

**CORK INSTITUTE OF TECHNOLOGY**  
**INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ**

**Semester 1 Examinations 2016/2017**

**Module Title: Food and Healthcare Chemistry**

**Module Code: CHEM7002**

**School: Biological Sciences**

**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): Dr. Eibhlis O'Connor**

**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 2016

**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) 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)
- Q2. I) Write a note describing of 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) 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)

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)