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**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)
MAIN CAMPUS**

**UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR**

**1ST YEAR, SECOND SEMESTER MAIN EXAMINATIONS
FOR THE DEGREE**

OF

PH.D. PUBLIC HEALTH NUTRITION

COURSE CODE: PHN 907

COURSE TITLE: FUNCTIONAL FOODS AND INDUSTRY

DATE: 20/04/2022

TIME: 9.00 - 12.00am

INSTRUCTIONS TO CANDIDATES

- a) This examination contains five (5) questions.
- b) Question 1 (one) is compulsory. Choose ANY other 3 (three) questions.
- c) Write all answers in the Answer Booklet provided.
- d) Write the University Registration number on each paper used.

TIME: 3Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 2 Printed Pages. Please Turn Over.

Instruction to Candidate

Answer FOUR (4) questions. Question one (1) is compulsory.

Question 1 (Compulsory)

- What are the key components of the definitions of “Functional Foods” and “Nutraceuticals”? How do these relate to ‘foods’, “Novel foods” and “Natural Health Products”? Use relevant examples to support your answer. (8 Marks)
- Explore scientifically proven beneficial effects/health benefits of functional foods using two major functional foods as examples. (7 Marks)
- What are the health benefits of omega 3 fatty acids as nutraceuticals? (5Marks)

Answer ANY Three questions

Question 2

- Identify four research opportunities in Public Health Nutrition to explore the relationship between a food, or a food component and an improved state of health and wellbeing or reduction of disease. (5 Marks)
- What do we mean by “microencapsulation” and “Nano encapsulation” in food systems? What would be the advantages of these two processes for functional foods and nutraceuticals? (5 Marks).

Question 3

- Explore the strength of the evidence to support the effect of dietary fiber (either collectively or a specific fiber) on risk reduction of two of the following: Type 2 Diabetes or Cardiovascular disease or Colorectal Cancer. Discuss also the purported mechanism of action by which this effect may be occurring. (7 Marks).
- Distinguish between probiotics, prebiotics, and synbiotics, giving one example of a food source for each to support your answer. (3 Marks)

Question 4

- Health-promoting phytochemicals commonly found in our daily food include; carotenoids, phytoestrogens, allicin, and glucosinolates amongst others. Discuss the main food sources of these chemicals in the diet, the possible mechanism of their activity, and evidence of potential health benefits and possible harmful effects. (6 Marks)
- What is meant by bio accessibility and bioavailability in functional foods? (2 Marks)
- What factors influence the parameters in question (b) above and how could they be improved? (2 Marks)

Question 5

You have observed that people you know who eat a lot of fruits and vegetables seem to have a lower rate of cancer compared to people you know who eat a lot of red meat. As a budding nutrition scientist, you are keen to test out this hypothesis but realize that starting with a human clinical trial is very expensive and not feasible as a first step. Instead, you decide to start with a combination of cell culture and animal studies to build your case. Based on concepts and models/theories discussed in class, briefly outline the design of 1 cell culture study and 1 animal study to test your observation. For each study, be sure to identify the specific research question being tested, and provide your rationale/or explanation for why you made the choices you did. (10 Marks)