

CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Autumn Examinations 2014/2015

Module Title: Food and Healthcare Chemistry

Module Code: CHEM7002

School: Biological Sciences

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

Programme Code: SNHSC_8_Y3
SHERB_8_Y3
SFSTE_8_Y3

External Examiner(s): Professor Torres Sweeney

Internal Examiner(s): Germain Levieille

Instructions: Answer any 4 of the 5 questions asked. Each question carries a equal mark weighing.
Please state clearly the questions addressed in your paper.

Duration: 2 hours

Sitting: Autumn 2015

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 the semi developed chemical equation of the formation of a peptide link between two amino acids. (5 marks)
- b) Protein nutritional value can be assessed using “protein efficiency ratio (PER)”. Describe the experimental determination of the PER for a food product? (8 marks)
- c) What is meant by the term “limiting amino acid” in a food product and its consequences in nutrition? (7 marks)
- d) Discuss the concept of “complete protein”, explain this concept and its implications in Human Nutrition. (5 marks)

- Q2. A Biuret reaction experiment was conducted using BSA to obtain of standard curve and you have obtained the following results:

Conc. of BSA mg/ml	0	1	2	3	4	5	6
Abs 540nm	0	0.484	0.932	1.412	1.893	2.032	2.134

You tested the concentration of protein in a number of beers and obtain the following data:

Beer 1: Abs_{540nm}=2.625 Beer1 after dilution at 1/10: Abs_{540nm}=1.122

Beer 2: Abs_{540nm}=2.108 Beer2 after dilution at 1/10: Abs_{540nm}=0.840

Beer 3: Abs_{540nm}=1.245 Beer1 after dilution at 1/10: Abs_{540nm}=0.475

- a) From these data, draw a graphic representation of the correlation between absorbance at 540nm and concentration of BSA. (8 marks)
- b) Calculate the correlation equation and indicate its limits of linearity. (7 marks)
- c) Calculate the concentrations of proteins of these 3 beers? Detail your calculations. (10 marks)
- Q3. a) What is the main class of compounds founds in oil. Give a general semi-developed chemical representation. (7 marks)
- b) Describe the process of oxidation of lipids. (8 marks)
- c) What are the contributing factors to lipid oxidation and discuss how to prevent lipid oxidation. (10 marks)

- Q4. Prevention of spoilage is an important concern for the food industries and a key factor is the water activity of the food products.
- a) Give the definition of the water activity in a food product? (5 marks)
 - b) Indicate how water activity is measured experimentally. (5 marks)
 - c) Why is it important to know the a_w of a food product? (7 marks)
 - d) What are the main strategies used to reduce the water activity of a food product? (8 marks)
- Q5. The development of a brown colour in foods can be attributed to 3 main types of reactions. Supported by relevant examples, describe each of these three reactions and highlight their key differences. (25 marks)