

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

**Autumn Examinations 2016**

**Module Title: Food and Healthcare Chemistry**

**Module Code: CHEM7002**

**School: Biological Sciences**

**Programme Title:** BSc (Honours) in Herbal Science – Year 3  
BSc (Honours) in Nutrition and Health Science – Year 3  
BSc Food Science and Technology – Year 3

**Programme Code:** SHERB\_8\_Y3  
SNHSC\_8\_Y3  
SFSTE\_7\_Y3

**External Examiner(s): Dr. Tom O Connor**  
**Internal Examiner(s): Germain Levieille**

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

**Duration:** 2 hours

**Sitting:** Autumn 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 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 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	0.5342	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<sub>540nm</sub>=3.625      Beer1 after dilution at 1/20: Abs<sub>540nm</sub>=1.342

Beer 2: Abs<sub>540nm</sub>=2.831      Beer2 after dilution at 1/20: Abs<sub>540nm</sub>=0.540

Beer 3: Abs<sub>540nm</sub>=3.245      Beer1 after dilution at 1/20: Abs<sub>540nm</sub>=1.175

- a) From these data, draw a graph representation 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. Give a general chemical representation. (10 marks)
- b) Describe the process of oxidation of lipids. What are the contributing factors and how can we prevent lipid oxidation. (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) What is meant by water activity in food product? (5 marks)
  - b) Indicate 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 revolves “protein efficiency ratio”. How can this ratio be determined experimentally for a food product? (10 marks)
- b) Another is the concept of “complete protein”, explain this concept and its implications in Human Nutrition. (15marks)