

**CORK INSTITUTE OF TECHNOLOGY  
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ**

**Semester 2 Examinations 2014/15**

**Module Title: Nutritional Analysis**

**Module Code:** BIOL7018

**School:** Science and Informatics

**Programme Title(s):** Bachelor of Science (Honours) Herbal Science – Year 2  
Bachelor of Science (Honours) Nutrition and Health Science – Year 2  
Bachelor of Science Applied Biosciences – Year 2

**Programmes Code(s):** SHERB\_8\_Y2  
SNHSC\_8\_Y2  
SBIOS\_7\_Y2

**External Examiner(s):** Prof. O Corcoran, Dr. T. O Connor

**Internal Examiner(s):** Dr. Aoife McCarthy

**Instructions:** *Section A: Short Questions:* Answer **all** questions in a separate answer book (50 marks)  
*Section B: Long Questions:* Answer **two** questions in a separate answer book (50 marks)

**Duration:** 2 hours

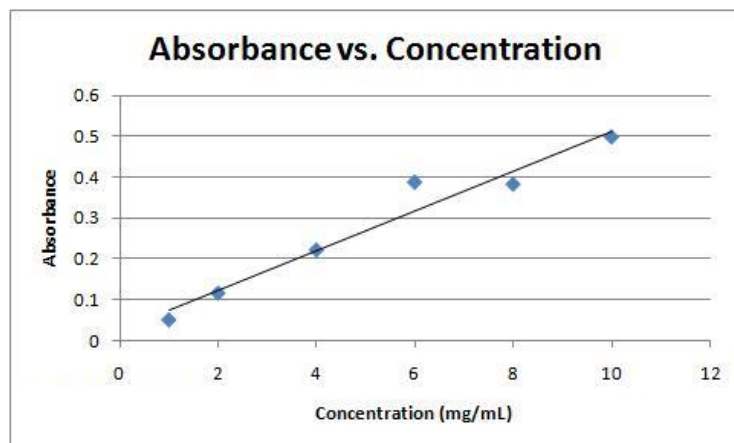
**Sitting:** Summer 2015

**Requirements for this examination:** Calculator

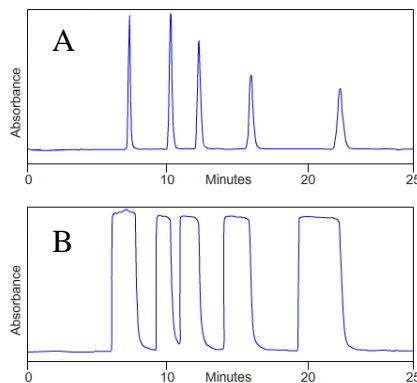
**Note to Candidates:** Please check the Programme Title and the Module Title to ensure that you have received the correct examination. If in doubt please contact an Invigilator.

**Section A: Short questions. Answer all questions in a separate answer book. [50 marks]**

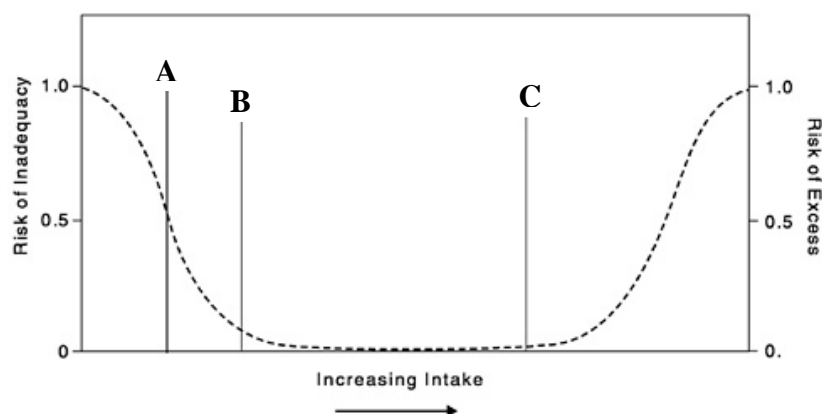
1. What is an essential nutrient? (1 mark)
2. List 2 functions of lipids in human nutrition. (2 marks)
3. Distinguish between simple and complex carbohydrates in nutrition. Include an example of each in your answer. (2 marks)
4. State the main function of the following micronutrients in health. (3 marks)
  - i. Calcium
  - ii. Zinc
  - iii. Vitamin C
  - iv. Vitamin D
  - v. Vitamin A
5. Consider the following graph of protein concentration (mg/ml) versus absorbance. (2 marks)
  - i. What is the protein concentration of a sample with absorbance of 0.5? Express your answer in  $\mu\text{g/ml}$ . Show all workings and calculations.
  - ii. What piece of laboratory equipment is required to obtain the absorbance values plotted in this graph?



6. Two concentrations of a single compound (labelled A and B) were analysed using High Performance Liquid Chromatography. Results of the experiment are shown in the figure below. Does A or B contain a higher concentration of the compound of interest? Give a reason for your answer. (2 marks)



7. Calculate the energy content of a 50g serving of a food containing 6.5g protein, 25g carbohydrate and 3g fat per 100g. Show all calculations clearly. (2 marks)
8. What is bioavailability? (1 mark)
9. Give **one** example of an enhancer and **one** example of an inhibitor of absorption. For each example state the enhancer/inhibitor **and** the nutrient whose absorption is effected by this enhancer/inhibitor. (2 marks)
10. Label the following diagram. *Note: use full, unabbreviated terminology.* (3 marks)



11. State the Acceptable Macronutrient Distribution Range (AMDR) for each macronutrient. (3 marks)
12. Pregnant women have higher RDAs for certain nutrients. List **three** such nutrients. (3 marks)

13.

- i. Use the Harris-Benedict equation for males (given below) to calculate the resting energy expenditure (REE) for Bill, a 65-year old male with weight 85kg and height 1.85m. Show all calculations clearly. (1 mark)

$\text{REE males (kcal/day)} = (\text{weight (kg)} \times 13.75) + (\text{height (cm)} \times 5.00) - (\text{age (yrs)} \times 6.76) + 66.473$
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- ii. Calculate Bill's estimated energy requirement (EER) given that Bill is sedentary. Show formula used and all calculations clearly. (2 marks)
- iii. Calculate Bill's daily protein requirement, based on his weight of 85kg. (2 marks)

14. Mary is a 54-year old female with weight 220 lb and height 175cm.

Calculate **and** classify Mary's body mass index (BMI). Show formula used and all calculations clearly. (2 marks)

15. Mary's waist circumference is 76cm and her hip circumference is 100cm.

- i. What is Mary's waist-hip ratio (WHR)? Show formula used and all calculations clearly.
- ii. Is this a healthy WHR for Mary? Give a reason for your answer. (2 marks)

16. John is a 30-year old male. His usual weight is 187 kg. In the last 2 months, John has lost 13 kg. Calculate John's percentage weight loss. Show formula used and all calculations clearly. (2 marks)

17. What anthropometric measurement can be used to measure lean tissue/body water? (1 mark)

18. Consider the following statements:

- i. "Person interviewed about their food & beverage consumption during defined period of time, usually 24 hours"
- ii. "Asks how frequently food items are consumed and indicates habitual intake"

What dietary assessment method does **each** of the above statements describe? (1 mark)

19. What technique can be used to measure basal metabolic rate (BMR) of an individual? (1 mark)

- 20.** Briefly distinguish between Marasmus and Kwashiorkor as deficiency disease states. (2 marks)
- 21.** Name one natural and one process-induced toxin in food. (2 marks)
- 22.** State two bacteria associated with food poisoning. (2 marks)
- 23.** Outline the difference between purely reductive and purely evaluative food labels. (2 marks)
- 24.** Calculate the protein efficiency ratio (PER) for a group of rats with an average initial weight of 40g, average final weight 150g and average protein intake 28g. Show formula used and all calculations clearly. (2 marks)

**Section B: Long questions. Answer two questions in a separate answer book. [50 marks]**

**Q1.** Discuss the importance of protein in nutrition under the following headings:

- Functions of protein in the human diet (14 marks)
- Recommended protein intakes for adults (3 marks)
- Consequences of protein excess (8 marks)

**Q2.** Describe and critically evaluate current methods available for analysing protein content of foods.  
(25 marks)

**Q3.** Write a detailed evaluation of the three dietary assessment methods available for analysing nutritional status.  
(25 marks)

**Q4.** “There are many factors, both external and internal, that can affect nutrient absorption.”  
Discuss the impact of the following factors on nutrient absorption:

- Food matrix
- Chemical form of nutrient
- Presence of other nutrients
- Physiological factors

(25 marks)