CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN FOOD SCIENCE AND TECHNOLOGY

FOST 242: FUNCTIONAL FOODS AND NUTRACEUTICALS

STREAMS: BSc. FOST **TIME: 2 HOURS**

DAY/DATE: MONDAY 14/04/2025 **8.30 A.M. – 10.30 A.M.**

INSTRUCTIONS:

- **The paper contains section A and B**
- **Answer all questions in section A and any two from section B**
- **Marks for each question are indicated in parenthesis ()**
- **Do not write anything on the question paper.**
- **Total marks = 70**

SECTION A: ANSWER ALL QUESTIONS (30 MARKS)

1. (a) Define the term "nutraceutical" and explain how it differs from a functional food. (2 Marks)

   (b) Explain the concept of bioavailability and its importance in the context of functional foods and nutraceuticals (4 Marks)

2. (a) Describe the role of antioxidants in preventing oxidative stress and name two examples of bioactive compounds with antioxidant properties. (4 Marks)

   (b) Describe the process of encapsulation in nutraceutical processing and explain why it is important. (4 Marks)

3. Explain the role of epigenetics in the development of chronic diseases and discuss how dietary interventions can influence epigenetic modifications. (4 Marks)
4. Explain the difference between nutrigenomics and nutrigenetics, and provide an example of how each field can be applied in personalized nutrition. (4 Marks)

5. Discuss the main types of health claims that can be made for functional foods and nutraceuticals? Provide an example of each type. (4 Marks)
6. Explain the concept of synbiotics in the development of functional foods and discuss the role and importance of postbiotics in such products. (4Marks)

SECTION B: ANSWER ANY TWO QUESTIONS (40 MARKS)

7. (a) Explain the five tenets of nutritional genomics and discuss the role of nutrients in the regulation of gene expression. (8 Marks)

   (b) Describe the process of developing a new functional food product, from the initial research phase to marketing. The functional food must contain at least three specified bioactive compounds delivering antioxidant, antihypertensive and antihypercholesterolemic properties. (12 Marks)

8. (a) Explain the role of the following bioactive compounds in human health (9 Marks)
   i. Omega-3 and omega-6 fatty acids
   ii. β-carotene
   iii. Glucosamine

   (b) Discuss the processes applied in the manufacture of nutraceuticals. (11 Marks)

9. (a) Explain the mechanisms of action of phenolic and polyphenolic compounds in enhancing human health. (10 Marks)

   (b) Discuss the regulatory challenges associated with the marketing of functional foods and nutraceuticals and how they can be addressed to ensure consumer safety and product efficacy. (10 Marks)

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