

**CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ**

Autumn Examinations 2011/2012

Module Title: Food and Healthcare Chemistry

Module Code: **CHEM7002**

School: Biological Sciences

Programme Title: BSc Food Science & Technology – Year 3
 BSc (Hons) Nutrition & Health Science – Year 3

Programme Code: **SFSTE_7_Y3**
 SNHSC_8_Y3

External Examiner(s): Dr Alison Gallagher, Dr Anne Nelson
Internal Examiner(s): Mr Germain Levieille

Instructions: **Answer any 4 of the 6 questions asked.**
 Each question carries equal mark weighting.
 Please state clearly the questions addressed in your paper.

Duration: 2 hours

Sitting: Autumn 2012

Requirements for this examination:

<p>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.</p>

- Q1. a) Give a definition of an enzyme. (5 marks)
- b) Indicate the main types of enzymes that have significant importance in Food Science. Please give relevant examples. (10 marks)
- c) Corn starch can be used to produce some syrups used as sweeteners. Describe the enzymatic process leading to the two main types of corn derived sweetening syrups. (10 marks)

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

Conc. of BSA mg/ml	0	1	2	3	4	5	6
Abs 540nm	0	0.5342	1.0582	1.5925	2.1452	2.452	2.784

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

Beer 1: Abs_{540nm}=3.625 Beer1 after dilution at 1/20: Abs_{540nm}=1.342
 Beer 2: Abs_{540nm}=2.831 Beer2 after dilution at 1/20: Abs_{540nm}=0.540
 Beer 3: Abs_{540nm}=3.245 Beer1 after dilution at 1/20: Abs_{540nm}=1.175

- a) From these data, draw a graph of the correlation between absorbance at 540nm and concentration of BSA. (8 marks)
- b) Calculate the correlation equation and its limits. (7 marks)
- c) Calculate the concentrations of proteins of these beers? Detail your calculations. (10 marks)
- Q3. a) What is the main class of compounds founds in oil? Draw the typical chemical structure of these compounds. (10 marks)
- b) Describe the process of lipid oxidation. What are the contributing factors to this process and how can lipid oxidation be prevented? (15 marks)

- Q4. The development of brown colour in food can be attributed to 3 main types of reactions. Please describe them and highlight their key differences. (25 marks)
- Q5. Prevention of spoilage is an important concern for the food industries and a key factor is the water activity of the food products.
- a) Describe the water activity of a food product. (5 marks)
 - b) Explain how water activity is measured. (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)
- Q6. a) Protein nutritional value involves “protein efficiency ratio”. How can this ratio be determined experimentally for a food product? (10 marks)
- b) What do you understand by the term “complete protein” in Human nutrition? (15 marks)