

مسابقة في الثقافة العلمية - مادة الكيمياء  
الاسم:  
الرقم:  
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**This Exam consists of Two Exercises .It is Inscribed on Two Pages Numbered 1 and 2.  
Answer The Two Following exercises:**

**First Exercise (10 points)  
DIOVOL PLUS**

**Composition per tablet**

100 mg of magnesium hydroxide, 300 mg of aluminum hydroxide and of magnesium carbonate,  
25 mg of simethicone...

Other ingredients: dry starch, cellulose, calcium cyclamate, gelatin, mannitol, sorbitol,  
magnesium stearate...

**Indications**

The balanced formula of Diovol Plus provides a fast relief of heartburn and of indigestion due to  
acidity and to gases.

**Method of administration**

**Adults:** To chew 2 to 4 tablets as needed, between meals and at bedtime or as prescribed by a  
physician.

**Precautions for use**

Do not take more than 16 tablets within 24 hours.

Diovol plus can hinder the absorption of iron preparations and/or tetracyclines preparations.

**Questions**

- 1- Referring to the text, answer the following questions :
  - 1.1- List the cases where Diovol Plus is prescribed.
  - 1.2- Choose, among the following ingredients, those that play the role of active ingredient in Diovol Plus: magnesium hydroxide, calcium cyclamate, sorbitol and aluminum hydroxide.
  - 1.3- Specify whether it is advised to take Diovol Plus with another medicinal drug containing iron which is prescribed to treat anemia.
- 2- Indicate the pharmaceutical class of Diovol Plus. Name three other classes.
- 3- Match each item of the column I to one item of the column II.

**Column I**

- a- Magnesium stearate
- b- Dry starch
- c- Cellulose

**Column II**

- i- Filler.
- ii- Lubricant.
- iii- Disintegrator.
- iv- Flavor.

- 4- Diovol Plus is formulated in tablets whereas Tetracycline is formulated in capsules.
- 4.1- Compare the composition of these two formulations.
  - 4.2- Give the advantage of manufacturing medicinal drugs in the form of tablets.
  - 4.3- List two other formulations of medicinal drugs.

- 5- Given below three proposals for the mass  $m$  of a tablet of Diovol Plus :

$$m < 425 \text{ mg} \quad ; \quad m > 425 \text{ mg} \quad ; \quad m = 425 \text{ mg} .$$

Choose the appropriate proposal. Justify.

### Second Exercise (10 points)

#### Lactose Intolerance

Lactose intolerance is the inability to digest a sugar called lactose that is found in milk.

When consuming foods containing lactose, an enzyme (lactase) in the small intestine decompose lactose into simpler sugars. These simple sugars are then easily absorbed into the blood stream

....

People with lactose intolerance do not produce enough lactase for many reasons: medications, genetic defect, injuries to the mucosa lining the intestines, age....

The most obvious mean of treating lactose intolerance is by reducing the amount of lactose in the diet. Fortunately, most people who are lactose intolerant can tolerate moderate amounts of lactose.

It often takes only the elimination of the major milk-containing products to obtain sufficient relief from the symptoms of this intolerance.

*<http://www.lactose intolerance. info/nutrition>*

#### Questions

- 1- Referring to the text, answer the following questions :

- 1.1- Define lactose intolerance.
- 1.2- List the causes of lactase deficiency.
- 1.3- Deduce that lactose is not a monosaccharide.

- 2- Give two symptoms of lactose intolerance.

- 3- Complete the word equation of the hydrolysis reaction of lactose :



- 4- One of the products of the previous reaction is a principal source of energy for our bodies.

Write the schematic representation of the oxidation of this product.

- 5-Milk contains, among others, vitamins B<sub>2</sub> and D.

- 5.1- Indicate one function for each of these two vitamins.
- 5.2- Give the class of each one of these two vitamins.
- 5.3- Justify the presence of these two vitamins in the milk.

- 6- Justify that people with lactose intolerance can consume yogurt (laban).

**First Exercise (10 points)**

**DIOVOL PLUS**

Part of the Q	Answer	Mark
1.1	Diovol Plus is prescribed in the case of heartburn and of indigestion due to acidity and to gases.	1
1.2	The ingredients that play the role of active ingredient in Diovol Plus are: magnesium hydroxide and aluminum hydroxide.	1
1.3	No since Diovol Plus can hinder the absorption of iron preparations.	1
2	Diovol Plus is an anti-acid. The three other classes: anti-inflammatory, antibiotic and analgesic.	1
3	a- → ii b- → iii. c- → i	1.5
4.1	Tablets are composed of active ingredient and inert ingredients called additives while capsules contain only active ingredient in a gelatinous container.	1
4.2	Manufacturing prefer to prepare medicinal drugs in the form of tablets because it is less expensive.	1
4.3	The two other formulations are: liquid and ointment (cream)...	1
5	The mass of a tablet of Diovol Plus is > 425 mg since this tablet contains ingredients other than magnesium hydroxide, aluminum hydroxide, magnesium carbonate and semithicone.	1.5

**Second Exercise (10 points)**

**Lactose Intolerance**

Part of the Q	Answer	Mark
1.1	Lactose intolerance is the inability to digest a sugar called lactose that is found in milk.	1
1.2	The causes are: medications, genetic defect, injuries to the mucosa lining the intestines, age....	1
1.3	The lactose is not a monosaccharide because lactase decomposes lactose into simpler sugars.	1
2	The symptoms are: fatigue , cramps, nausea, diarrhea.	1
3	Lactose + water $\longrightarrow$ glucose + galactose	1
4	Glucose <del>oxidation</del> $\longrightarrow$ CO <sub>2</sub> + H <sub>2</sub> O + energy.	1
5.1	Vitamin D : promotes phosphorous and calcium absorption in the intestine and their fixation in the bones. Vitamin B <sub>2</sub> : involves in the metabolism of proteins...	1
5.2	Vitamin D is liposoluble . Vitamin B <sub>2</sub> is hydrosoluble	1
5.3.	Water in the milk justifies the presence of vitamin B <sub>2</sub> . The lipids in the milk justifies the presence of vitamin D.	1
6	Yogurt does not contain lactose.	1

