

CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Semester 1 Examinations 2013/14

Module Title: Food and Healthcare Chemistry

Module Code: CHEM7002

School: Biological Sciences

Programme Title: Bachelor of Science (Honours) in Herbal Science – Year 3
Bachelor of Science in Food Science & Technology – Year 3
Bachelor of Science (Honours) in Nutrition and Health Science – Year 3

Programme Code: **SHERB_8_Y3**
SFSTE_7_Y3
SNHSC_8_Y3

External Examiner(s): Prof Torres Sweeney

Internal Examiner(s): Mr 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 2013

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 principal type of lipid found in food? Give its general molecular structure. (5 marks)
- b) Elaborate on how the nature of the fatty acids impacts on the melting of fat. (5 marks)
- c) Describe the main processes used for the extraction of fat and oils. (5 marks)
- d) Describe the refining processes oil may require after extraction. (5 marks)
- e) Discuss how the chemical nature of fatty acids affects the nutritional quality of food. (5 marks)
- Q2. 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)
- Q3. a) Describe the oxidation processes of fat and oils. (8 marks)
- b) Discuss the factors promoting lipid oxidation? (5 marks)
- c) Discuss the prevention of lipid oxidation in food products. (5 marks)
- d) Discuss the role of antioxidants and illustrate with examples of common antioxidant compounds. (7 marks)
- Q4. a) Give a definition of an enzyme. (5 marks)
- b) Discuss the factors affecting the activity of enzymes. (5 marks)
- c) Sweetening syrups can be produced from corn starch. Describe the process involved to make such sweet syrups. (10 marks)
- d) Discuss the nutritional problem associated with high fructose syrups. (5 marks)

- Q5.
- a) Give a definition of the water activity of a food product? (5 marks)
 - b) Describe how water activity is measured. (3 marks)
 - c) Why is it important to know the a_w of a food product? (5 marks)
 - c) Elaborate on the different types of “bonded water” and on how this is related to the water activity of the food product. (5 marks)
 - d) Discuss the technique in the prevention of spoiling of food products by controlling water activity. (7 marks)