



FACULTY	AGRICULTURE, ENGINEERING AND NATURAL SCIENCES		
SCHOOL	AGRICULTURE AND FISHERIES SCIENCES		
DEPARTMENT	FOOD SCIENCE AND SYSTEMS		
SUBJECT	FOOD TOXICOLOGY		
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First Opportunity Examination

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This question paper consists of three **(3)** pages excluding this front page.

Instructions

- Section A: Compulsory
- Section B: Answer any two (2) questions

SECTION A [60]

QUESTION 1 [10]

Define the following terms

- a) Biotoxins [2]
- b) Chronic Toxicity [2]
- c) Dose-response [2]
- d) Lethal dose (LD50) [2]
- e) Xenobiotics [2]

QUESTION 2 [20]

- a) State three (3) challenges for food control authorities. [3]
- b) List two (2) heavy metals and state two (2) mechanisms that explain heavy metals impact on human health. [4]
- c) Explain the connection between green chemistry and modern toxicology. Provide one (1) example of the principle of green toxicology and one (1) for green chemistry. [3]
- d) List two (2) classes of organic solvents and provide one (1) compound example for each class. State two (2) types of toxicity they cause and list the factors affecting their impact on humans. [6]
- e) The toxicity of a substance usually depends on several factors, briefly discuss any two (2) factors with relevant one (1) example for each factor. [4]

QUESTION 3 [30]

- a) List any three (3) toxin-producing bacterial species. [3]
- b) Explain the reasons why plants produce toxins. [3]
- c) Explain the difference between food allergy and food intolerance. Give examples for each. [4]
- d) Briefly define the term "Dose" and explain with examples why it is very important in toxicology. [4]
- e) Differentiate between food infection and food intoxication. [4]
- f) Based on nanoparticle uses in food, list three (3) food applications and their functions. [6]

- g) Process-induced toxins are formed in food because of food processing/preparation. Name any two (2) toxicants that are produced during food processing and explain how they are formed. [6]

SECTION B [40]

QUESTION 1 [20]

Reliable and reproducible *in vitro* methods have the potential to yield a scientifically sound strategy to test the ever-growing list of toxic substances in food.

- a) Define *in vitro* toxicology testing. [2]
- b) Explain how you would know if an experiment were reproducible. [4]
- c) Explain the factors that are considered when it comes to developing reliable and reproducible *in vitro* toxicological test methods and discuss the main steps from development to implementation phases. [10]
- d) Mention any problems/disadvantages of *in vitro* studies. [4]

QUESTION 2 [20]

Mycotoxins can cause a variety of adverse health effects and pose a serious health threat to both humans and livestock.

- a) Define mycotoxins. [2]
- b) List any four (4) types of mycotoxins. [4]
- c) List four (4) food products that are likely to be affected by mycotoxins. [4]
- d) Name and explain the mycotoxin poisoning you are likely to get from consuming contaminated apple juice. [4]
- e) Explain how the risk of mycotoxicosis can be minimised. [6]

QUESTION 3 [20]

Biosafety levels are set by the Centre for Disease Control and Prevention (CDC). These levels are based on the agents or organisms that laboratory personnel are researching or working on.

- a) How many levels does biosafety CDC have? [4]

- b) List two infectious disease agents that can be included under biosafety level 2 (BSL-2). [2]
- c) What are the precautions to be followed at biosafety level 2? [8]
- d) State the unique characteristics of the microbes and their infections in BSL-4 and provide two (2) examples of such microbes. [6]

QUESTION 4

[20]

To develop a National Food Control Strategy (NFCS), you need to consider several processes, collection, collation, and evaluation of required information.

- a) List six (6) of the required information to develop the NFCS. [6]
- b) Explain the factors influencing the NFCS. [6]
- c) State four components that must be included in the final NFCS. [8]

END OF THE EXAMINATION