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المديرية العامة للتربية   فرع الآداب والإنسانيات
دائرة الامتحانات

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

This Exam Includes **Two Exercises**. It Is Inscribed on 2 Pages Numbered **1** & **2**.
The Use of A Non-programmable Calculator Is Allowed.

Answer The Following Two Exercises:

First Exercise (10 points)
Medicinal Plants Which Revolutionized Medicine

In a situation of growing interest for medicinal plants, some of them really revolutionized medicine by introducing very effective molecules, they did not only bring solutions to mild pain (sickness).

Aspirin or the biggest "success story"

Acetylsalicylic acid, the molecule of the most famous of the medicinal drugs: the aspirin, is synthesized from the active ingredients contained in willow and/or queen of the meadows. These plants, still used nowadays against various painful illness like rheumatics, contain salicylated derivatives. The molecule of aspirin could be obtained through some extraction techniques and acetylation.

These plants are thus the base of the largest medical success for a pharmaceutical laboratory (Bayer®) which is the creation of a molecule able to act against pain, fever and inflammation. With a low dose, acetylsalicylic acid can also act to flow blood and to limit cardiovascular diseases (infarct…).

Aspirin would even have virtues against certain forms of cancer. An extraordinary success issues from medicinal plants! **...**

CREAPHARMA. ch.   News Medicaments & Molecules 05..

Questions:

1- Name the active ingredient of aspirin.
2- Specify if aspirin is a natural medicinal drug or a synthetic one.
3- a)   Indicate three therapeutic effects of aspirin.
    b)   Mention another medicinal drug, usually known, having some therapeutic effects of aspirin.
4- For lack of aspirin and other synthetic medicinal drugs, indicate an effective way for relieving pain.
5- Give the reason of which aspirin is advised in a low dose as a preventive treatment for certain diseases.
6- Justify why aspirin is not advised for a person suffering from ulcer.
7- Aspirin is an analgesic medicinal drug; it is taken without prescription as a moderate pain reliever.
    a)   Name another analgesic used to treat severe pain.
    b)   Justify why it is forbidden to be used without prescription.

Second Exercise (10 points)
Nutritional Characteristics of the "Rice pudding"

The nutritionists classify food by groups according to the food components supplied by these groups. The table below gives two of these groups with their main components:

Group of Food	Main Food Components	
	Energetic	Non energetic
Fruits and vegetables	Simple carbohydrates	- Water - Vitamin C - Minerals
Fatty substances	- Lipids - Saturated fatty acids in fatty substances of animal origin - Unsaturated fatty acids in fatty substances of vegetable origin	- Vitamins A and D in butter - Vitamin E in oils

Document 1: two groups of food.

"Rice pudding":
   o Ingredients by person: 25 g rice, 175 g half-skimmed milk, 20 g sugar

	Proteins g/100 g	Lipids g/100 g	carbohydrates g/100 g	Calcium mg/100 g
Rice	8	0	77	0
Half-skimmed milk	3.2	1.7	4.8	120
Sugar	0	0	100	0

Document 2: nutrients of the ″Rice pudding″.

Given: 1 g of carbohydrates provides 16 kJ; 1 g of lipids provides 38 kJ and 1 g of proteins provides 17 kJ.

Questions :

1- a)   Indicate the groups of food which are covered by the " Rice pudding".
   b)   Name a group of food different from that covered by "Rice pudding" and not mentioned in document (1). Give its main food components.
2- Identify two carbohydrates which constitute the "Rice pudding".
3- Justify, referring to document 1, that vitamin C is hydrosoluble whereas vitamins A, D and E are liposoluble.
4- Specify the main difference between saturated fatty acids and unsaturated fatty acids in molecular structure.
5- Find the missing values: **a**, **b**, **c**, **d**, **e and f** in the following table:

	Quantity (g)	Proteins (g)	Lipids (g)	Carbohydrates (g)	Calcium (mg)
Rice	25	2	0	19.25	0
Half-skimmed milk	175	**a**	**b**	**c**	210
Sugar	20	0	0	**d**	0
Total	220	7.6	**e**	**f**	210

6- Calculate the energy value of the preparation of "Rice pudding" for one person.

First Exercise (10 points)
Medicinal Pants Which Revolutionized Medicine

Expected Answer	Mark	Comments
1- The active ingredient of aspirin is acetylsalicylic acid.	1	
2- Aspirin is a synthetic medicinal drug. That is justified by the following sentences: ***the aspirin,*** is synthesized …, through extraction techniques and acetylation.	1.5	
3- a) Aspirin reduces or eliminates pain (narcotic), decreases or eliminates fiver (antipyretic), reduces or eliminates inflammations of muscles or of joints (anti-inflammatory), prevents coagulation of blood…	3x0.5	
b)Paracetamol, Sedergine, Tylenol, Di-antalvic… are current medicinal drugs having some pharmaceutical effects of aspirin.	0.5	
4- Willow could be used to relieve pain in cases where synthetic medicinal drugs are absent (missing).	1	
5- Aspirin in a low dose is advised as a preventive treatment for certain diseases because aspirin act **to flow blood** and to limit cardiovascular diseases.	1.5	
6- Aspirin is not advised for the person suffering from ulcer, because aspirin that has acidic characters, increases the acidity in the stomach.	1	
7- a) Morphine is an analgesic used to treat severe pain	0.5	
b)The use of morphine leads to the risk of dependency. In the event of prolonged use, it becomes a drug.	1.5	Morphine acts on the nervous system

Second Exercise (10 points)
Nutritional Characteristics of the "Rice Pudding"

Expected Answer	Mark	Comments
1- a) "Rice pudding" cover the following two groups of food: (milk and dairy products) and (cereals and leguminous plants).	1	

b) The groups of food that are not covered by "Rice pudding" and not mentioned in document (1) are:
 * Meat, poultry and fish
   • Animal proteins
   • Lipids
   • Iron
   • Vitamins (group B)
 * Beverages
   • Water
	2x1	

		1	
• Minerals • Sugar in sweet beverages. 2- The two carbohydrates are: Sucrose and starch . 3- According to the table of document – 1, one finds that vitamin C is in the group of food " fruits and vegetables" which are mainly formed of water; this proves that vitamin (C) is hydro-soluble. Whereas vitamins A, D and E are in the group of food "fatty substances" which are mainly lipids; this proves that these three vitamins are liposoluble. 4- Carbon chains in the molecules of the saturated fatty acids contain only simple carbon-carbon bonds; while the carbon chains in the molecules of the unsaturated fatty acids contain one or more carbon-carbon double bond(s). 5- In the preparation "Rice pudding" for a person, there are: proteins: $\dfrac{25x8}{100} + \dfrac{175x3.2}{100} + 0 = 7.6$ g; lipids: $\dfrac{175x1.7}{100} = 2.975$ g carbohydrates: $\dfrac{25x77 + 175x4.8 + 20x100}{100} = 47.65$ g. Energy involved by this preparation is then: 7.6x17 + 2.975x38 + 47.65x16 = 1004.65.Kj ≈1005 kJ. **For LH**	1 2 1 3		

	Quantity (g)	Proteins (g)	Lipids (g)	carbohyd rates (g)	Calcium (mg)
Rice	25	2	0	19.25	
Skimmed half milk	175	**5.6**	**2.975**	**8.4**	210
Sweeten	20	0	0	**20**	0
TOTAL	0	7.6	**2.975**	**47.65**	210

6- Energy involved by this preparation is then:
7.6x17 + 2.975x38 + 47.65x16 = 1004.65. 1005 kJ.

6x0.25

1.5