

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

This exam includes two exercises. It is inscribed on 6 pages numbered from 1 to 6.

The use of a non-programmable calculator is allowed.

مسابقة في مادة الكيمياء المدة: ساعة

(بالغة الإنكليزية)

الاسم:

الرقم:

Answer The Two Following Exercises:

Exercise 1 (10 points)

Breast milk

Breast milk is the best diet for infants during the first months of life.

It provides babies with everything they need for their optimal physical and mental development.

The principal sugar of mother's milk is lactose.

What are the protective benefits of breast milk?

It's well known that breastfed babies get fewer infections and allergies than formula-fed babies.

This is because breast milk naturally strengthens baby's immune system. Breast milk contains "probiotics", which act as food for "good" bacteria in baby's intestine such as "intestinal floras".

The "good" bacteria encourage a protective lining to form in baby's intestine, that helps prevent stomach upset and diarrhea.

Questions:

1. Referring to the text, **answer** the following questions:

1.1. Give the role of probiotics found in mother's milk.

1.2. State two protective benefits of mother's milk.

1.3. Pick out the statement which justifies that mother's milk is a complete food.

2. **Choose** among the list of elements below the common four chemical elements that constitute protein:

- K (potassium)
- C (carbon)
- H (hydrogen)
- F (fluorine)
- O (oxygen)
- N (nitrogen)

3. Answer by true or false and **correct** when it's false.

- Transport proteins are nutritive proteins.
- Regulatory proteins regulate some physiological activities.

4. Lactose undergoes hydrolysis reaction in the presence of the enzyme “lactase”.

For many babies and people, digestion and absorption of lactose cause a problem.

4.1. **Recopy** and **complete** the word equation of the hydrolysis reaction of lactose written below:

Lactose + water → +

4.2. **Show that** this reaction is a catabolic reaction.

4.3. The deficiency of the enzyme “lactase” causes a problem.

4.3.1. **Name** this problem.

4.3.2. **Choose**, among the following, two symptoms caused by the deficiency of the enzyme “lactase”:

- Coma
- Diarrhea
- Nausea
- Depression in respiratory drive

5. **Document-1** represents the composition of one cup of milk for feeding a baby from 6 to 11 months.

Nutritive composition of 1cup of formula milk	
Nutrient	Mass
Carbohydrates	17g
Protein	2.9g
Total Fat	6.25g
Calcium	145 mg

Document-1

Given:

Energy value for 1 g of nutrient:

Carbohydrates: 3.75 kcal; Lipids: 9 kcal; Protein: 4 kcal.

A mother provides **10 months** old baby with 1 cup of formula milk each morning.

5.1.Show that the energy value provided by this amount of milk is **131.6 Kcal.**

5.2.Babies from 6 to 11 months old need **260 mg** of calcium per day.

Answer by true or false and **correct** when it's false.

5.2.1. Calcium is a macromineral because its daily need is greater than **20 mg**.

5.2.2. This amount of milk covers the baby's need of calcium.

Exercise 2 (10 points)

Medical Prescription

Sami catches flu accompanied with headache, sharp cough, and fever.

A physician gives him the following **medical prescription**:

- Amoxicilline[®] 500 mg
- Doliprane[®] 100 mg
- Toplexil[®] 0.33 mg /mL

1. Referring to document-1 and the medical prescription, **specify** whether Sami suffers from viral or bacterial infection.

AMOXICILLINE[®] 500 mg: Capsule

This antibiotic belongs to the penicillin family. It is used for the treatment of various infections, mainly for pneumonia, bronchitis, throat and ear infections...

Document-1

2. To prevent bacteria resistance, the physician insists on taking Amoxicilline[®] for two weeks.

2.1. Define bacteria resistance.

2.2. List two mechanisms that make a bacterium resistant to antibiotic.

3. **Answer the following questions:**

3.1. Referring to document-2, **pick out** the active ingredient of Doliprane[®].

3.2. Referring to document-2, **specify** the pharmaceutical class of Doliprane[®].

3.3. Referring to documents-2 and 3, why the physician prescribes Doliprane[®] rather than Aspirin[®]?

DOLIPRANE[®] 100 mg : Divisible Suppositories

This medicinal drug contains paracetamol. It is used to lower fever and in the treatment of painful infections.

Document-2

ASPIRIN[®]

Aspirin is a very effective analgesic even of its risky usage. It can cause severe damage to the stomach leading to significant bleeding.

Document-3

3.4. Sami is a child of **30 Kg**. He must take Toplexil® in **four divided doses** per day.

Referring to document-4, **determine** the volume (in mL) of each dose.

TOPLEXIL® 0.33 mg/mL: 150 mL syrup

It is used for symptomatic treatment of sharp cough. This medicine is for adults and children over 2 years of age.

For children, the daily dosage depends on the weight of the child: **1 mL** of syrup **per kg** of body's weight per day.

Document-4

4. Referring to the three documents-1, 2 and 4:

Indicate the formulations of the three medicinal drugs prescribed for Sami.

Give a possible formulation for Aspirin®.

5. Medicinal drugs can be prepared by different ways.

Match each item of column A to the corresponding item of column B.

Column A	Column B
a- Preparation by synthesis	i- Penicillin
b- Fermentation or microbiological culture	ii- Insulin
c- Extraction from animals	iii- Aspirin