يتكون هذا الامتحان من أربعة تمارين، موزّعة على أربع صفحات. يجب اختيار تمرينين فقط.

تنبيه: في حال الإجابة عن أكثر من تمرينين، عليك شطب الإجابات المتعلقة بالتمارين التي لم تعد من ضمن اختيارك، لأن التصحيح يقتصر على إجابتي التمرينين الأوليين غير المشطوبين، بحسب ترتيبهما على ورقة الإجابة. يمكن الاستعانة بالآلة الحاسبة غير القابلة للبرمجة.

Answer Two (2) of the following exercises.

Exercise 1 (10 points) Fibers

Fibers are an important part of our food diet. They play an important role as many components such as carbohydrates, fats, proteins, vitamins and minerals.

Fibers belong to the class of carbohydrates. They cannot be broken down into simple sugar molecules in the human body and so cannot be digested in the human body.

However, when the fibers supply required by the body is insufficient, a fiber deficiency occurs.
Among the symptoms of fiber deficiency in the human body:

- High cholesterol level: Fibers absorb cholesterol and favor its elimination from the human body. When one does not consume enough fibers, the cholesterol level in the body increases.
- Risk of weight gain: Eating fibers does not significantly increase calories because when people consume food rich in fibers, they feel full and do not need to eat more for at least a few hours.

www.starhealth.in

Questions:

1. Referring to the text, answer the following questions:
   1.1. Name four nutrients mentioned in the text.
   1.2. Indicate why fiber deficiency increases cholesterol level in the human body.
   1.3. Why does consuming food rich in fiber limit weight gain?

2. Choose the correct answer:
   2.1. The enzymatic hydrolysis reaction of glycogen produces the following monosaccharide:
   a- Fructose b- Galactose c- Glucose
   2.2. Cholesterol is a:
   a- Simple lipid b- Steroid c- Complex lipid

3. Given the following statements. Answer by true or false and correct the false one(s).
   3.1. Catabolic reactions are pathways where large molecules are broken down into smaller molecules with absorption of energy.
   3.2. The symbols of the elements that constitute carbohydrates are: H, O and N.
   3.3. A mineral with a daily need more than 100 mg is a macro-mineral.

4. Cellulose is a fibrous substance.
   4.1. Give the class of cellulose.
   4.2. Justify that cellulose is not considered a nutrient in the human body.

Exercise 2 (10 points) Fatty Acids

Fatty acids contain carbon, oxygen and hydrogen in their molecules. They are classified into saturated fatty acids and unsaturated fatty acids. These latter can be further classified into monounsaturated fatty acids and polyunsaturated fatty acids.

Saturated fatty acids are sometimes called "unhealthy fats" because they raise the risk of heart disease and stroke. On the other hand, unsaturated fatty acids are called "healthy fats" because they promote heart health.

Omega-3 fatty acids are polyunsaturated fatty acids.

Consuming Omega-3 fatty acids may: keep the skin healthy, reduce depression and anxiety, assist in preventing age-linked mental decline and Alzheimer's disease, …

Omega-3 diets can be found in vegetarian, vegan and non-vegetarian options. Salmon, flax seeds, walnuts, chia seeds, canola oil, soy oil and soybeans are excellent sources for Omega-3.

www.starhealth.in

Document-1 represents the nutrition facts of some nutrients in 100 g of nuts

Protein	10g
Carbohydrates	5.5g
Total Fat	57g

Document-1

Given:
1g of carbohydrates provides 3.75 kcal
1g of proteins provides 4 kcal
1g of lipids provides 9 kcal

Questions:

1. Referring to the text, answer the following questions:
   1.1. Name the chemical elements that constitute fatty acids.
   1.2. Pick out the disadvantages of consuming saturated fatty acids.
   1.3. List three benefits of consuming Omega-3 fatty acids.
   1.4. Give two examples of food rich in Omega-3.

2. Copy and complete the following schema:
   Fatty substances $\xrightarrow{Digestion}$ …… + …… $\xrightarrow{Cellular\ oxidation}$ …… + …….. + Energy

3. Vitamins are classified into two classes.
   3.1. Name these two classes.
   3.2. Choose, from the following, the vitamins that may be present in fat:
   i- Vitamin B_{12} ii- Vitamin K iii- Vitamin D iv- Vitamin C

4. Answer by true or false and correct the false one.
   4.1. Cholesterol is not found in plants.
   4.2. Phospholipid is a simple lipid.

5. Referring to **Document-1**, calculate the energy value provided by 100 g of nuts.

Exercise 3 (10 points) Aspegic®

Aspegic® is an aspirin-based medicinal drug. It is available over the counter without prescription. This drug is used to reduce fever and to relieve pain. It is prescribed in particular to calm inflammatory rheumatic diseases.
Aspegic® is found in the form of powder for oral solution in sachets of 500 mg and 1000 mg.
The dosage of this medicinal drug for adults and children over 50 kg is one sachet of 1000 mg per dose. This dose can be repeated, if necessary, after a minimum period of four hours without exceeding three sachets of 1000 mg per day.
The side effects of Aspegic® are: stomach aches, gastritis, nose or gums bleeding, …

Tinnitus (ringing in the ears), decreased hearing and headaches are generally observed in the case of Aspegic® overdose.

www.notretemps.com

Questions:

1. Referring to the text, answer the following questions:
   1.1. Indicate two cases in which Aspegic® is used.
   1.2. Justify that Aspegic® is antipyretic.
   1.3. List three side effects of using Aspegic®.
   1.4. Pick out two overdose effects of Aspegic®.

2. Aspegic® is available in powder form for oral solution.
   Give three other formulations of a medicinal drug.

3. Match the items of **column (A)** to the corresponding items of **column (B)**.

Column A	Column B
a- Anti-acid	1- Reduces inflammation of the muscles and joints
b- Anti-rheumatic	2- Eliminates severe pain
c- Narcotic	3- Reduces excess gastric acid

4. Anti-inflammatory drugs are classified into two classes.
   4.1. Name these two classes.
   4.2. Indicate the class of aspirin.

5. Medicinal drugs come from several sources. List three sources of medicinal drugs.

Exercise 4 (10 points) Vancomycin® 125 mg

Antibiotics are medicinal drugs used to kill or inhibit the growth of microorganisms. Although they are very beneficial in the treatment of most bacterial infections, it is essential to find the correct medication and dosage for each person so that they get the best possible results.
Physicians usually choose the medication by considering the type of infection, the patient's age, weight,
Vancomycin® 125 mg is an antibiotic used in oral form to treat certain digestive tract infections caused by excessive proliferation of the bacteria (Clostridium difficile).
Using Vancomycin® 125 mg may cause some side effects such as: an alteration of taste, nausea, vomiting, rash, fever, …
The usual oral dose for an adult is 125 mg (in case of non-severe infection), taken every 6 hours for 10 days.
The usual oral dose for an adult is 125 mg to 500 mg (in case of severe and complicated infection), taken every 6 or 8 hours for 7 to 10 days.

www.vidal.fr

Questions:

1. Referring to the text, answer the following questions:
   1.1. Pick out the factors to be considered when a medication is prescribed.
   1.2. Indicate the case in which Vancomycin® 125 mg is prescribed.
   1.3. Justify that Vancomycin® 125 mg is a narrow-spectrum antibiotic.
   1.4. List three side effects of using Vancomycin® 125 mg.

2. Correct the following statements:
   2.1. Vancomycin® 125 mg can be used in the case of a viral infection.
   2.2. Vancomycin® 125 mg is a fungicidal drug.

3. Once antibiotic treatment is started, it is very important that patients continue to take their antibiotic therapy as prescribed in order to prevent bacterium resistance.
   3.1. Define bacterium resistance.
   3.2. Give one of the mechanisms that makes a bacterium resistant.

4. In certain cases of infection, anti-inflammatory and antibiotic treatment can be combined at the same time to ensure recovery from a bacterial infection.
   4.1. Give the role of anti-inflammatory drugs.
   4.2. Name the two classes of anti-inflammatory drugs.
   4.3. To which class of anti-inflammatory drugs does cortisone belong?

مشروع أسس تصحيح مادة الكيمياء

Exercise 1 (10 points) **Fibers**

Question	Expected Answer	Mark
1.1.	carbohydrates, fats, proteins, vitamins	**1**
1.2.	Fibers absorb cholesterol and favor its elimination from the human body. When one does not consume enough fibers, the cholesterol level in the body increases.	**1**
1.3.	When people consume food rich in fibers, they feel full and do not need to eat more for at least a few hours. Thus, consuming food rich in fiber limit weight gain	**1**
2.1	c- Glucose	**1**
2.2	b- Steroid	**1**
3.1	False. Catabolic reactions are pathways where large molecules are broken down into smaller molecules with release of energy.	**1**
3.2	False. The symbols of the elements that constitute carbohydrates are: H, O and C.	**1**
3.3	True	**1**
4.1	Polysaccharide	**1**
4.2	They cannot be broken down into simple sugar molecules in the human body and so cannot be digested in the human body. Or: it cannot be hydrolyzed in the human body due to the lack of the enzyme cellulase capable of catalyzing the hydrolysis of cellulose.	**1**

Exercise 2 (10 points) **Fatty Acids**

Question	Expected Answer	Mark
1.1.	Fatty acids contain carbon, oxygen and hydrogen	**1**
1.2.	They raise the risk of heart disease and stroke.	**1**
1.3.	keep the skin healthy, reduce depression and anxiety**,** assist in preventing age-linked mental decline	**1**
1.4	Salmon**,** flax seeds…	**1**
2	Fatty substances $\xrightarrow{Digestion}$ fatty acids +glycerol $\xrightarrow{Cellular\ oxidation}$ $CO_2 + H_2O +$ Energy	**1**
3.1.	Hydrosoluble vitamins and liposoluble vitamins	**1**
3.2.	ii- Vitamin K iii- Vitamin D	**1**
4.1	True	**0.5**
4. 2	False. Phospholipid is a complex lipid.	**1**
5	Energy value provided by 100 g of nuts E = (10 × 4) + (5.5×3.75) + (57 × 9) = 573.625 Kcal	**1.5**

Exercise 3 (10 points) **Aspegic®**

Question	Expected Answer	Mark
1.1.	Aspegic® is used to reduce fever and to relieve pain.	**1**
1.2	Aspegic® is an antipyretic since it is used to reduce fever .	**0.5**
1.3	Side effects of Aspegic® are: stomach aches, gastritis, nose or gums bleeding	**1.5**
1.4	Overdose effects of Aspegic® Tinnitus (ringing in the ears), decreased hearing	**1**
2	Capsules, liquids, sprays, ointments, suppositories	**1.5**
3	a→ 3, b→ 1, c→ 2	**1.5**
4.1	Steroidal anti-inflammatory and non-steroidal anti-inflammatory	**1**
4.2	Aspirin is a non-steroidal anti-inflammatory	**0.5**
5	Sources of medicinal drugs: Synthesis, fermentation or microbiological culture, and extraction from animals or plants	**1.5**

Exercise 4 (10 points) **Vancomycin® 125 mg**

Question	Expected Answer	Mark
1.1.	Factors to be considered when a medication is prescribed: the type of infection, the patient's age, weight.	**1**
1.2	Vancomycin® 125 mg is used to treat certain digestive tract infections.	**1**
1.3	Vancomycin® 125 mg is a narrow spectrum antibiotic since it targets only one type of bacteria.	**1**
1.4	Side effects such as: an alteration of taste, nausea, vomiting…	**1**
2.1	Vancomycin® 125 mg can be used in the case of a bacterial infection.	**1**
2.2	Vancomycin® 125 mg is a bactericidal drug.	**1**
3.1	A bacterium that cannot be eradicated by the antibiotic.	**1**
3.2	Some resistant bacteria have the capacity to produce enzymes, which modify or break the molecules of the antibiotic, and render it inactive.	**1**
4.1	Anti-inflammatory drug reduces or eliminates inflammation.	**0.5**
4.2	Steroidal anti-inflammatory and non-steroidal anti-inflammatory.	**1**
4.3	Cortisone is a steroidal anti-inflammatory.	**0.5**