

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

**Autumn Examinations 2012**

**Module Title: Principles of Nutrition**

**Module Code:** BIOL 7021

**School:** Biological Science

**Programme Title:** Bachelor of Science (Honours) in Herbal Science – Year 2

**Programme Code:** SHERB\_8\_Y2

**External Examiner(s):** Dr Julia Green

**Internal Examiner(s):** Dr. Helena Stack/Mr. G. Levieille

**Instructions:** Answer question 1 and two other questions.

**Duration:** 2 Hours

**Sitting:** Autumn 2012

**Requirements for this examination:**

Answer Q1 in a separate booklet

**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.

Answer question 1 and two other questions.

Answer *Q1* in a separate booklet.

**Q1.** A Bradford protein assay was conducted using BSA (Bovine Serum Albumin) as standard to obtain of standard curve and you have obtained the following results:

Conc. of BSA mg/ml	0	0.2	0.4	0.6	0.8	1.0
Abs 595nm	0	0.262	0.512	0.785	0.984	1.322

Three soya solutions were prepared with 1g of soya flour dissolved in 50ml water adjusted a three different pH (pH 3, pH6.5 and pH8 respectively). These preparations were then centrifugated to eliminate the flour insoluble residues. The three supernatants containing soluble proteins were assayed using Bradford in the same condition as the BSA standard and you obtained the following data:

Soya extract at pH3:  $\text{Abs}_{595\text{nm}}=0.550$

Soya extract at pH6.5:  $\text{Abs}_{595\text{nm}}=0.935$

Soya extract at pH8:  $\text{Abs}_{595\text{nm}}=1.250$

- Draw the standard curve for Bradford assay (BSA as standard protein). (3 marks)
- Give the equation establishing the correlation between BSA concentration and  $\text{Abs}_{595\text{nm}}$  (4 marks)
- Estimate the protein concentrations of each soya solutions using the graph. (3 marks)
- Calculate the values of these protein concentrations using the equation. (3 marks)
- Calculate the yields of extraction for each pH assuming that soya flour is 50% protein. (3 marks)
- Comment on the causes of variation of solubility of protein at different pHs. (4 marks)

**Q2.** Write a short note on each of the following:

- ATP/ADP (4 marks)
- Biological oxidation-reduction reactions (4 marks)
- Catabolism and Anabolism (4 marks)
- Gibbs free energy (4 marks)
- Glycaemic index (4 marks)

**Q3.** Write an essay on the catabolism of carbohydrates to Acetyl Co-A.

(20 marks)

**Q4.** Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair Health (WHO). Discuss using the following headings:

BMI	(2 marks)
Obesity causes	(10 marks)
Prevention and treatment	(6 marks)
Symptoms and consequences	(2 marks)