory GABA synapses, and this inhibits the transmission of the nervous message. This shows that alcohol slows down reflexes.	1
4	Alcohol attenuates the capacity of the driver to stop the car when facing a danger, so this increases the risk of car accidents. This is why imposing sanctions on drivers whose alcoholemia exceeds the threshold (0.3g/L) can prevent them from driving after consuming alcohol. This can decrease car accidents.	1 3/4

Part of the ex.	Exercise 3 Multiple Scleroses	Mark 7 pts
1	The speed of conduction of the nervous message slows down in the person suffering from MS.	1
2.1	Document 2 shows that the velocity of the conduction of the nervous message in none myelinated fibers is 2m/s, slower than that, 12m/s, in the myelinated ones that have the same diameter 2 μ m.	1
2.2	Myelin accelerates the conduction of the nervous messages.	1
3	Myelin is of phospholipid nature. It is located around the nerve fibers.	1 1/2
4	The fibers of the person suffering from multiple sclerosis behave like none myelinated ones. This implies that these fibers have lost their myelin sheaths and this slows down the conduction of the nervous message. Therefore, multiple sclerosis disease is due to the destruction of myelin sheaths around nerve fibers.	11/2
5	Parkinson – Alzheimer	1