المركز التربوي للبحوث والإنماء	الهيئة الأكاديميّة المشتركة قسم: العلوم	المادة: الكيمياء – لغة إنكليزية الشهادة: الثانوية العامة الفرع: الإجتماع والإقتصاد -الآداب والإنسانيات نموذج رقم: ١ / ٢٠١٩ المدّة: ساعة واحدة

This Exam Is Composed of Two Exercises. It Is Inscribed on Two Pages, Numbered 1 and 2. Answer The Two Following Exercises:

Exercise 1 (10 points) Promoting Health Nutrition

Lipids include a broad range of fats, oils, waxes and steroids; examples of dietary lipids are cholesterol, monounsaturated, polyunsaturated, saturated and trans-fats. The primary function of dietary lipids is to serve as an energy source. In addition, they allow absorption and storage of lipid-soluble vitamins such as A, D, E and K.

Proteins have an essential role in repairing and maintaining every cell in the human body; they also supply energy. Meals containing notable amounts of lipids and proteins are numerous and typically easy to make. A meal composed of a whole large egg and half an avocado has 8 g of proteins, 9 g of carbohydrates and 19.5 g of fat. The breakdown of the lipids in this meal includes, among others, 186 mg of cholesterol, and fats of which 3.7 g saturated, 11.7 g monounsaturated and 2.8 g polyunsaturated. The energy intake of this meal is 233 calories. Therefore, the human body can be thought of as an engine that releases the energy present in the digested foods.

This energy is utilized for the mechanical work performed by the muscles, for the secretory processes and to maintain the body's structure and functions. Part of this energy is dissipated as heat; nevertheless, heat loss is controlled so as to keep body temperature within a narrow range. Unlike other engines, however, the human body, through chemical reactions, is continually breaking down (catabolizing) and building up (anabolizing) its component parts. Foods supply the nutrients essential to the manufacture of the new materials and provide energy needed for the chemical reactions involved.

Questions:

1. Referring to the text, answer the following questions:
   - **1.1.** Pick out the different forms of lipids.
   - **1.2.** State the roles of lipids in the human body.
   - **1.3.** Indicate the energy requirements of the human body.
   - **1.4.** Define the terms: anabolic and catabolic pathways.
   - **1.5.** Determine the percentage of saturated fats in the meal.
   - **1.6.** Which food in the meal contains cholesterol? Justify.
2. **Document-1** shows an excerpt from an article about some plant oils.
   - **2.1.** Specify which plant oil is considered to be the healthiest.
   - **2.2.** Indicate the physical state of coconut oil when placed in the fridge at 4°C.
3. "Vitamins are organic micronutrients essential for good health".
   - **3.1.** Explain this statement.
   - **3.2.** The livers of polar bears contain a very large amount of vitamin A. Explain why some early explorers in the arctic died from consuming too many livers.
4. **Document-2** shows the daily diet of an adolescent. Identify a diet-related disorder that may develop if this type of diet were to be continued into adulthood.
5. An experiment was conducted to investigate food spoilage: Two equal sized slices of fresh apple were placed in individual dishes for 5 hours:

Plant oil	Melting point (°C)	Boiling point (°C)
Olive	- 41	+216
Corn	-11	+232
Peanut	-2	+232
Coconut	+25	+177
«plant oils with lower melting points are healthier because they are high in unsaturated fatty acids».		

Document-1

- Corn flakes with full cream milk and sugar
- Meat pie with tomato sauce
- Banana and avocado
- Lasagna with a green salad and garlic bread
- Ice- cream with chocolate chips.

Document -2

Dish 1: One slice of apple.
Dish 2: One slice of apple dipped in lemon juice.
Choose, among the following, the result of this experiment. Justify.

a. Apple Slices in both dishes will turn brown at same time.
b. Nothing has been observed at the level of slices.
c. Apple slice in dish 1 will get brown faster than that in dish 2.

Exercise 2 (10 points) Drugs and Their Classes

Drugs are chemicals of low molecular masses that interact with macromolecular targets and produce a biological response. When this biological response is therapeutic and useful, these chemicals are called medicinal drugs and are used for diagnosis, prevention and treatment of diseases. If taken in doses higher than those recommended, they become potential poisons. Drugs can be classified mainly on the criteria outlined as follows:

(a) On the basis of pharmacological effect of the drugs. This classification provides doctors with the whole range of drugs available to treat a particular problem. For example, analgesics, antibiotics.

(b) On the basis of drug action on a particular biochemical process. For example, all antihistamines inhibit the action of histamine which causes inflammation in the body. A major breakthrough in the treatment of hyperacidity came through the discovery that histamine stimulates the secretion of pepsin and hydrochloric acid in the stomach. Antihistamines, such as Ranitidine (Zantac®) prevent the interaction of histamine with the receptors present in the stomach wall.

(c) On the basis of chemical structure of the drug. Drugs classified in this way share common structural features and often have similar pharmacological activity.

Examples of neurologically active drugs are tranquilizers and analgesics. Analgesics are classified as opioïds (addictive) and non- opioïds. Morphine Salts® are a familiar example of the first class and Aspirin® is an example of the second.

Generic name	**Brand name**	**Pharmaceutic effect**
	Zantac®	
	Aspirin®	
Morphine		
Document-1		

Questions:

1. Pick out from the text the criteria used to classify drugs.

2.1. List two commonly used antacids.

2.2. Referring to the role of Ranitidine in the text, compare its action to that of a common antacid.

3. Complete the table in document–1.

4. Document–2: shows the compositions and contra-indications of some analgesics.

4.1. Give, the different formulations of a drug.

4.2. Indicate the route of administration of each.

4.3. "Usually, your doctor will prescribe first non-opioid analgesics for moderate pain. If stronger pain medications are needed, combined analgesics are usually the second step followed by opioid analgesics for very severe pain".
Explain this statement.

Non opioïd analgesics		**Opioïd analgesics**	
Aspirin®	Paracetamol®	Codeine phosphate®	Morphine salts®
Composition Tablets: acetylsalicylic acid 300 mg Suppositories: 150 mg, 300 mg	Tablets: 500mg Oral solution: 120 mg/5 mL Suppositories: 60mg, 100 mg	Tablets: codeine phosphate, 30 mg	Tablets: morphine sulfate 10 mg Oral solution: 10 mg/5 ml Injection: 10 mg/ml, ampoule
Contra-indications -Asthma, -Allergic disease -Impaired renal or hepatic function.	-Asthma -Hepatic impairment -Renal impairment	-Renal and hepatic impairment -Dependence	-Renal and hepatic impairment. -Dependence (severe withdrawal symptoms if withdrawn abruptly).
Document-2			

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أسس التصحيح:

Part of question	Exercise 1 (10 points) Promoting Health Nutrition Expected Answers	Mark
1.1.	The forms of lipids are: fats, oils, waxes and steroids.	1
1.2.	Energy source. Allow absorption and storage of lipid-soluble vitamins.	½ ½
1.3.	For the mechanical work performed by the muscles and in the secretory processes and partly for the work necessary to maintain the body's structure and functions.	1 ½
1.4.	Anabolic : small parts build up into larger and more complex parts. Catabolic: big parts break down into smaller parts.	½ ½
1.5.	% of saturated fats= $\frac{mass\ of\ saturated\ fats}{total\ mass\ of\ fats}$x 100 = $\frac{3.7}{19.5}$x 100 = 18.97%	1
1.6.	Cholesterol is mainly provided by the egg since it is of animal origin.	¼ ¼
2.1.	Olive oil since it has the lowest boiling point (-41°C), therefore, it has the highest degree of unsaturation among the oils listed in document-1.	¼ ¼ ¼
2.2.	Solid state.	¼
3.1.	Vitamins are organic nutrients since they contain the carbon element. Micro: they are needed in small amounts by human body. Essentials nutrients: They are needed for the proper functioning of the body (regulatory) and they are not synthesized by the human body.	¼ ¼ ¼
3.2.	The livers of polar bears contain fat-soluble vitamins such as vitamin A that can be toxic since the excess accumulates in fat tissues.	¾
4.	Obesity, as the diet contains a lot of refined sugar (sugar, chocolate, ice crème, white flour, donut,…) and lipids (lasagna, ice cream, chocolate…).	¼ ¼ ¼
6.	The result is statement "c". Dish 1 will turn brown as a result of oxidation. Dish 2 will not brown as readily, as vitamin C found in lemon juice is an antioxydant.	¼ ½

Part of question	Exercise 2 (10 points) Drugs and their classes Expected Answers	Mark
1	On the basis of their pharmacological effect, the drug action on a particular biochemical process, and the chemical structure of the drug.	1 ½
2.1	Maalox Rennie	½ ½
2.2	Commonly used antacids neutralize excess acidity in the stomach, while Ranitidine prevents the interaction of histamine with the stomach wall, thus preventing secretion of pepsin and hydrochloric acid in the stomach.	½ ½ ½

<table>
<tr><td>3.</td><td></td><td colspan="3"><table>
<tr><th>Generic name</th><th>Brand name</th><th>Pharmaceutic effect</th></tr>
<tr><td>Ranitidine</td><td>Zantac®</td><td>antihistamine</td></tr>
<tr><td>Aspirin</td><td>Aspirin®</td><td>analgesic</td></tr>
<tr><td>Morphine</td><td>Morphine salt</td><td>analgesic</td></tr>
<tr><td colspan="3">Document –1</td></tr>
</table></td><td></td><td>6x(¼)</td></tr>
<tr><td>4.1</td><td colspan="4">Tablets, suppositories, oral solution, injection.</td><td>4x(¼)</td></tr>
<tr><td>4.2</td><td colspan="4">Oral way: tablets and solutions.
Rectal way: suppositories.
Intravenous way: injection.</td><td>¾
½
½</td></tr>
<tr><td>5</td><td colspan="4">Non opioid analgesics such as Aspirin and Paracetamol are used for mild to moderate pain. Codeine and Morphine salts are used for severe pain, however they might cause dependence and severe withdrawal symptoms if used abruptly.
For this reason, opioid analgesics are not frequently used, in order to avoid addiction problems.</td><td>½
½

¾</td></tr>
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