

الاسم:	مسابقة في الثقافة العلمية: مادة الكيمياء
الرقم:	المدة: ساعة واحدة

This Exam Includes **Two Exercises**. It Is Inscribed on 2 Pages Numbered **1** and **2**.
The Use of A Non-programmable Calculator Is Allowed.

Answer The Following Two Exercises:

**First Exercise (10 points)
Energetic or Not?!**

The daily food of each individual must provide him with a sufficient quantity of various substances (nutrients)....

The fibers are the rigid components of the walls of the plants. They are brought by the fruits and vegetables, and they are little or not energetic because they are little or not digested by the digestive tract. Nevertheless, they play on this level an essential role: they induce an effect of satiety* because they are water mouthfuls, they allow a good contraction of the intestinal muscles, which avoids the constipation, they cover the intestinal walls and support the development of the beneficial intestinal flora, which ensures a protection against the aggressions, they reduce the absorption of the lipids, which supports to decrease the proportion of blood cholesterol, they limit the increase in the sugar proportion in blood just after the meal....

Protein is an assembly of small molecules called amino acids. Some of these amino acids are known as essential....

The lipids are the nutrients contained in fats and are composed of molecules called triglycerides....

Although, they are also often called sugars, the food that made up of carbohydrates is not necessary of a sweet flavor. The candies rich in carbohydrates have a sweet flavor, but pasta or rice, which are also rich in carbohydrates, are deprived of it....

Foods containing carbohydrates are classified according to their capacity to raise the sugar proportion in blood; which is called the hyperglycemic capacity or the glycemic index of a food. This index is considered 100 for the food which is the most hyperglycemic, when the carbohydrates are absorbed as glucose "pure". A food of glycemic index 50 is 2 times less hyperglycemic than glucose....

* *To eat one's fill.*

Questions:

- 1- Indicate the purpose of the food.
- 2- State the principal nutrients provided by food. Classify them as energetic and non-energetic nutrients.
- 3- Say why fibers are not regarded as nutrients.
- 4- Extract the importance of fibers in the food.
- 5- Give the general formula of α -amino acid.
- 6- Say why certain α -amino acids are called "essential α -amino acids".
- 7- Explain the term "saturated fats" and "unsaturated fats".
- 8- Bread is a rich food in starch. If we chew a piece of bread, we feel the sweet taste. Explain.
- 9- The hyperglycemia is an indication of a disease. Specify its food origin.

Second Exercise (10 points) **Anti-inflammatory and Acute Otitis* of the Child**

A good approach of acute tympanitis** physiopathology, the pharmacology of steroidal or non steroidal anti-inflammatory drugs and the choice of the drugs are some factors that improve the treatment of children's acute tympanitis. This treatment aims for three objectives: stop the infection, decrease the pain and try to short its development as approximately 40 percent of tympanitis change into serous (fluid) otitis.

Then, it is important to determine the relevancy of the association of steroidal or non-steroidal anti-inflammatory drugs for the antibiotic treatment of acute otitis.

Short corticotherapy treatment (five to seven days with 1 to 2 mg/kg/day of prednisone's equivalent) uses synthetic glucocorticoids which have an anti-inflammatory activity higher as cortisol.

In addition, corticosteroidals have not proved their effectiveness. In particularly, ...Then, they have a short beneficial effect which disappears with time. As well, non-steroidal anti-inflammatory drugs should be reconsidered.

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* *Ear inflammation.*

** *Otitis media.*

Questions :

- 1- Indicate the general role of a medicinal drug.
- 2- The preparation of a drug is done:
 - by synthesis,
 - by microbiological fermentation,
 - by extraction of the animal kingdom or vegetable.Assign to each one of the following drugs the method of preparation: aspirin, morphine, tetracyclin.
- 3- "The therapeutic assumption of responsibility of the otitis must have three objectives: stop the infection, decrease the pain, try to short its evolution by controlling the inflammatory reaction". State three classes of medicinal drugs for this treatment.
- 4- Give the name of a current anti-inflammatory drug steroidal or non-steroidal.
- 5- A young person, of 10 years and body weight of 30 kg, catches an otitis. What daily amount he must take in the compressed form of "15 mg" (each tablet contains 15 mg of active ingredient)?
- 6- The bacterium of an otitis infection being identified, specify the nature of antibiotic to be advised from the spectrum point of view.
- 7- Indicate two undesirable effects of the treatment by cortisol (cortisone).

First exercise (10 points)
Energetic or Not?!

Expected Answer	Mark	Comment
1- Food must provide the organism with the nutrients that it needs. Or they supply energy and build up tissues of the organism.	1	
2- The principal nutrients are: carbohydrates, proteins, lipids, vitamins and minerals. Carbohydrates, proteins and lipids are energetic whereas vitamins and minerals are not energetic.	1	
3 - Fibers are little or not energetic because they are little or not digested by the digestive tract.	0.5	
4 - Fibers induce an effect of satiety because they are water mouthfuls, they allow a good contraction of the intestinal muscles, which avoids the constipation, they cover the intestinal walls and support the development of the beneficial intestinal flora, which ensures a protection against the aggressions, they reduce the absorption of lipids, which supports a decrease in the proportion of blood cholesterol, they limit the increase in the sugar proportion in blood just after the meal.	2	
5 - α -amino acids have as a general formula: $R - CH(NH_2) - COOH$.	0.5	
6 - The essential α -amino acids are those which are provided by the food and not manufactured by the organism.	1	
7- "Saturated fats": the carbon chain of the fatty acid constituting triglyceride is saturated, all the C - C are simple bonds. "unsaturated fats": the carbon chain of the fatty acid constituting triglyceride is unsaturated, it contains one or more C = C double bonds.	2	
8 - The starch, in the presence of saliva containing amylase is hydrolyzed into glucose which has the sweet taste.	1	
10 The origin of hypoglycemia is the consumption of food with a high glycemic index.	1	

Second Exercise (10 points)
Anti-inflammatory and Acute Otitis of the Child

Expected Answer	Mark	Comments
1- The general role of a drug is a therapeutic role (treating disease, relieving pain).	1	
2-Aspirin is prepared by synthesis, morphine is extracted from plant sources, tetracycline is obtained by microbiological fermentation.	1.5	
3- The three classes of medicinal drugs for the treatment of otitis are: antibiotics, analgesics and anti-inflammatory drugs.	1.5	
4- Aspirin is an anti-inflammatory drug.	1	
5- The mass of antibiotic for a daily consume by an individual is: $1 \times 30 = 30\text{mg}$. Or $2 \times 30 = 60\text{mg}$. The number of tablets is between 2 and 4 because the mass ranges between 30 and 60 mg.	2	
6- Since the nature of the infection is identified, it is necessary to use an antibiotic with a narrow spectrum.	1.5	
7- Two undesirable effects of the treatment by cortisol (cortisone): retention of water , overweight and obesity, unwanted hair, hypertension, hyperglycemia.	1.5	