

**This Exam Includes Two Exercises. It Is Inscribed On six Pages Numbered 1 and 6.  
The Use Of A Non-Programmable Calculator Is Allowed.**

## مسابقة في مادة الثقافة العلمية - مادة الكيمياء

المدة: ساعة واحدة

(لغة انكليزية)

الاسم: .....

الرقم: .....

## Answer the Two Following Exercises

### First Exercise (10 points)

### Grapefruit

Grapefruit is an excellent source of many nutrients and phytochemicals. It is low in calories, rich in fiber and vitamin C.

Grapefruit is a part of food diet which helps the body's metabolism to burn fat and it lowers the cholesterol level.

On the other hand, a published study in “The British Journal of Cancer” found a relation between **the daily consumption** of grapefruit and **an increase in the risk of breast cancer** in post-menopausal women.

This study focuses on the inhibition, by grapefruit, of CYP3A4 enzyme which metabolizes estrogen.

This fruit is thought to increase the levels of estrogen, the hormone which is associated with a higher risk of breast cancer.

Researchers and other experts said that more researches are still needed.

The essential nutritive composition of 100 g of grapefruit is given in the table of **document-1**

<b>Nutritive composition per 100 g</b>	
<b>Energy value: 33 kcal</b>	
<b>Nutrient</b>	<b>Mass</b>
Sugars	7.31 g
Lipids	0.10 g
Proteins	0.69 g
Fibers	1.1 g
Vitamin C	33.3 mg
Calcium	12 mg

**Document-1**

## **Given:**

- 1 g of lipids gives 9 kcal;
- 1 g of proteins gives 4 kcal;
- 1 g of carbohydrates gives 4 kcal.
- The daily need of calcium in adults is between 600 mg and 1000 mg.

## **Questions**

**1.** Referring to the text, **justify** the following affirmations:

- 1.1.** The consumption of grapefruit should be limited by women with post-menopause.
- 1.2.** Grapefruit is ideal to prevent cardiovascular diseases.
- 1.3.** Grapefruit possesses antioxidant properties.

**2.** **Verify** the energy value produced by 100g of grapefruit.

**3.** **Choose** the correct answer

**3.1.** Calcium is:

- a-** macro mineral
- b-** trace mineral
- c-** organic nutrient

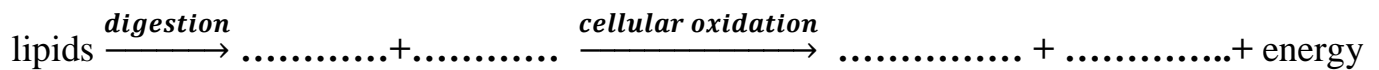
**3.2.** Dietary fibers:

- a-** are digestible nutrients
- b-** avoid constipation
- c-** cause colon cancer

**3.3.** The vitamins A and E are:

- a-** liposoluble
- b-** hydrosoluble
- c-** energetic

4. Grapefruit helps the catabolism of lipids. **Copy** and **complete** the following schematic representation:



5. Proteins are essential nutrients for the human body; they are present in small quantities in grapefruit and in variable amounts in other foods.

**5.1. Name** the four chemical elements present in all proteins.

**5.2. List** a principal animal source and another principal vegetal source of proteins.

**5.3. Give** two functions of proteins.

Active ingredient: Levofloxacin.

Tavanic<sup>®</sup> is prescribed, in adults, for the treatment of the following infections:

- Pneumonia
- Complicated infections of the skin and soft tissues.

It is convenient to take into consideration the recommendations concerning the appropriate use of bactericidal antibiotics.

Tavanic<sup>®</sup> is contra-indicated for infants and adolescents in the growth period.

Tavanic<sup>®</sup> solution is administered as slow intravenous injection, once or twice per day.

The initial treatment of Tavanic<sup>®</sup> intravenously administered could be followed by an orally administered Tavanic<sup>®</sup> in form of coated tablets.

The treatment duration includes:

- the intravenously treatment  
followed by
- the orally administered treatment.

The duration of the intravenously treatment depend on the medical condition, it normally lasts between 2 to 4 days. The orally administered Tavanic<sup>®</sup> lasts from 7 to 14 days.

The side effects of Tavanic<sup>®</sup>: insomnia, nervousness, diarrhea, vomiting and nausea...

## Questions

1. By referring to the text, **answer** the following questions:

**1.1. Indicate** the active ingredient of Tavanic<sup>®</sup>.

**1.2. List** two cases where the patient should be treated by Tavanic<sup>®</sup>.

**1.3. Give** two formulations of Tavanic<sup>®</sup>.

**1.4. Pick out** three side effects of Tavanic<sup>®</sup>.

2.

**2.1. Justify** that Tavanic<sup>®</sup> is a bactericidal antibiotic

**2.2. Correct** the following false propositions.

- a. A patient, who suffers from a headache, takes Tavanic<sup>®</sup>.
- b. An infant of 4 years old, suffers from chronic pneumonia, is treated with Tavanic<sup>®</sup>.

**3. Copy and complete** the following table:

Medicinal drug	Aspirin <sup>®</sup>	Maalox <sup>®</sup>	Cortisone <sup>®</sup>
One pharmaceutical effect			
One side effect			

**4.** A patient who suffers from pneumonia is treated by intravenously administered followed by oral treatment of Tavanic<sup>®</sup> for 5 days.

**4.1. Specify** whether this duration of treatment is sufficient.

**4.2.** A patient takes Tavanic<sup>®</sup> for the prescribed duration without being cured due to bacteria resistance. **Define** bacteria resistance and give one of the mechanisms that make a bacterium resistant to Tavanic<sup>®</sup>.