

CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Semester 1 Examinations 2014/15

Module Title: Food and Healthcare Chemistry

Module Code: CHEM7002

School: Science and Informatics

Programme Title: B.Sc. (Honours) in Herbal science
B.Sc. (Honours) Nutrition and Health Science
B.Sc. in Food Science and Technology

Programme Code: SHERB_8_Y3
SNHSC_8_Y3
SFSTE_8_Y3

External Examiner(s): Professor Torres Sweeney
Internal Examiner(s): Germain Levieille

Instructions: Answer 4 out of these 5 proposed questions. Each question carries a equal mark weighing of 25%.
Please state clearly the questions addressed in your paper.

Duration: 2 hours

Sitting: Winter 2014

Requirements for this examination:

Note to Candidates: Please check the Programme Title and the Module Title to ensure that you have received the correct examination paper.
If in doubt please contact an Invigilator.

- Q1. a) Lipids are made of very different molecules with common properties. What is the main type of lipids found in food? (5 marks)
Give its general molecular structure (5marks)
- b) Elaborate on how the nature of the fatty acids is linked to the melting point of the fat. (5 marks)
- c) Describe the main processes used for the extraction of fat and oils and some frequently applied post-extraction refining processes. (10 marks)
- Q2. I) Write a note describing the following terms.
- a. Iodine number of a fat (3 marks)
 - b. Acid value of an oil (3 marks)
 - c. Saponification value of a fat (3 marks)
 - d. Hydrogenation of vegetable oils (3 marks)
- II) a) Discuss the concept of plasticity of a fat. (6 marks)
- b) Give a short description of the techniques that can be applied to a fat/oil to increase its plastic range. (7 marks)
- Q3. a) Describe the oxidation processes of fat and oils. (5 marks)
- b) Describe a test commonly used to access the level of oxidation of lipids in food products and ingredients. (5marks)
- c) What are the contributing factors to lipid oxidation? (5 marks)
- d) Elaborate on strategies available to minimise the impact of factors of lipid oxidation. (5marks)
- e) Develop on the action of antioxidants and illustrate with examples of commonly used antioxidants compounds. (5 marks)

- Q4. a) Give a definition of the water activity of a food product. (5 marks)
- b) Write a description of the measure of water activity. (3 marks)
- c) Why is it important to know the aw of a food product? (5 marks)
- d) Elaborate on the different types of “bonded water” and on how this is related to the water activity of the food product. (5 marks)
- e) Discuss the prevention of spoilage of food products by controlling water activity. (7 marks)
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- Q5. a) Proteins are made of chain of amino acids. Give the general chemical structure of amino acids. (3 marks)
- b) Give the semi developed equation of the creation of amide linkage (also called peptide bond) between two amino acids. (7 marks)
- c) One of the methods to measure the amount of protein in a food product is the Kjeldahl method. Describe the principle of this method and discuss its limitations. (5 marks)
- d) Protein nutritional value revolves around the concept of “protein efficiency ratio (PER)”. Describe the experimental determination of the PER. (5 marks)
- e) What is meant by “limiting amino acid” in food ingredients and discuss its consequences in nutrition? (5 marks)